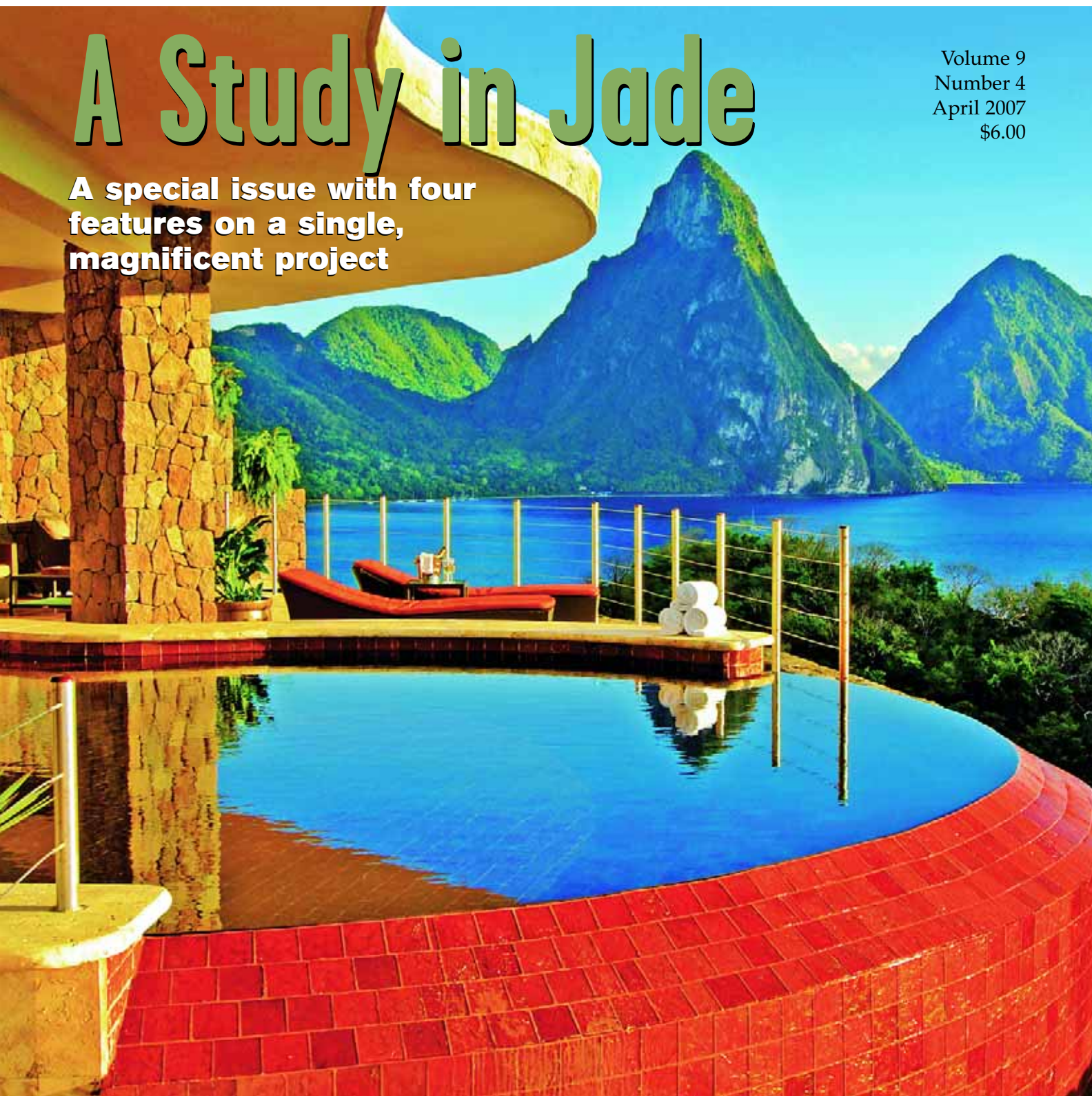
Inside: Brian Van Bower on 'Green' Options

WaterShapes

Design • Engineering • Construction



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Number 4
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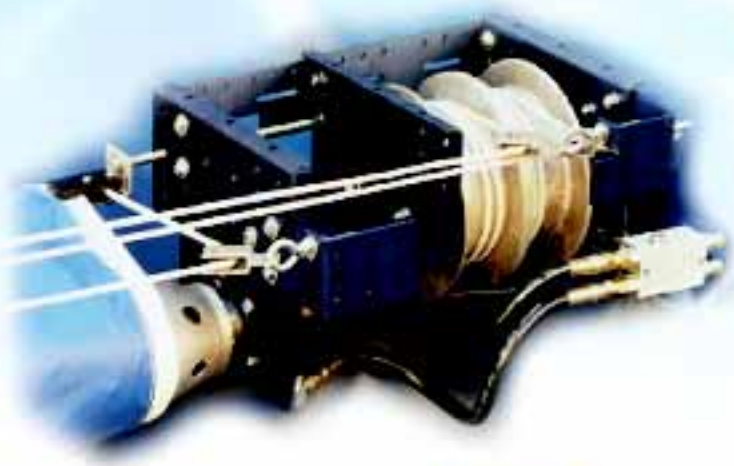

