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A Dialogue on Design

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INTERVIEW

A DIALOGUE ON DESIGN

*William A. McDonough**

*Michael Allan Wolf:*** Much of your career has been an effort to create substantive prototypes for the oft-praised ideals of sustainability¹—such as the development of the Hannover Principles² and the work at DesignTex³—and environmental design—for example, the Heinz Family offices in Pittsburgh⁴ and

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1. Sustainability is defined as “meet[ing] the needs and aspirations of the present without compromising the planet to sustain an equally supportive future.” WILLIAM McDONOUGH PARTNERS, THE HANNOVER PRINCIPLES—DESIGN FOR SUSTAINABILITY 3 (1995) (on file with the *University of Richmond Law Review*). See Appendix, *infra*.

2. THE HANNOVER PRINCIPLES—DESIGN FOR SUSTAINABILITY, although officially presented at the 1992 World Urban Forum of the Earth Summit in Brazil, was commissioned by Hannover, Germany, host of the 2000 World’s Fair. The purpose of the Hannover Principles is to develop design principles consistent with the theme of the World’s Fair: “Humanity, Nature and Technology.” William McDonough Partners proposed the Hannover Principles as “principles to inform the international design community of the issues inherent in the consideration of sustainable design, rather than provide an ecological checklist for construction.” *Id.* at *author’s note*.

3. “DesignTex as a corporation is committed to an ongoing examination of our products[—textiles—]in light of their impact to the environment.” Thomas Hamilton, Introduction to DESIGNTEX, THE WILLIAM McDONOUGH COLLECTION (1995) (on file with the *University of Richmond Law Review*). “McDonough . . . [has] been able to select textile dyes which are most compatible with the environment.” *Id.* at 29; see John Pierson, *Special Table Legs Cleverly Hide Numerous Office Wires*, WALL ST. J., June 16, 1995, at B5.

4. The Heinz Family Foundation, a proponent of environmentally responsible architecture, had their penthouse in the CNG Tower in Pittsburgh transformed into an

the Wal-Mart in Lawrence, Kansas.⁵ While innovation and creativity engender their own rewards (professional, financial, and spiritual), in legal terms, designers at the edge raise the standard of what it means to be reasonable and prudent in your profession. What role, if any, should this reality play in the decision-making process of those similarly inclined to push the design envelope?

McDonough: I think there are two fundamental issues involved here. One is an ethical one: If one knows something could be potentially better, should the designer not pursue that improvement, rather than take a purely negative position that because the next step might be actually dangerous one should be avoid taking it? The creative will and spirit really do need to be allowed to play at the edge of progress. We need to allow that instinct some freedom; otherwise we won't be able to really enjoy the true fruits of prosperity that we speak about.

The second issue is the professional one: The biggest problem faced by professional organizations that develop codes setting performance standards is the reversal of the essential creative interest. When professionals say, "I've met the code," what they are really saying is, "If I could do worse, I would, but they won't allow me." The attitude that views the code as a minimum (and that wishes it were lower) is most pernicious. The

"elegant loft filled with daylight and outside air." To create an environmentally friendly office as well as a verisimilitude of the outdoors, design features included a plant-filled solarium, private offices with offset walls and large clerestories, eight rooftop skylights, an individual thermostat in each office, and a system delivering outside air to each office. Furthermore, furnituremakers were selected from the members of the Woodworkers Alliance for Rainforest Protection, carpets were selected for minimum off-gassing and laid with water-based adhesives, and all-natural plasters were used. See Bradford McKee, *Sustainable Design*, ARCHITECTURE, July 1995, at 61; see also Harry Stoffer, *Teresa Heinz, A Woman on A Mission*, PITT. POST-GAZETTE, Nov. 7, 1993, at A1.

5. A Wal-Mart advisory committee led by Hillary Rodham Clinton sought to build a Wal-Mart that uses less energy through resource conservation, and that has improved indoor air quality. This Wal-Mart has a "low-energy system that relies on skylights with electronic daylight sensors on the roof that can dim or brighten fluorescent lights according to how much light is coming from outside." Additionally, the waste and runoff water is used to irrigate the landscape, and there is an on-site recycling center. See Bob Ortega, *Wal-Mart Store Comes in Colors, But is All Green*, WALL ST. J., June 11, 1993, at B1.

code is simply a guide to how humans in this point in history have determined the minimum standard, effectively trying to realize a negative vision: we are actually trying to kill each other and we have to put the brakes on at some point. These are all negative signals.

