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TRADITIONAL DESIGN IN THE AGE OF CLIMATE CHANGE

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In Response

A discussion of traditional architecture in the face of climate change yields myriad yet related perspectives.

BY KILEY JACQUES

Traditional design often inherently results in sustainable design. This New England house was designed by Albert, Righter & Tittman. Photo by Robert Benson.

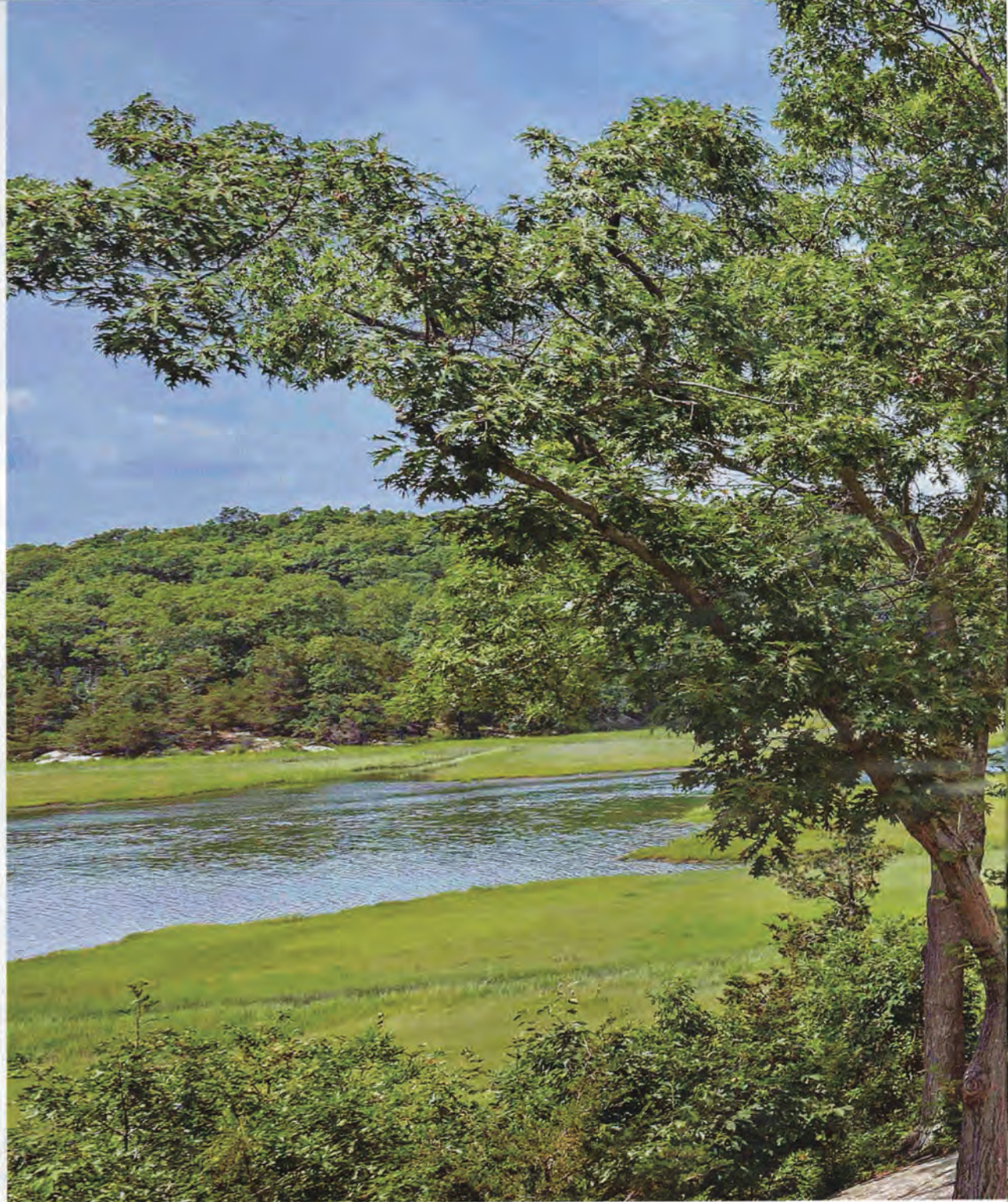
Architects and designers around the globe are constructing buildings that mitigate their impact on our increasingly vulnerable natural environment. The role played by traditional architecture is significant. Classical design principles, when applied with an eye toward sustainability, result in energy savings; high thermal performance; minimal waste; durability, the possibility of replication; and effective, low-tech, aesthetically pleasing buildings. What's called for is thoughtful consideration of the forms, systems, and materials that support both human habitation and the surrounding environs. In fact, it's been said that architectural design based on environmental preservation is the *only* option for maintaining quality of life and preventing environmental damage.

Climactic changes have already affected buildings—and we can assume they will continue to do so. A rise in average ambient temperature, for example, compromises habitant comfort and increases energy consumption, forcing design plans to adapt. Building morphology, solar access, and design and construction of the thermal enclosure are the principal features considered when laying out sustainable design strategies—considerations for which include: sun shading of windows, high thermal mass, high thermal mass night flushed, direct evaporative cooling, natural ventilation for cooling internal heat gain, passive solar direct-gain low mass, and passive solar direct-gain high mass.