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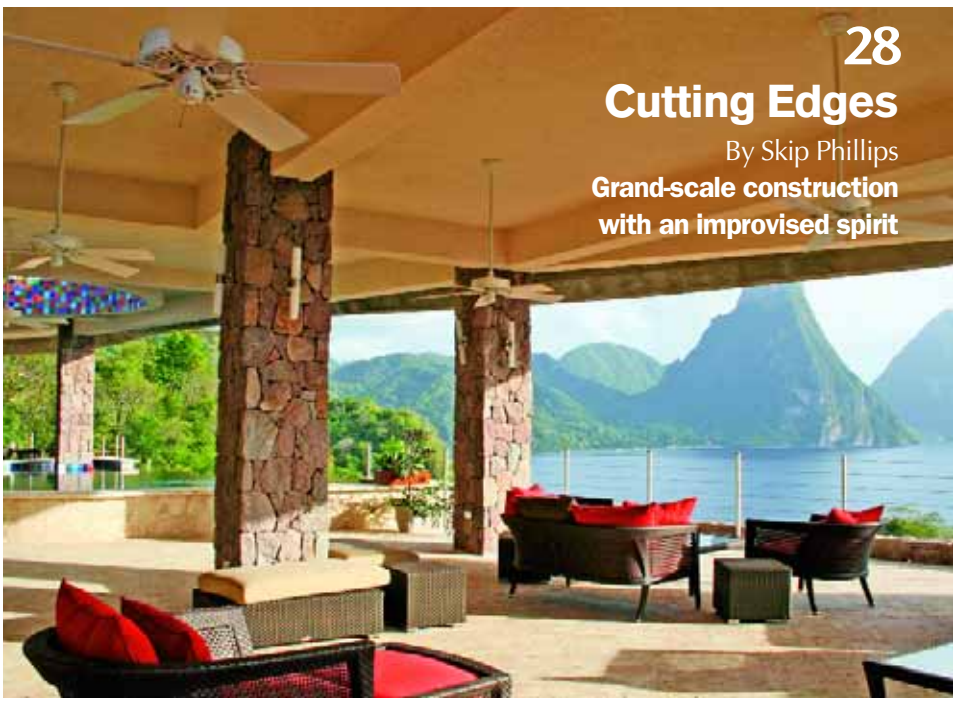