My work is about trying to set positive signals. It's not about how we wish we could do less; it's more about how we wish we could do more with less, and in that sense, it is quite a positive signal.

Wolf: You do, however, run into the problem of negligence when you push that envelope. Innovative architects, for example, set a new standard to which everybody else would be held, given the way we interpret negligence law.⁶

McDonough: That's how we advance our civilization. If anything, I'd say I would be proud of any professional organization that is willing to advance its standards on that basis. Negligence clocks start in various ways. A judge or jury might be looking at an issue of a specific moment in time, asking, "Did your profession consider this to be a standard or was this information known to the general public in such a way you should have incorporated it?" This question also involves the level of professionalism of the person himself when we say, for example, "A person with your experience should have know better." I guess it is this sort of wish for collective amnesia that we are trying to counter. We are saying that if you are not paying attention to indoor air quality information that is coming across the transom, for example, then in a sense you are negligent because these things really do matter. If I've started some negligence clocks, then I am delighted to hear them ticking.

The other exciting part of this, though, is that it is not about negligence; it's more about the idea that we can progress with care in a world while being motivated not by the concept of guilt but by the concept of productive advance. That is the key

6. See generally W. PAGE KEETON ET AL., PROSSER AND KEETON ON TORTS §§ 28-45 (5th ed. 1984).

thing. You mentioned some projects, several of which are offices, such as the Environmental Defense Fund building in New York City, which, in the early 1980s was the first office in the city to look at the issue of indoor air quality.⁷ When we started the inquiry, what we discovered about materials and their off-gassing was terrifying. When we went to the industries and asked questions such as, "Why is this paint off-gassing all of these dangerous organic compounds?" and "Are you aware of these determined negative health effects?" their answer was, "The information is proprietary and it's legal, so don't worry about it." It was astonishing.

For us, it wasn't a question of the legal; it was a question of the ethical. Because we're designers we see design as the first signal of human intention; and, it appears that the intention behind some of this activity was to have the lowest possible standards and to kill people within some legalized range of speed, rather than trying to advance our state-of-the-art at all times. I even got calls at that time from professional organizations in my industry asking me to stop talking about these issues in public because I was starting negligence clocks by being on the front page of the *Wall Street Journal*.⁸ This experience has led us to the conception that, because design is the first signal of human intention, it is highly positive activity, not a reaction based on guilt. For attorneys, especially, it is an exciting notion that we could be designing a regulatory matrix that enhances creativity in a positive direction, using carrots rather than sticks. As anyone who has ever been to the circus knows, the sticks are important because they get everyone's attention, but it's the carrots in the end that will fundamentally change the playing field.

Wolf: Let's talk about those sticks for a moment. The areas of property law in general and land-use regulation in particular are often perceived by planning, architecture, and land development professionals to be stifling and restrictive.⁹ Indeed, there

7. See Rose Gutfield, *Will Poland Plant a Forest to Satisfy a U.S. Architect?*, *WALL ST. J.*, Oct. 23, 1989, at A1.

8. See *id.*

9. See, e.g., CHARLES M. HAAR & MICHAEL ALLAN WOLF, *LAND-USE PLANNING*,

is an active and growing movement to restrict regulations that have a negative effect on real property values.¹⁰ Based on your experience, what would you say are the chief ways in which the laws regarding the use and enjoyment of property are enervating?

McDonough: From a design perspective, there are two fundamental characteristics of current property regulations. One is that in the search for fairness, we oftentimes create a uniform pattern to mitigate the notion that we would otherwise have to develop diverse customized responses. The interesting thing is that that is not what the landscape looks like. The land is not uniform, as culture is not uniform in the development of patterns. In an idealized world, we would be able to respond to natural energy flows, to locale, to culture, to history, to material technologies that make sense, and so on. Because we're not necessarily embodying diverse values in our codes in this sense, it is very hard for regulation to become particularly responsive to a site.