In response to our increasingly sensitive environment, architects today and in generations to come must think in terms of climate, history, and culture, and then design accordingly. Among those doing so is Rafe Churchill. His “New Farmhouse,” a Palladio and Bulfinch Award-winning net-zero house in Connecticut, is a solid example of traditional-meets-sustainable design. “There’s a lot going on in the new farmhouse basement,” notes the architect, referring to the complex mechanical systems in place to support the 4,500-square-foot home. The simplicity of the architecture, however, makes the new construction look like it has been standing for centuries. “Most people think the owners renovated an old house.”

The one thing that indicates something green is going on is the 10-kilowatt solar array on the roof, which generates enough electricity to support the house. “I would say the one element people are more accustomed to seeing is solar [panels],” says Churchill, suggesting that there are cases when sustainable design elements, though visible, do not detract from traditional architecture. “Looking at the European model...you can have a house that is much older than any American farmhouse, and it can still be covered in solar panels...and it looks great, and is strangely comforting in some way. It kind of says: ‘This old house is ready to go or it’s up to speed or it’s all systems go.’” He also sees solar paneling as indicative of someone who is “doing the whole thing.” If there are panels, it is reasonable to assume they are practicing sustainability on many levels.

With every project, Churchill’s primary focus is durability. “The most important thing we are going after in our projects is the quality of construction,” he says, adding that poorly executed work does not support sustainability. “If you want to have a sustainable building and industry as a whole, you need to have skilled carpenters and trades persons on each



project...I think the most important piece of this program is typically overlooked.”

In terms of environmental footprint, Churchill feels many houses that qualify as sustainable are bigger than they need to be. Smaller houses are simply more energy efficient. He believes the most successful projects are less than 3,000 square feet in size. “After that, it is about windows and insulation. If you can get all those things going, you are well on your way.”

Looking at traditional architecture in the age of climate change, Churchill says: “I don’t think you have to give up on it,” though he notes many projects that fall into the sustainable category are more contemporary in design, referencing mid-century modern work. “That’s fine, but I do think that people get confused and think that sustainable building has to be of its own unique style, whereas you can build a farmhouse and have it satisfy all these requirements.” If anything, he feels traditional designs lend themselves more readily to regulating heating and cooling systems because they feature corner rooms that have windows designed for cross ventilation, as well as reasonable ceiling heights and clapboard

siding, which make “a lot more sense” in terms of maintenance and durability.

Traditional design elements that consistently pose challenges in terms of sustainable design? Windows. “Double-hung windows are a preference, nearly a requirement for our projects, and they are inherently not as tight as a casement and awning window,” he notes, adding he would prefer to do a glazing with three glass layers (most double-hung windows are double-glazed, whereas the casements and awnings are triple-glazed). “A double-hung window is only as tight as the racks and the weather stripping, and they must be secured tightly, which is sometimes hard to accomplish given their design,” he explains. “We have struggled with that. There is no doubt it kind of gets in the way.”

Conversely, traditional design principles that lend themselves easily to sustainable design include the footprint. Take, for instance, the rectangular Colonial: “These structures are very easy to build. You can locate the boilers and furnaces centrally.” With more contemporary designs, on the other hand, there may be more of a linear footprint, which is not as energy efficient. Simple floor plans enable



J. B. Clancy of Albert, Righter & Tittman suggests a roof with deep overhangs will protect the building longer—the design becomes part of the solution. Photo by Robert Benson.

highly effective heating and cooling, cross ventilation, and insulation systems. “The way houses are built today is not that different than the way they were built 150 years ago—that says a lot for the process. It worked very well then and it works pretty well now.”

Historic restoration is a valid means for marrying traditional and sustainable principles. “If people are really concerned about climate change,” notes Churchill, “they should be looking for an old house.” As climate change is influenced by development, it makes sense to control its sprawl. “There are ways to live without having a negative impact on the environment. Your home is one of them,” he says, noting that people often view the economy in terms of housing development, seeing new construction as a positive sign. “It’s not necessarily a good thing. Do we really need to build more houses? Maybe what needs to change is the way people are living.”

Churchill recognizes that sustainability requirements for building are changing, but he feels that with solid windows, tight insulation, and a builder who is willing to “insert a few new steps,” even the U. S. Green Building Council’s Leadership in Energy and Environmental Design (LEED) certification is

possible. Those added steps might include the ductwork, which needs to be sealed with a masking rather than tape; a better sealed building envelope; and ventilation details, which need special addressing. “It’s not that complicated and it’s pretty easy to do,” he asserts.

Foreseeing the building industry will change in response to shifting code requirements, Churchill notes how codes have always influenced design. “With changes in industry code and industry standards and clients’ expectations, there is no doubt that the details of these houses will be influenced. There is certainly the risk of historically accurate details changing and not being able to be included because of new strategies for more efficient houses,” he acknowledges. Historical accuracy may give way to the “streamlining” of things. Roof and trim details, for example, may become more minimized.