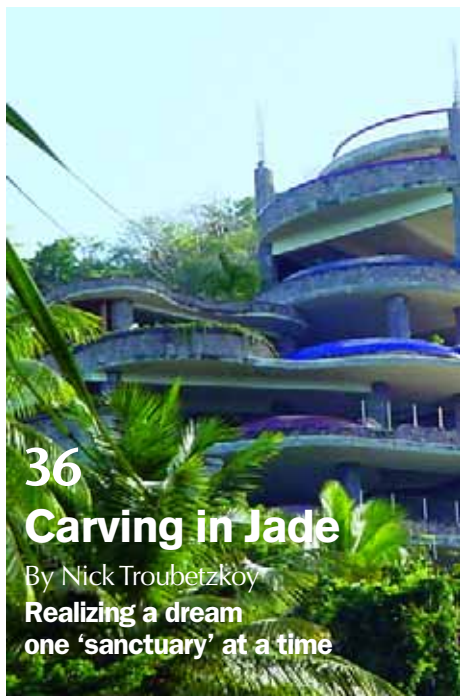

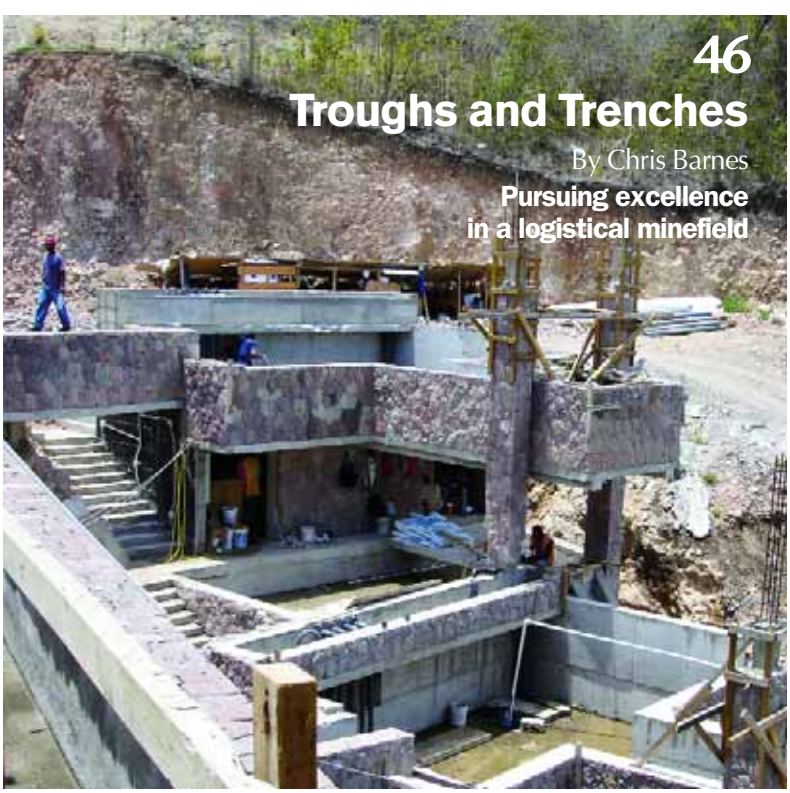

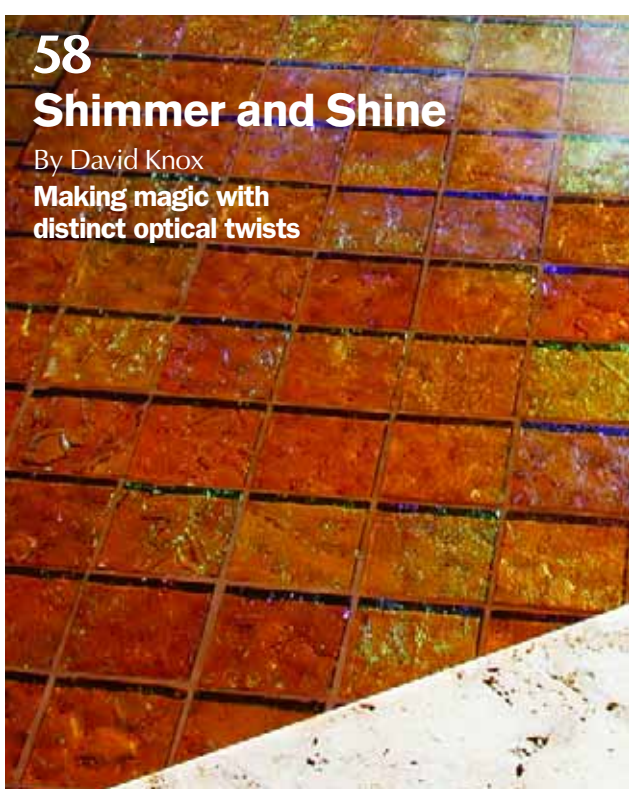

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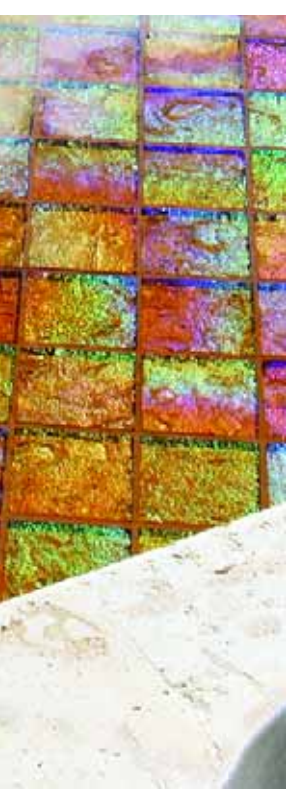

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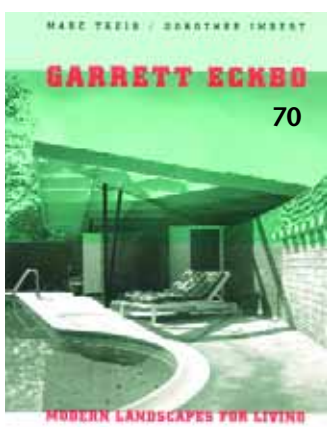

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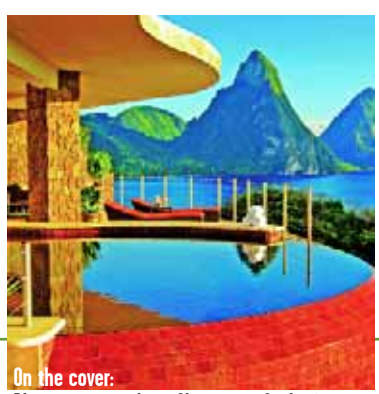

Photo courtesy Anse Chastanet, St. Lucia.

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By Eric Herman

Witnessing a Vision

You hold in your hands an entirely unique issue of *WaterShapes* – distinct in that all four of the feature articles are about a single project called Jade Mountain.

Time will tell, of course, but Jade Mountain may turn out to be one of the grandest expressions of "watershaping" in our lifetimes (or anyone else's, for that matter). It is at the very least a work of vision and artistry that must be shared and seen to be believed.

Set on the Caribbean island of St. Lucia, the project is the brainchild of architect/owner Nick Troubetzkoy, a man who has devoted years of creativity and resources to development of an inspiring, transcendent resort/vacation experience on the very highest level. It can loosely be termed a work of organic architecture and water, but that sells it short: This is a work of almost unimaginable scope, unlimited depth and nearly visceral execution.

I was there in December 2006 for four days and experienced some of what the place is all about. The rooms, which are called "sanctuaries," each have their own vanishing-edge pools, their own color schemes and their own architectural flavors. All of them are open to views of the ocean, the rainforest and the island's rugged volcanic landscape, occupying spaces imbued with air, light and a sense of profound sculptural beauty.