The other troubling aspect of property regulation is that it seeks often to follow the lowest common denominator rather than a higher standard, reflecting the patterns already understood by advanced professionals to be moribund and sub-optimal. The freedom to explore new approaches that are site-specific in a way that's profitable for one and all is really the main challenge here. From a design perspective, the excitement for me is to see that the techniques that we'll need to use, the shifts that will address these two questions, is the rendering visible of various alternatives. Let's look at how we can create institutional venues that allow property owners, for example, to examine the alternatives that would produce the most prosperous solution to everyone, based on a diversity of opportunities related to sites specifically situated in culture. We have already seen this on a localized level, when we compare the Planned Unit Development¹¹ to its sprawl alternative. We can do that on a much larger, regional scale. We can also start to examine

363-370 (4th ed. 1989).

10. *See, e.g., id.*

11. *See id.* at 279-283.

multiplier effects, to make internalities of externalities, to look, for example, for job creation and at effects on transit patterns, to start really to model the cost of infrastructure to communities. We can then start to develop cost models that are much more productive. Then the design itself can start to draw some new visions where people can come together and understand how to create more value rather than less. It doesn't get seen as a *taking*,¹² it gets seen as a *giving* within a much richer context.

Wolf: Is it your perception that the public decision-makers would have the resources to implement and oversee these more "holistic" proposals? Don't you see a problem in that the public decision-makers, particularly on a local level, might not have the resources necessary to analyze accurately these interrelated planning visions?

McDonough: That's why I think the models are so important. I think one of the powerful ways I can communicate my thinking is to render prototypes because then I have this rather elegant statement at the tip of my tongue: "It exists, therefore it is possible." I think that as we start to see the models of an empowered community working through its own issues and developing its own way of measuring progress, if we can share those models and people view them as a resource to be tapped into, we are going to see a burgeoning that is quite revolutionary. We're going to see examples of this soon on the Web; within a year is my guess. We will have community development tools available and we will start saying, "Put your information here and start modeling it."¹³

What we'll see is whether community leaders will be given tools that have the new set of values embodied within the tool. Right now the leading professional design cadre, the profession-

12. See generally HAAR & WOLF, *supra* note 9 (discussing eminent domain, just compensation, regulatory takings, and inverse condemnation)*.

13. See, e.g., Michael Allan Wolf, *EZ Project* (visited Jan. 27, 1997) <<http://www.urich.edu/~ezproj>> (providing Internet resource on Enterprise Zones, Empowerment Zones, and Enterprise Communities).

als that communities would hire to assist them in formulating a new vision, typically ended their education twenty years ago. There is no significant continuing education among design professionals. I know that in architecture it's minimal. For those architects who left school twenty years ago or more, the word "ecology" never showed up on their radar screen when they were in school. The same is true of "forestry." What we're going to see is that forward-looking community leaders are going to be ahead of the professionals because what the former are recognizing is that the present systems don't work.

The current crop of professional counselors is at this point pursuing a strategy of tragedy. As Jaime Lerner would say, "The minute you project the tragedy, you have the tragedy."¹⁴ The professionals awake to find that we're going to be paving over our community or that we're going to have to sprawl and that the cost in getting the services to the people or of getting the children to school are just untenable, not to mention the costs of infrastructure. Systems that are now forty-five and fifty years old have to be rebuilt. There is a strange irony here—the professionals who are projecting this tragedy now have a vested interest in seeing that the tragedy actually happens so that they can be proved correct.

Once we recognize the poverty of the strategy of tragedy, the only intelligent response is to design a strategy of change. That's where I live. I live in the world of determining what is the strategy of change that is necessary to solve these design problems. It is the job of creative people to start to model alternatives so that people have something they can check out,

14. Jaime Lerner, an architect by trade, is the governor of the farmbelt state of Parana, former mayor of Parana's capital city Curitiba, and founder of the urban planning thinktank, The Jaime Lerner Institute. Jaime Lerner garnered an international reputation for creating simple, environmentally sound and successful solutions to Curitiba's urban problems, and combatting the "tragedy syndrome." See *Urban Renewal: Let Them Eat Cake*, THE GUARDIAN, June 5, 1996, at 5. ("People try to sell you complexity, they see the destiny of the city as tragedy, but if you're pessimistic about cities then you are pessimistic about human beings.") (quoting Jaime Lerner). Jaime Lerner had residents planting trees, convinced the poor to recycle by providing free fruit, and increased the percentage of commuters using the bus system to 75%. See *Home Remedies are Best*, ECONOMIST, April 17, 1993, at 45; see also Mario Osavo, *Habitat-Latin America: "A City For Everyone,"* THE INTER-PRESS SERVICE, June 12, 1996.

whose tires they can kick. We see our work as problem-solving and we would like to have it recognized as such.

