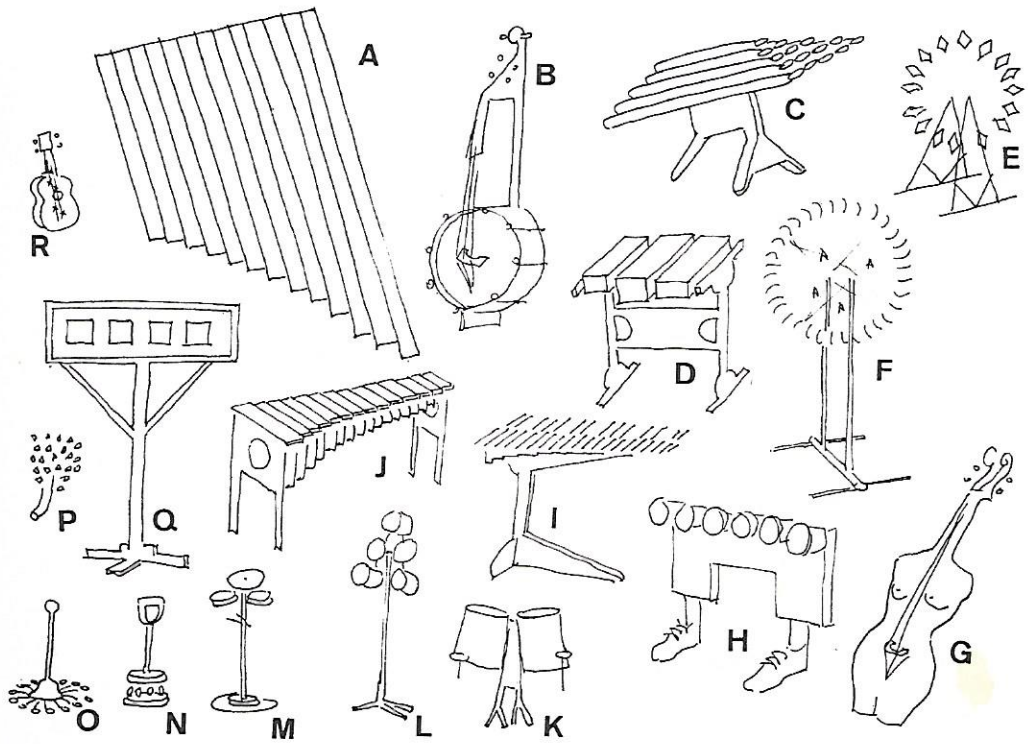
A R C H I T E C T U R E

CALIFORNIA



ARCHITECTURE
CALIFORNIA

Volume 17 Number 1 May 1995

Other Than Architecture

etcetera

Building Ecology Is My Destiny

Hal Levin

If architectural education is about problem solving, then I lucked out. Because now I am working on the biggest design problem yet: Building Ecology!

My two years designing schools in rural Colombia as a Peace Corps Volunteer architect helped expand my horizons beyond my narrow Oregon and California upbringing and the middle-class design problems posed at Wurster Hall, UCB. Given $300 budgets for one room schools with teachers' living quarters, I learned to design with nature and a lot of volunteer community organized labor. Climates that close to the equator vary with the altitude. The eighteen school sites ranged from sea level tropical rain forest to 10,000 foot high plain—hot and steamy to cold and dry. Passive heating and cooling as well as daylighting were the only options. These schools were energy efficient by necessity, forcing me to learn what later became a valuable asset, design with climate.

After the Peace Corps I was determined to continue my work in community development and social change. I pursued social housing—farmworker, Native American, self-help, owner-builder, Model Cities—mostly dependent on the Federal government for subsidies. I became disenchanted with these programs as I learned they often helped those most who needed the help least, and those least who needed it most. I consulted on the sites and services approach to squatter settlements around Mexico City with British housing guru John Turner, and to people who were designing or building their own homes, empowering people by putting them in charge of the important decisions. I was seeking anything that seemed socially meaningful.

In the mid-70s, when I moved to the Santa Cruz Mountains to learn to build so that I could give competent advice to others, I ran into code barriers to environmentally-sensible building. Everything that made sense was illegal: the use of recycled building materials including lumber, windows, plumbing, and electric fixtures; wastewater disposal in greywater systems; human waste disposal in compost toilets; and low voltage direct current wiring for power from wind generators and solar photovoltaic panels.

As I began to fight the authorities around the code issues, I was launched into leadership of a local group advocating building code reform. I chaired a County committee to advise the Board of Supervisors, and I practised what I had preached by showing that I could build myself an energy efficient, passive solar, 1,200 sq. ft. house for $13,000 using recycled windows from a military base, used plumbing fixtures, recycled lumber, and a variety of other dollar- and environment-conserving materials. After building a handful of houses and remodelling a couple of others while taking on a consultant role for people who wanted to do it themselves, I pursued ways to make a wider impact.

When Governor Jerry Brown appointed me to the State Board of Architectural Examiners, frequent meetings in airport hotels reminded me of how terribly uninhabitable—how unhealthy—much of what our licensees designed really was. Our mandate was to protect public health, safety, and welfare. It was clear to me that most

architects didn't have a clue as to what their buildings were doing to the occupants health.