As our contributing authors note, there are no televisions, no clocks and no phones, and at least one of each sanctuary's walls is gone, leaving each room open to the sea air. The privacy is complete, but there's always a sense of connection to the greater environment and the spectacular surroundings.

And everywhere you turn, there is water – flowing, reflecting, weaving its way through the space. And no two of the 25 in-room pools are alike: Each has its own color and shape and offers guests a unique perspective on its role in their experience.

It is, at root, an environment defined by, integrated with and dramatically enhanced by a medium in which every watershaper works – but in this case, the work has been performed on a scale well beyond ordinary reckoning. Indeed, Jade Mountain often feels like a single, massive watershape: The water is not an adjunct to the place; rather, it's at the very heart of the experience, inseparable from it.

There are four articles in this package: To start, longtime *WaterShapes* contributor Skip Phillips discusses the basic design challenges and solutions, followed by Troubetzkoy, who defines his overarching vision. Then you'll see and read of the experiences of watershaper and hydraulics expert Chris Barnes, who actually managed the installation of the pool systems. Finally, tile designer and manufacturer David Knox explains the nature of the material he developed exclusively for this project, one color and piece at a time.

Enjoy this special issue of *WaterShapes*: We think you'll be as inspired as we were by this opportunity to dig deep and sort through all the layers of a truly gargantuan, endlessly fascinating project.

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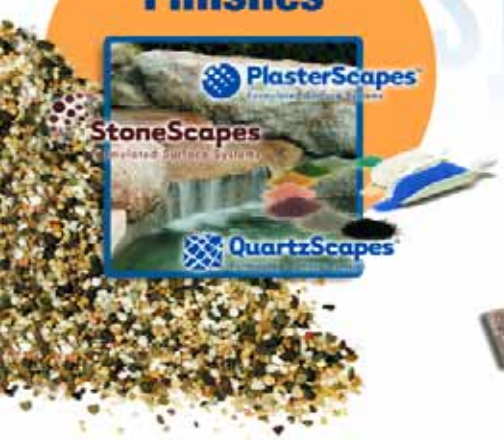

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April's Writers

Skip Phillips is president of Questar Pools, a high-end swimming pool design-and-build firm based in Escondido, Calif. He started his business in 1975 as a service/supply/repair operation, moving quickly into renovations and new construction. Now a veteran designer and builder of high-end, custom swimming pools, Phillips has won more than 100 local, national and international design awards. His reputation is tied closely to hillside pools featuring vanishing-edge designs; he is one of only two U.S. instructors currently teaching classes on vanishing-edge pools and has written and participated in numerous magazine articles on the subject. Phillips is a past president of the National Spa & Pool Institute and is a co-founder of the Genesis 3 Design Group.

Nick Troubetzkoy is owner of Jade Mountain and Anse Chastanet, two high-end resorts located on the Caribbean island of St. Lucia. A Russian/Canadian architect who studied at the University of British Columbia and worked with well-known Canadian architects Ron Thom, Bud Wood and Arthur Erickson, he first visited St. Lucia in the early 1970s on what was supposed to be a sabbatical. He fell in love with the place, stayed on and, in 1974, purchased the site on which his resorts now stand. His love of open spaces and buildings that are set in harmony with their natural environments influenced the redesign of Anse Chastanet, but it has reached a new level of imagination in the design and construction of Jade Mountain.

Chris Barnes is owner and founder of Barnes Water Tech, a firm specializing in plumbing, hydraulic design, troubleshooting, remodeling and construction of residential and commercial swimming pools, spas and fountains. He entered the watershaping trades right out of high school, starting his career as a laborer for a plumbing, excavation and steel contractor. He started his own firm in 1983 and has continued to educate himself on hydraulics via a wide range of manufacturer educational programs. He may be reached at barneswater@aol.com.

David Knox is president and founder of Lightstreams, a manufacturer of specialized glass tile in Mountain View, Calif. He earned bachelor's degrees in art history and American studies from Connecticut College in 1978. Following stints on Wall Street and beyond, he established Directed Light, a laser-systems development and manufacturing firm in San Jose, Calif., and pursued additional studies in mathematics and optics. During the 1980s and '90s, the company made lasers for a veritable "who's who" list of major technology firms, including Hewlett Packard, Motorola, Raytheon and Hughes Aircraft. He sold the firm in 1998 and continued to consult for the laser industry until 2002, when he changed career directions and began applying his knowledge of lasers and optics to the manufacture of glass tile.

By Brian Van Bower

Turning Green

Whether you call yourself an environmentalist or not, the current information about climate change and a range of related issues is something you need to consider.

Before you react to that statement, be advised that you don't have to accept global warming as fact or anything else experts and scientists might say at face value. What you *do* have to accept, however, is that there's enough going on in those arenas that your *clients* are picking up on it – and personally, that's more than enough motivation for me to start paying attention sooner rather than later.