Wolf: One of your prototypes in the area of environmental planning concerns the work you are doing with the city of Chattanooga.¹⁵ Was the invitation to do the work attributable to the positive reception your other work has received, to community-based assessments, to an enlightened set of professional planners, or perhaps to a forward-thinking local government? Was there something structural about Chattanooga's planning decision-making or, was this the happy coincidence of certain personalities, or the generally perceived nature of the tragedy that the city was facing?

McDonough: I think it was really a spectacular combination of everything, but the fundamental part of it lies at the end of your last question. Remember that I was invited to Chattanooga in the 1980s. Things were already underway, conversations were engaged, people had been at work since the late 1960s. Chattanooga had had, as they characterized it, a civic heart attack, the result of an addiction to the first industrial revolution. Some communities have to hit bottom before it dawns on their leaders that these are not small problems and that fundamental change is required in order for survival to be contemplated. Here's a case of a city in which drivers had to have their headlights on at noon because of the particulate matter in the air, where businesspeople took extra shirts to the office if they had a meeting. The fact that we would actually allow that condition to exist and consider it normal is astonishing. It was not until Chattanooga, not Los Angeles, was cited as having the worst air in America¹⁶ that there was a wide realization that the problem had to be fixed and that they had to fix it by themselves, not on EPA's orders. That's the spirit that started the creative enterprise that involved a lot of communication among members of the community, industrial leaders, and civic

15. See Robert Frenay, *Chattanooga Turnaround*, AUDUBON, January 1996, at 82.

16. See Jeff Woods, Regional News, UPI, Jan. 11, 1983, available in LEXIS, News Library, ARCNWS file.

leaders because they simply realized that they had to adopt a strategy of change. That's why Chattanooga is such a wonderful model.

I proposed something called "zero-emissions zoning"¹⁷ that is being vigorously debated. It's been a thrilling thing because the first people to come out in favor of this concept were from Dupont. The chairman of Dupont went to Chattanooga and announced that the intention of the entire corporation was to become a zero-emissions company.¹⁸ This is not a marginal concept in terms of land use; all of a sudden, it means that we can start to address brownfields, start to replace transportation jobs, and start to restore cities. Regulation is the first signal of the failure of design, it seems to me. It says that we haven't figured out how to do something safely, so now we have to figure out to regulate it. I'm much more interested in a design agenda that says, "Don't create the problem, don't need the regulation." Eliminate regulations for all time, not just for this generation, and not just so that this generation can pollute and kill, but so that all generations can be free of that kind of what Jefferson would probably characterize as intergenerational, remote tyranny.

Wolf: Those are certainly the thoughts of someone who has found regulation or law to be enervating. Have you ever found the contrary to be true, that is, that the law and its institutions have been invigorating?

McDonough: I think that a lot of regulation has been invigorating. For example, the President's Council on Sustainable Development learned that there was no such thing as uniform sustainable development;¹⁹ they discovered instead that, to para-

17. See Paul Nealy, *A Lofty Goal Set at Zero*, CHATTANOOGA TIMES, Aug. 12, 1995, at B1.

18. See *id.*

19. The goal of sustainable development is "to meet the needs of the present without compromising the ability of future generations to meet their own needs." THE COMMISSION ON ENVIRONMENT AND DEVELOPMENT (THE BRUNDTLAND COMM'N), OUR COMMON FUTURE 43 (1987). Recently, the President's Council on Sustainable Development noted that "[e]ven if technological progress reduces the rate at which the

phrase Tip O'Neal, "all sustainability is local."²⁰ The other thing that this highly diverse group (included in the group are ten major corporate CEOs, environmentalists, cabinet officials, and representatives of labor and civil rights organizations) discovered that was also quite astonishing was that the regulatory framework of America and the amount of regulation in industry as they presently stood were acceptable.²¹ Imagine that—these are major political and business leaders telling the Congress not to decimate environmental regulation. Instead, they were saying that Congress should leave existing restrictions in place because they are known quantities and allow all of us to start designing our way out of needing regulations at all. That was a magnificent statement that ended up on the front page of the *New York Times*.²²