When I began to research environmental health issues, I discovered that nearly everything I found offensive in modern institutional building environments was potentially hazardous to occupants health. I was given an advance copy of *The Healthy House*, a self-published book by the late Ken Kern, owner-builder advisor supreme. He had discovered lots of potential health hazards in housing—indoor air pollutants, electromagnetic fields, noise, certain kinds of light or its absence, and a host of others. I was fascinated. I began my own intensive research, reading scientific journal articles, contacting Federal and state government researchers, and talking to experts I encountered.

At this same time, in the summer of 1978, I began working at the research center at the College of Environmental Design at UC Berkeley and teaching in the Department of Architecture. It was an excellent context for me to dig further into the problems of indoor pollution, and I did. What I couldn't understand became the syllabus for my self-education in environmental and health science.

Several things became clear. Building analysis was static. Separate aspects of a building were treated as whole problems rather than as integrated parts of a larger system. Environmental problems in buildings resulted from a lack of coordination by the architects of all the increasingly specialized disciplines and consultants involved in making buildings. A pattern lead me to understand that buildings, their occupants, and the larger environment formed a system that was interdependent. To describe the systematic study of these relationships, I borrowed from ecology and systems theory to articulate the concept of "building ecology" in *Progressive Architecture* in 1981.

I became an indoor air quality expert, although my interests and concerns continued to be much broader. I have remained concerned about all the physical, social, and psychological factors that affect building occupants health, comfort, and well-being.

When the Steering Group of the AIA's new Committee on the Environment, assembled by Bob Berkebile to implement the Critical Planet Rescue Resolution from the 1990 AIA Convention, failed to win significant support beyond Susan Maxman's presidency, many of us turned to participating in charettes for clients expressing interest in sustainable design. Solar energy, energy conservation, daylighting, recycled materials, no CFCs, waste water treatment on site, and a number of other so-called "sustainable design" strategies were implemented, as much as possible into every design project. But there was no rationale basis for choosing one strategy over another, other than the clients willingness and budget.

Still, knowledge of the harmful impacts of human activity on the global environment has increased significantly in recent years. Concern about potentially disastrous impacts on the balance of planetary processes that affect all forms of life, including humans, has become manifest in rapidly growing expressions of public awareness and concern. As a result, governments, corporations, and individuals have been increasingly adopting new goals and behaviors to slow the environmental degradation from human activity. Noteworthy examples are the energy conservation efforts that were born during the oil supply crises of the 1970s and more recent efforts to phase out the use of stratospheric ozone-depleting compounds used for refrigeration, aerosol propellants, and pesticides, among others.

Architects and their clients have increasingly attempted to improve the

environmental performance of building projects. The terms "sustainable design," "green building," and others have been applied to this growing tendency to practice environmentally-responsible design. To a great extent, the practice has consisted of the application of a litany of established methods, such as energy and water conservation, recycling of waste products, incorporation of used materials into new building products. These practices are being adopted increasingly by designers. Standards and guidelines are even being developed to inform these practices.

However, there is a total lack of any comprehensive assessment of building impacts on the environment. There is a lack of any analysis by designers of the relative environmental impacts of the various components of the "sustainable" building design, operation, and use practices that they employ. As a result, decisions are made among alternatives without benefit of any fundamental analysis of the outcomes. There is currently no way to prioritize environmentally protective or benign design alternatives when they may conflict or to choose from among harmful ones.

I am now working on an EPA research project, the goal of which is to characterize (describe and quantify) the overall environmental impacts of buildings on the environment, in order to inform actions related to planning, design, construction, use, and disposal or reuse of buildings.

The global warming, water pollution, air pollution, resource consumption, ozone depletion, habitat destruction, and other environmental impacts of buildings are being quantified in order to assess their relative magnitudes. This will allow determination of the significance of building contribution to the overall environmental hazard. A scoring system will then allow comparison of the degree of harm contributed by various phases of a building's life cycle. This information together with a rating or scoring of the relative seriousness of the environmental degradation will allow a ranking of the importance of the various environmental impacts created by building design, construction, use, and disposal (or reuse). The scoring system will require the development of specific assignable values to environmental harm, including biological, social, ethical, and moral considerations.

The ultimate outcome of the project will be an analytical framework, tools, and data that will "translate" various general properties of a building and its materials and equipment into an environmental impact score. This score will enable designers to assess alternatives on-line in real time as they investigate various implications of design alternatives, and seek to achieve sustainable design.

True sustainability, however, means establishing a planetary system that can continue indefinitely. This means closed-loop systems of resources, equity among the haves and the have-nots, and a major shift in the efficiency of our resource consumption. Many believe that, while significant changes are required in order to accomplish this, we can maintain a European standard of living in a sustainable world. But the synthetic problem solving I learned through architectural education, seasoned by years of research and experimentation, leads me to embrace an inevitable fact: energy and resource consumption must be cut drastically. And this can only be accomplished if efficiencies are increased commensurately. This will require a new mode of living unlike anything we know. In the end we must do this, or planetary environmental changes such as global warming, ozone depletion, and scarce resources will change our living patterns for us, perhaps more than we can tolerate as a species.