In other words, as both enlightened citizens and forward-thinking watershapers, I think things are at a point where it's probably wise to pay attention to these issues and reasonably assess how they might affect our lives and our businesses. Why not get proactive and, as an industry and as individual operators within it, start discussing the potentialities for a new generation of "green" watershapes?

In public-relations terms, this may be an uphill climb, because watershapes have never been what people think of as environmentally friendly products. Instead, they're seen as luxuries, and although there have been developments that enhance energy efficiency in particular, the focus has mostly been on reducing operating costs rather than on saving the planet.

You don't have to accept global warming as fact or anything scientists might say at face value. What you *do* have to accept is that your *clients* are picking up on these discussions.

My pragmatic belief is that, despite the challenges, we need to jump out ahead of this issue by marketing energy-saving and otherwise "green" options to our clients. This may not even entail a grand overhaul of our industry, but it almost certainly will require dramatic shifts in mindsets and development of a range of ready answers for clients who almost certainly will start raising these questions.

watching the trends

I write this knowing full well that my client base is generally so affluent that not one of them has ever raised a concern about energy costs. Indeed, there are projects I've designed where the ongoing, monthly costs of running the systems are many times greater than what most people pay for their housing.

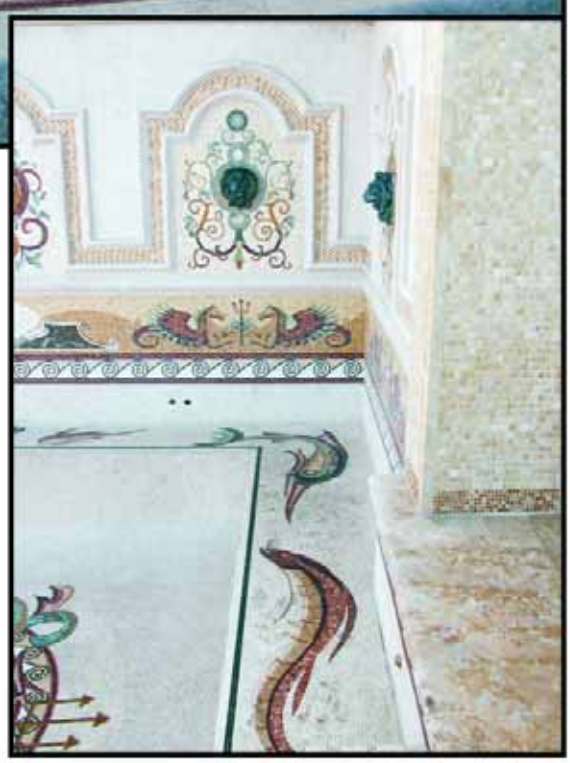
These clients can afford such costs and don't seem to crave "energy-efficient systems" at all – and I don't know if they ever will. But these folks read the papers and listen to the news and form opinions: When the time comes that relative greenness is an issue for them, I want to be ready. (It also makes sense that as government plots its courses of action that even the hyper-rich will be forced to think about these issues, like it or not.)

Just look what's happening in the automobile industry if you need an analogy: Where Toyota's Prius was once the only hybrid car out there and took a distinctly minimalist approach to comfort and accessories, the field is now filled with well-appointed, high-performing vehicles that boast hybrid technology – including a nice, expensive Lexus.

Where hybrids once appealed mostly to those who wanted to conserve fuel and save the planet (because the cars really didn't save those consumers much if any money), they are now being made to appeal to higher-end buyers who want quality cars that look good and are well appointed at the same time they make their drivers feel they're doing their

Classic Roman Mosaic Swimming Pool & Spa

The pool shown in these photos is rendered in the Classic Roman style. The entire pool and surrounding walls are marble mosaics. Carved limestone moldings and cast bronze water emitters are also made by Vita Nova.



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parts for the environment.

It may work the same way with watershapes: Our clients will still want all the luxury and pleasure they can afford, but they'll want it to come with fundamental systems that don't overuse chemicals or waste energy or water in what might seem negligent ways.

With all that in mind, let's take a quick look at some of the areas in which watershapes may already be advancing along the "green" curve. This is not an exhaustive list by any means: I'm just pulling up a few examples of measures we can all consider, and I'm certain you can think of others that are either available now or will be in the future.

Water conservation is the obvious place to start.