The Council arrived at this position after vigorous debate, during which industry representatives asserted that growth was imperative as the economic engine of our culture and the environmentalists countered by saying growth that creates environmental degradation is disastrous. Eventually, the Council members discovered that they did have complete consensus because a woman in San Francisco who had heard the debate made a simple, yet profound point: She noted that the debate was not about whether to grow or not to grow. Instead, the question involves distinguishing between those things that we wish to grow, such as prosperity, health, literacy, clean water, and those that we wish not to grow, such as poverty, destitution, indigence, and ignorance.²³ As soon as that idea crossed the threshold of the President's Council, the consensus was reached almost instantaneously. Can you imagine sitting there saying, "I wish to grow toxins, pollution, crime, destitution, illiteracy?"

United States uses resources and generates waste on a per capita basis, population growth will make the objective of sustainable development more difficult." PRESIDENT'S COUNCIL ON SUSTAINABLE DEVELOPMENT, *SUSTAINABLE AMERICA: A NEW CONSENSUS FOR PROSPERITY, OPPORTUNITY, AND A HEALTHY ENVIRONMENT FOR THE FUTURE* 142-45 (1996).

20. TIP O'NEILL & GARY HYMEL, *ALL POLITICS IS LOCAL, AND OTHER RULES OF THE GAME* xv (1994).

21. See John H. Cushman, Jr., *Adversaries Back the Current Rules Curbing Pollution*, N.Y. TIMES, Feb. 12, 1996, at A1.

22. See *id.*

23. See *id.*

We can now take that message into our communities and ask, "Do you wish to grow a certain amount of asphalt, to grow the separation of families from their cultures, to grow the costs of infrastructure, to grow air pollution and traffic, to grow the export of capital from your community to Saudi Arabia for fuel, to grow the amount of pesticides that are polluting your water?" Too often, these are the kinds of results you get when you start growth under the present conditions. We need to dissect the debate over growth into its constituent parts—positives and negatives—in a coherent way.

Wolf: You noted in *Design, Ecology, Ethics and the Making of Things*,²⁴ your sermon at the Cathedral of St. John the Divine, that when you first came to the United States after a childhood in the Far East you were "taken aback when I realized that we were not people with lives in America, but consumers with lifestyles. I wanted to ask someone: when did America stop having people with lives."²⁵ What questions did you want to ask when you found yourself relocated to Virginia, onto Mr. Jefferson's campus?

McDonough: I discovered something fundamental, and it was that the greatness of the United States resides in the fundamental design assignment that you can see inherent in the Declaration of Independence. That, to me, was revolutionary. We all love being Americans, I think. This culture does represent an opportunity of diversity and freedom that is really been inspiring to the planet.

I look at the Declaration of Independence as a design and I believe that Mr. Jefferson did, too. Remember that on his tombstone, Jefferson referred only to the things he designed—the Declaration of Independence, the Statute of Religious Freedom,

24. William McDonough, *Design, Ecology, Ethics and the Making of Things*, Sermon at the Cathedral of St. John the Divine (February 7, 1993), in WILLIAM McDONOUGH PARTNERS—SELECTED ARTICLES (on file with the *University of Richmond Law Review*).

25. *Id.* at 3.

and the University of Virginia.²⁶ In fact, he even designed the tombstone. These are the things he left behind, not his activities, but his legacies, his designs. And what is the underlying design assignment of the Declaration? It is as simple as "design a system of social relationship that calls for life, liberty, and the pursuit of happiness, free from remote tyranny." In Jefferson's case, remote tyranny might have been George III, but the message is basically about sustainability. Jefferson was saying to the monarch in England, "You can't manage us here because you don't understand what we need and your demands on us are untenable. You don't understand our needs and our situations. This remote tyranny makes us unable to pursue life, liberty and happiness under these conditions."