“I would say that is where our struggle is: We want to be referencing historic details, [but] can we still do it? What is it going to be in the future? There’s going to be a compromise, but I don’t think design will be compromised *that* much. I think we will have trouble with windows and doors in the future—

that’s a lot...because you touch them every day,” he says, lamenting an unborn generation that will never know the sound of a screen door closing or a double-hung window opening on a pulley.

TRADITIONAL AND SUSTAINABLE

“It’s been interesting to watch how the conversation has evolved over the last 10 years,” says J. B. Clancy of Boston-based Albert, Righter & Tittman Architects. “At one time, people were saying buildings can be part of the solution, can help solve the problems—we can make buildings that consume less energy and resources, will have less impact on the larger picture, and be part of the solution to lower emissions.” Now, he sees the conversation as one focused on what buildings need to do to adapt to climate change, and suggests there are two questions to be asked: Can buildings be part of the solution for averting catastrophic climate change by reducing their energy consumption? And how will buildings change in the future as the climate changes—how will they respond to that?

Considering the relationship between traditional architecture and energy consumption, Clancy makes



the point that before mechanical heating and cooling systems, the building was the primary climate control system. Looking at traditional architecture before the advent of fossil fuels, he notes, “the building itself was doing all the work.” Pre-fossil fuel consumption, a building in a hot climate, for instance, relied solely on materials, orientation, and features like deep long porches to stay cool. Likewise, in a colder climate like New England, a house might be turned so the larger façade faced the sun, with the roof orientated toward the north. Once fuel could be burned to produce heat, however, building shapes and materials changed.

For example, the simple rectangular plan of a salt-box house, which arranged everything around a central chimney, could now be more complex in design. Clancy sees the Victorian house as a response to this

newfound creative freedom in terms of the configuration of spaces; radiator systems meant water could be moved throughout the house, deeming orientation around the chimney unnecessary. “That freed up where things could go,” he explains. Additionally, much of the ornamentation on houses was made in factories, which meant a Queen Anne-style house might be built anywhere; materials could be shipped around the country with the dawn of railways—a fossil fuel-based transportation system. In short, the harnessing of energy allowed architecture to respond in new ways.

Coming back to buildings as part of the solution to address climate change, Clancy agrees with the notion that traditional forms of architecture support simple, sustainable design. Traditional features like porches and overhangs, for example, lend themselves

nicely to sustainability. “The roof is the best way to protect a building from the elements. A building with deep overhangs will be protected longer and require less maintenance, which equates to durability—a major component of sustainable design.

Clancy sees a strong correlation between location and low-energy consumption designs. “There is a relationship between a low-energy building—or a building that responds to its climate—and traditional design because a lot of traditional designs were developed in the pre-fossil fuel era,” he explains. “So a lot of elements they have, such as ways of bringing light in or keeping heat in or keeping light or heat out—those things were very specific to the climates they were developed in.” Given that, many traditional design principles are still appropriate today.

“If I were trying to make a low-energy building,”



LEFT: Rafe Churchill designed this house with a 10-kilowatt solar array on the roof—just one visible element of sustainable design.

RIGHT: The new house is a net-zero design. Photos by John Gruen.



he says, “I would use a very simple shape because the complexity of the shape causes challenges.” He believes the simple box shape of a Greek Revival house, for instance, though highly ornamented, can be done inexpensively and sustainably if the details are thoughtfully considered. Furthermore, because LEED certification looks at things like materials and systems, achieving it does not need to impact the look of a building.

Albert, Richter & Tittman Architects’ Habitat Passive House—a certified-passive Habitat for Humanity house in Vermont—is a shining example of sustainable and traditional design principles harmoniously at work. The 1,350-square-foot three-bedroom home was built to the German passivity standard, which focuses on the amount of energy the building consumes. According to Clancy, they relied

on heavy insulation, passive solar orientation, and a very tight envelope (the primary control system) to achieve their goals. The modest farmhouse design does not make evident its sustainable elements. “Nobody driving by would say, ‘Oh, look at the new green machine that was just built.’”

Clancy sees today’s architects looking at what can be done with buildings themselves to achieve sustainability energy goals. Like Churchill, he imagines the focus turning toward where and how people live, as well as how they move about and where things are located. He predicts an even more targeted look at cities and denser living environments.

His firm was part of a post-Hurricane Irene study in Vermont conducted to determine ways of replacing the housing (mostly trailers) that was wiped out. Their energy analysis looked at single-family homes

as well as some attached units; through the energy modeling process it was determined that combining units automatically reduces energy consumption because the overall surface-to-volume ratio is much more efficient. “As we are looking toward meeting some of these energy goals, we can create a very efficient single-family house but we could also take five of those and put them together and it would be even more efficient,” Clancy explains. “And if those five units were located next to services that people could walk to, or use infrastructure that already exists, that makes it even more efficient.” None of this, he feels, needs to jeopardize traditional design. “Those very dense urban neighborhoods are the most traditional,” he points out. Energy-saving, compact future developments will be traditional in the sense, too, that they won’t rely on fossil fuels.