water everywhere

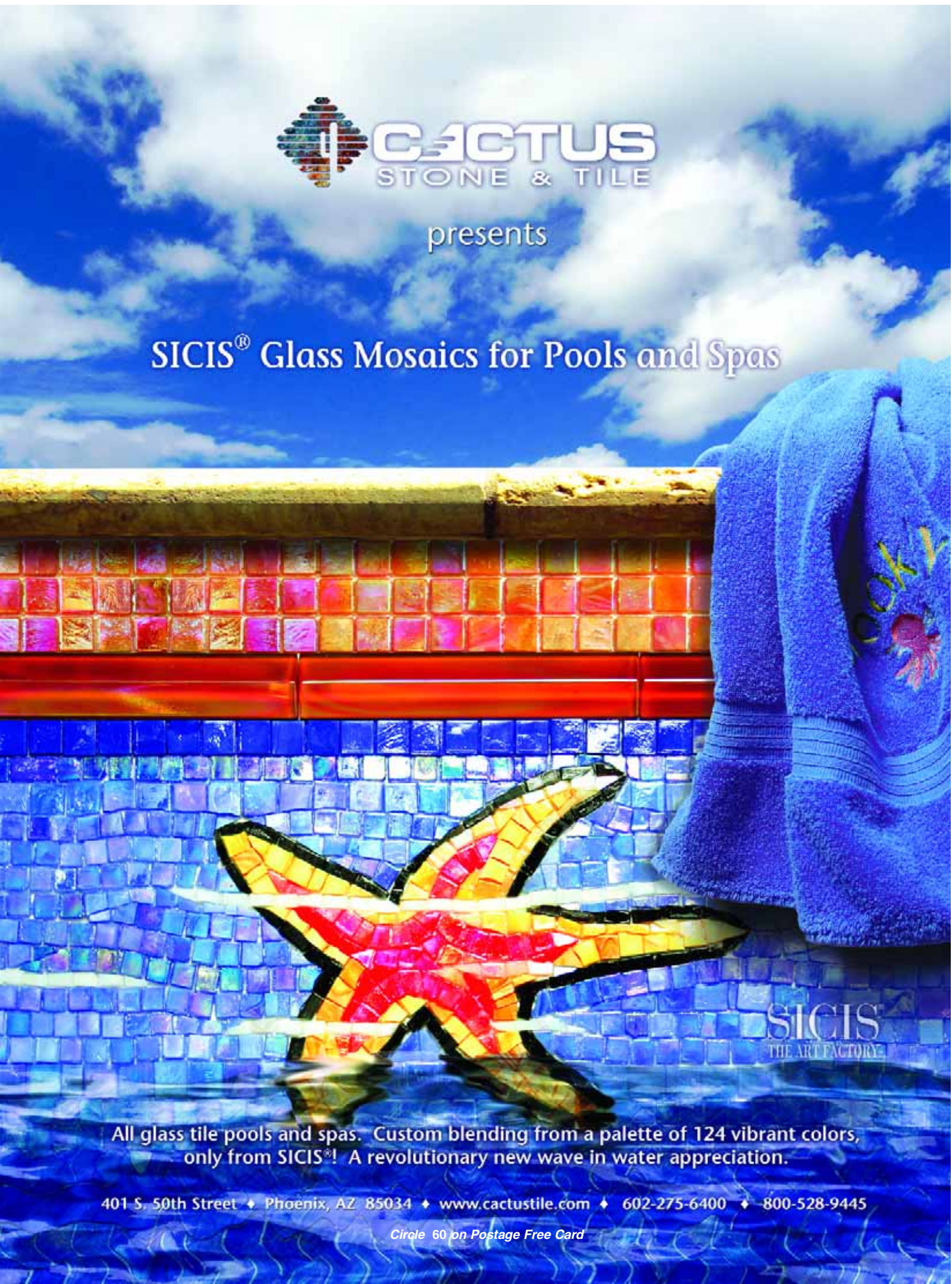
There are lots of reasons why creating pools that make the most of the water they use is a good idea. We know even without concern about environmental issues that fresh, potable water is not an unlimited resource and that as our population continues to increase, pressure will only increase on watershapers to employ water-saving measures. That's long been the case in areas that experience drought (particularly Arizona and southern California), but my guess is this is an issue that will become of importance almost everywhere before long.

There are several approaches my designs have taken to this particular issue, but one unusual twist we've included in several recent water-in-transit designs (that is, those with vanishing edges and/or perimeter-overflow systems) is an upsized combination of tanks and troughs that allow us to collect, store and use rainwater that enters the system.

In some cases, we've also pitched decks in ways that directs much more incidental water into the system. Where a couple years back, the decks might have been slightly pitched toward a slot for two or three feet to recapture splash, in some cases we're now pitching decks out as far as 10 to 12 feet beyond the edge of the pool, in some cases directing water back into the system from the entirety of a deck's surface.

With added capacity in our surge tanks, we now are *storing* water that would otherwise have been sent to waste. By doing so, we establish reserves that make up for evaporative losses instead of allowing the water level to hit the low-water sensor in the auto-fill system and relying on the potable-water supply. This is a concept that can be applied in just about any vanishing-edge or perimeter-overflow system – and in the grand scheme of things, the cost of upsizing surge capacity or collector-tank volume (space permitting) is generally small.

Along those same lines, we've been considering automatic pool covers for more applications. These systems have benefits that go well beyond water conservation (keeping the water cleaner and enhancing safety being just two), but my primary interest in this context is cutting down on evaporation to save water and reduce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heating requirements and chemical consumption.

For their part, covers manufacturers have done a good job of developing systems that suit modern designs and a wider range of pool types, including perimeter overflows and vanishing edges. Moreover, they come in wider ranges of colors that help them work as a design element – all very positive advances.

Also in this vein, I think that it's incumbent upon watershapers to build systems that don't leak. Water-leveling technology has substantially reduced an installer's need to be scrupulous in this respect, making it easy to overlook leaks so long as they're not major. But that's irresponsible in this day and age, and I believe we should test our vessels to be sure they are watertight.

efficient flows

Another critical area in which we can tout our green credentials has to do with hydraulics.