Today, we are looking again at issues of sustainability in the context of what I call the Declarations of Interdependence. Today, our nemesis is intergenerational remote tyranny. When we leave a persistently toxified planet, that is a remote tyranny on future generations. Indeed, Jefferson himself, in his *Notes on the State of Virginia*,²⁷ the country's first biodiversity catalog, recorded where the Commonwealth's trout were located. Unfortunately, many of the places where Jefferson found trout no longer have trout. The Blue Ridge has rivers and streams that are death to trout now, thanks to acid rain.²⁸ It is no longer a question of what are we leaving behind for future generations; the question is what are we not leaving behind. In the Blue Ridge, what we're leaving behind is an acidified stream; what we're not leaving behind is trout. That is the intergenerational version of remote tyranny,

I think Mr. Jefferson would be railing against that tyranny if he were with us today. To this American, who arrived in Charlottesville to take up a small part of the mission that Mr. Jefferson left for us, this is a problem that demands a revolutionary response. The great part for me is that I get to walk around Mr. Jefferson's grounds talking about the next industri-

26. DUMAS MALONE, *JEFFERSON AND HIS TIME: THE SAGE OF MONTICELLO* 499 (1981).

27. THOMAS JEFFERSON, *NOTES ON THE STATE OF VIRGINIA* (William Peden ed., Univ. of N.C. Press 1981) (1781).

28. See Diana L. Weigman et al., *Guidelines for Liming Acidified Streams and Rivers* (visited Nov. 4, 1996) <<http://www.ext.vt.edu/docdb/natres/natres-43>>.

al revolution, the next design revolution. In Virginia, we can talk about revolution and people don't consider it untraditional. To me, that makes Mr. Jefferson's home a very powerful platform.

APPENDIX

THE HANNOVER PRINCIPLES

1. *Insist on rights of humanity and nature to co-exist* in a healthy, supportive, diverse and sustainable condition.

2. *Recognize interdependence.* The elements of human design interact with and depend upon the natural world, with broad and diverse implications at every scale. Expand design considerations to recognize even distant effects.

3. *Respect relationships between spirit and matter.* Consider all aspects of human settlement including community, dwelling, industry and trade in terms of existing and evolving connections between spiritual and material consciousness.

4. *Accept responsibility for the consequences of design decisions* upon human well-being, the viability of natural systems and their right to co-exist.

5. *Create safe objects of long-term value.* Do not burden future generations with requirements for maintenance or vigilant administration of potential danger due to the careless creation of products, processes or standards.

6. *Eliminate the concept of waste.* Evaluate and optimize the full life-cycle of products and processes to approach the state of natural systems in which there is no waste.

7. *Rely on natural energy flows.* Human designs should, like the living world, derive their creative forces from perpetual solar income. Incorporate this energy efficiently and safely for responsible use.

8. *Understand the limitations of design.* No human creation lasts forever and design does not solve all problems. Those who create and plan should practice humility in the face of nature.

Treat nature as a model and mentor, not as an inconvenience to be evaded or controlled.

9. *Seek constant improvement by the sharing of knowledge.* Encourage direct and open communication between colleagues, patrons, manufacturers and users to link long term sustainable considerations with ethical responsibility, and re-establish the integral relationship between natural processes and human activity.

The Hannover Principles should be seen as a living document committed to the transformation and growth in the understanding of our interdependence with nature, so that they may adapt as our knowledge of the world evolves.

GUIDELINES

The Hannover Principles are a set of maxims that encourage the design professions to take sustainability into consideration. They are descriptive of a way of thinking, not prescriptions or requirements. The guidelines below demonstrate the City of Hannover's intention to apply these principles as elements of the overall design competitions associated with EXPO 2000. They take the form of a framework, based on the enduring elements of Earth, Air, Fire, Water, and Spirit, in which design decisions may be reviewed and evaluated. The guidelines offer critical instruction on the responsibility of designers.

It is hoped that those who enter the competitions will bring to their task uncommon ability, skill and care, assuring that their creative acts will be able to blend aesthetic concerns with ecological principles and provide a new inspiration for the challenge of design. In this way, design becomes a didactic tool to demonstrate that sustainable thinking can be put into practice in the real world.

ELEMENTS

The five elements provided a structure for the ancient world. The world can still be perceived along these lines, and they are presented here as an outline to frame the primary concerns of the environmental program for the EXPO site.