For a long time now, many have aggressively promoted the benefits of hydraulic efficiency in plumbing, filter and pump sizing. In fact, your head had to have been buried in the sand for years now for you not to have heard all about the value of using smaller pumps, larger filters and upsized plumbing to save energy costs and increase the service lives of motors while reducing noise and delivering a host of related benefits.

What many won't know or recall is that 23 years ago, back in 1984, Florida Atlantic University's Department of Electrical & Computer Science's Center for Energy Efficiency delivered a report called the "Swimming Pool System Energy Efficiency Optimization Study."

Intended as a definitive study to formalize standards for flow rates and pump and plumbing sizing, the report was submitted to what was then the National Spa & Pool Institute and to the Florida Power & Light Company. (It's no small point of pride that my good friend Bill Kent of Horner Equipment was instrumental in supporting this groundbreaking work under the leadership of FAU's Dr. Roger Messenger.)

As it turned out, the study was far ahead of its time. The researchers analyzed how pools use energy by studying all sorts of variables across a range of system and operating conditions and found conclusively that designing systems with smaller pumps and larger plumbing sizes (thus decreasing head pressure and line velocities) allowed a pump to create more flow using less energy. None of this is a major revelation at this point, but it is interesting to note just how long the information has been around!

Through Genesis 3 and in my own work, I'm a huge advocate for designing systems that operate at six feet per second on both the suction and discharge sides of the plumbing system – compared to the eight-foot-suction/ten-foot-discharge "minimum standards" suggested (and often not met) even today in the pool industry.

As our understanding of hydraulics has advanced, we've learned a great deal more that enhances the picture even further. With perimeter-overflow and vanishing-edge systems, for example, we know they can be built with edges so precise and hydraulic systems so efficient that keeping even long edges wet can be accomplished with half-horsepower pumps. In these cases, precision and efficiency make a huge difference in delivering spectacular visuals while minimizing operating costs.

the beat goes on

Now that more of us have accepted the big-pipe/small-pump philosophy, many are finding new efficiencies by giving the same sort of scrutiny to the way whole circulation systems work.

My colleague and Genesis 3 co-founder Skip Phillips has learned, for example, that it pays to upsize the system plumbing beyond the sizes that might seem to be dictated by fittings on filters and heater manifolds: Despite the fact that it seems counterintuitive, doing so *still* adds to energy efficiency even when those fittings on a heater or a filter will accommodate plumbing no larger than two inches. Even though the flow is constricted as it enters the bottleneck, overall efficiency is still improved.

Skip is also at the cutting edge when it comes to application of advances in pump technology and the variable-speed drives that are now finding wide application in ways that greatly enhance pump and hydraulic efficiency. The same can be said of proper use of two- or three-speed pumps that enable systems to operate at different flow rates depending on system demands.

With these technologies, Skip is quick to point out that advancements in pumps do not relieve the watershaper of a responsibility to pair proper equipment with properly sized plumbing: The same hydraulic principles still apply, and these

technologies are powerful support for sound hydraulic practices rather than their replacement.

This leads me to a final topic I'd like to raise, this one having to do with *heating*.

It's no secret that, depending on circumstances, heating pool and spa water can be the most expensive detail of system operation. It takes a lot of energy to heat even a relatively small body of water – and depending on how that heat is generated and maintained, the differences in costs and energy usage can be dramatic.

For many years now, manufacturers have provided our industry with various high-efficiency heaters, heat pumps and solar heating units that all can be deployed to dramatically reduce heating costs, and thermal covers have a role here, too. But my sense is that there's more to be achieved on this front by people willing to step outside the box of conventional thinking.

Recently, for example, I've been involved in developing systems that use geothermal energy to heat water and in projects that call for integrating watershape systems into overall residential- and commercial-property heating/air-conditioning systems. These sorts of solutions are not going to be right for every job; my point is that there are technologies out there that enable us to think in new ways – and it's probably time to get aggressive in seeking them out and learning to apply them.

Along these lines, I've always been intrigued by the possibility of insulating watershape shells to save on heating costs. As you should know, concrete is not, depending on thickness and density, always the best insulator, and the heat of expensively warmed water is often rapidly transferred to the soil or air surrounding a shell. For years now, Mark Urban has advocated the use of materials to insulate plumbing and indeed entire vessels, and maybe it's an idea whose time has come.

(Mark is also a proponent of "flow reversal," a system in which water skimmed from the pool's surface is heated and then added back to a pool via its main drain, which allows the warmed water to rise and heat a pool more efficiently.)

Just how important any of these concepts will be in the future is a big question mark. One thing, however, is certain: The concepts of energy efficiency and environmental stewardship are becoming more and more important to society at large, and at some point that system of concerns will become part of the world of watershaping as well. As I see it, this spells "opportunity" in big, bright letters. WS

Brian Van Bower runs Aquatic Consultants, a design firm based in Miami, Fla., and is a co- founder of the Genesis 3 Design Group; dedicated to top-of-the-line performance in aquatic design and construction, this organization conducts schools for like-minded pool designers and builders. He can be reached at bvanbower@aol.com.