Earth

In design, the earth is both the context and the material. For the EXPO site a balance must be struck between context and material which provides a meaningful and livable diversity of scale. A full range of experience from the "urban" to the "wild" is essential to the landscape within which human culture evolves.

Design solutions should benefit flora and fauna as much as humans, upon the notion that natural processes take care of themselves best when left alone. The overall sense of community, linking humanity and nature, should be enhanced. A premium value should be placed on unbuilt space, particularly existing undeveloped lands. Re-use and expansion of the existing fabric may offer alternatives to new construction that will preserve the natural landscape.

New construction, when necessary, should be seen as an extension of the present built fabric, not as independent, self-contained development. Building materials need to be considered for their broadest range of effects, from emotive to practical, within a global and local context. Local production should be stressed, along with approaches that emphasize the regional, cultural, and historical uniqueness of the place. Designers should consider the interaction and implementation of diverse materials within local climate and culture in a meaningful and productive way. They are encouraged to consider the use of indigenous materials and the practical and effective utilization of modern technology, including advanced glazing, energy efficient fixtures and appliances, and nontoxic water treatment systems.

All materials used must be considered in the following terms:

- Buildings should be designed to be flexible enough to accommodate many human purposes, including living, working or craft, allowing the materials to remain in place while serving different needs. After the EXPO, the use of the site will change. Design should include alternatives for how the site can be adapted to post-fair requirements.

- Materials should be considered in light of their sustainability; their process of extraction, manufacture, transformation and degradation through proper resource management and biodiversity on a global and local scale. All materials should be considered in terms of their embodied energy and characteristics of toxicity, potential off-gassing, finish and maintenance requirements.

- Products used shall not be tested on animals.

- Recyclability and recycling of materials is essential. But recycled materials should not be encouraged if they are the result of a product designed for disposability. Provision should be made for the disassembly and re-use of all products by the manufacturer if necessary. The recyclability of an entire structure must be considered in the event that the building fails to be adaptable to future human needs.

- Materials should be chosen to minimize hazardous chemicals.

- Solid waste left after maximal avoidance must be dealt with in a nontoxic manner. In nature, waste equals food. The aim is to eliminate any waste which cannot be shown to be part of a naturally sustainable cycle.

- Life-cycle analysis of all materials and processes is important. (Life-cycle assessment is a process in which the energy use and environmental impact of the entire life cycle of the product, process, or activity is catalogued and analyzed, encompassing extraction and processing of raw materials, manufacturing, transportation and maintenance, recycling, and return to the environment.[])

- The design should qualify the environmental and economic costs such that the benefit of the project in relation to expense is understood in both the short and long terms.

Air

The air is the element whose degradation we can sense most immediately. When the air is bad, all can feel it. Local atmospheric pollution may have global consequences, so the overall design must not contribute to further atmospheric denigration

of any kind. Designs must be evaluated in terms of their atmospheric effects, including those on ozone depletion and global warming. Alteration of the microclimate is equally significant. Any possibility for the design to counter-balance or contribute to remediation of existing environmental damage should be explored.

- Air pollution implications of all design systems will be considered in the evaluation of designs. General air quality issues should also be considered to insure that no off-site or on-site air pollution results from the design.

- Wind patterns in all seasons should be evaluated for both detrimental and beneficial effects on site configuration.

- Noise pollution should be accounted for and minimized.

- Building design must accommodate ventilation systems suitable to the issues of air quality. This may involve strategies which show concern for dangerous outdoor air conditions as well as efficient indoor air exchange.

- Natural ventilation patterns must be considered at every scale from the urban to the domestic as an alternative to artificial climate control.

- The health effects from indoor air quality problems must be considered during the design process.

Fire

Fire is the most dramatic symbol of the human ability to harness natural energy. Energy is required to achieve comfort and convenience and to transform materials to useful effect. Designers are encouraged to instill their designs with the ability to operate based on on-site renewable energy sources, insofar as is possible, without reliance on fossil fuels or remote electrical generation. It is possible, given technologies and materials available today, to create buildings which maintain comfort levels passively without fossil fuels. This should be considered a minimum condition of energy design.

- The design should be aware of its interaction with renewable natural energy flows. Solar energy should be evaluated in terms of its efficiency and its enjoyment by inhabitants and

visitors throughout the annual cycle. This implies an understanding of solar access and care for proper screening and shading techniques.

- Possibilities for on-site energy production must be considered, and accommodations should be incorporated into design.

- Buildings should, wherever possible, be net exporters of energy.

- Water heating shall be from renewable resources and be efficiently incorporated into the design.

- Transportation requirements will be considered in terms of their impact on overall energy consumption. Pedestrians and bicyclists should have priority. Mass transit should be efficient and available, and private automobile use should be discouraged. Allowances for automobiles should be carefully considered for their present and future implications with regard to energy use, urban planning and social effect. Auto services should anticipate alternative fuel strategies.

- The relationship of the design and the power grid should be considered. Minimum impact on energy demand from the grid is a goal, as well as the value of decentralized energy sources.

- The energy "embodied" in the building materials can have a significant impact on the energy consumption of the project. Embodied energy refers to all the energy necessary to extract, refine, transform and utilize the materials.

Water

Water is the most basic element of life on the planet--it will be celebrated as a fundamental life-giving resource. Opportunities to create understanding and enjoyment of water will be encouraged throughout the design of buildings, infrastructure and landscapes. Elements which celebrate the profound value of this resource on both material and spiritual levels deserve serious consideration. Designs will recognize the communal, cultural, historical, spiritual and poetic possibilities of the use of water and its central role as a precondition for life.

- Water use must be carefully accounted for throughout the entire design process.

- Water sources must be protected from contamination and careful consideration given to efficiency techniques at every step.

- Potable water consumption should only be used for life-sustaining functions.

- Water from aquifers, rain water, surface run-off water, gray water, and any water use for sewage transport or processing systems should all be considered within a cyclical concept.

- Waste water must be returned to the earth in a beneficial manner. Organic treatment systems should be considered.

- No ground water contamination should result from any use of water resources related to the construction or operation of any of the project's facilities.

- Design shall consider rainwater and surface run-off water as a possible resource for inhabitants and in building systems.

- Design should minimize impermeable ground cover.

- Gray water can be treated and applied to practical or natural purposes suitable to its characteristics.

- Water use in any process related activity shall be put into recirculation, and toxic chemicals or heavy metals should be minimized. All discharges of process-related water shall meet drinking water standards.

- Water, if used for sewage treatment or transportation, shall be restored to drinking water standards prior to distribution or re-use.

Spirit

This most ineffable of elements is also the most human. Concern for sustainability is more than a matter of compliance with industrial regulation or environmental impact analysis. It embraces a commitment to conceive of the work of design as part of a wider context in time and place. The design for EXPO 2000 must embody the form of the theme "Humanity, Nature and Technology," illustrating and fostering the sense of place essential to any human experience of the meaning of sustainability. To present the message of the value of all life

and the rightful human place as a part of this, people must be able to experience the feeling of belonging to the earth firsthand. Living in sustainable architecture is nothing less than an appeal to accept our place in the world, mediated between human and natural purposes.

The presence of the element of spirit ensures that design will be seen as only part of the solution, never the whole. Building on the principle of humility, the design philosophy here should realize its inherent limitations in trying to plan and direct both human and natural processes. Design may encourage a sense of permanence and community, but it cannot legislate it. Similarly, no assumed laws of nature can be the only criteria for evaluating a design. The solution must present an aesthetic statement which sets up human society as a conduit toward the further understanding of nature, not as an affront or an enemy to it.

One of the most prevalent arguments against holding EXPO 2000 in Hannover is the fear that the impact of the expected 50 million visitors might degrade the city and its environs. At the same time, it is essential that the principles of sustainability to which Hannover has committed itself could be articulated in such a way that they reach some of the billions of the earth's inhabitants who will have no opportunity to reach the site at all. Therefore, designers are encouraged to consider approaches to decentralizing the fair, such that the plan could incorporate pavilions or centers in other countries, scattered across the globe, that might be linked by electronic means such as "tele-presence" communications technology. It may then be possible for the wisdom of thousands of encouraged "sustainable" solutions and examples to be shared and enjoyed among the world's people in a "sustainable world's fair".

The philosophy behind these guidelines is to point those who partake in EXPO 2000 in the direction of greater concern and conception of the enduring human place in nature.