By Stephanie Rose

Micro Managment

As professionals, we must be keenly aware of the climate and how it might be reflected in our clients' yards – especially when the weather gets bitterly cold.

As much as I love cold weather, I have to concede that we experienced way too much of a good thing this past winter.

Long periods of extremely cold weather are the norm in many other parts of the country, and plants survive. Here, however, our local plants may be accustomed to surviving the isolated sub-freezing night, but sustained, frosty temperatures lasting nearly a week are something they weren't meant to handle.

I'm sure you've seen the results of our cold snap in the news: Much of the state's citrus population – yes, coincidentally, the wonderful treats I wrote about in last month's column – has sustained long-term damage and the trees in many cases will take two years and more to recover. And that doesn't just affect us here: The rippling effects will be felt in grocery stores nationwide for the foreseeable future.

As a homeowner, I'm always aware of what freezes can do to my garden, but I recognize that it's primarily a *visual* blow and that whatever falls prey to the weather can be replanted. As a landscape designer, however, the scope of my concern is larger as I consider my *clients'* losses and reflect on a key lesson to be learned: As professionals, we must be keenly aware of the climate and how it might be reflected in our clients' yards.

The lesson is about more than the climate at large: In this recent cold snap, I couldn't help observing how topography and the presence of architecture played into the ability of plants to survive the cold.

cultural awareness

I had yet to finish harvesting my Satsuma tangerines a few weeks back when I saw the weather forecast on the nightly news and heard that we were in for several nights of sub-freezing temperatures.

I went to sleep each night fearing that what was left of my crop would succumb to the cold, but when I walked into my yard each day, I was surprised to find not only that the fruit had survived, but that it hadn't sustained any of the damage that was already being reported by citrus growers throughout the state.

My garden had experienced subfreezing temperatures each night for a week – temperatures that had my neighbor's garden sporting icicles all over the place because an automatic sprinkler valve had stuck in the "on" position for a full day. In my own garden, only a few yards away, there was no serious damage, although there were some distinct but disparate consequences.

One morning, for example, I was pleased to note that a plant directly adjacent to the house appeared perfectly normal – and disappointed to see, just five feet away, the same variety of plant completely devastated by the freeze.

Armed with this observation, I took inventory throughout my garden, front and back, and observed variations on this same phenomenon in different locations throughout: Some plants had apparently survived because of their proximity to the house or some other substantial structure, but other perennials of similar type just a few feet away (but out in the open) had not survived.

This immediately carried me back to college science classes and discussions of microclimates. I'm no expert on the subject, but I clearly recall that any structure that gives off heat – particularly heated spaces such as homes but also walls and other sources of radiant heat – can warm an area

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up to a foot or two away enough to protect tender plants from freezing temperatures.

Everywhere I looked, this concept applied: In at least three locations, for example, Plectranthus 'Mona Lavender' had survived up against the house, but it has suffered frost damage in all other locations, necessitating severe cutting back.

But this tour of my yard didn't resolve the mystery of why my fruit trees had made it when so many had not.

grand-scale issues

Why had my Satsuma tangerines and other citrus survived the bitter cold while growers throughout the region incurred heavy losses? The answer, it seems, is all about location, location, location.

In this case, my home is situated on an upslope, and much of the reported damage to citrus crops apparently occurred in low-lying areas. The difference is no more than a hundred feet or two, but being up at this slightly higher elevation seems to have protected my trees from the worst of the weather's effects.

The difference: Cold air pools in low-lying areas such as valley floors. Up on a slope at any sort of elevation above that floor, such pooling doesn't readily occur. In addition, the air kept moving, and stillness apparently enhances the damage subfreezing temperatures can do.

I'm sure I don't have all the answers (and I'd love to hear from anyone who is better informed, because I am truly curious), but what I've observed in the weeks since the big freeze has made me want to know more about microclimates and how I can use them in my design work to enable more plants to make it through harsh weather.

The implications here are wide-ranging. Placing the same plant throughout a client's garden, for example, may make for a cohesive design, but I will never be able to guarantee it will perform equally well in all locations. (I wish I had a dollar for every complaint I've heard from clients who think I've sold them a bad plant because others of that same variety are doing just fine: I'd be rich!)

Although the weather is a key factor here, there are others that come into play to influence the success or failure of a planting scheme:

◗ **Soil composition.** Using multiple plants of the same variety in various places around the same yard is no guarantor of success, mainly because the quality of the soil will vary from spot to spot around the yard. Any sort of amending, whether with fertilizers and composts or with natural decomposition of fallen leaves and other debris, will serve a local role in how plants perform.

I've taken a soil sample in one spot and found soil of a completely different composition just a few feet away – a particularly common phenomenon in developments where the terrain was significantly disturbed during construction. Plants will respond in different ways in each situation, depending upon the health of the plant, its type and its general characteristics (not to mention the unique nature of each specimen).

As always, the key is communication with your clients about their expectations. The fact that a plant dies does not mean you sold anyone a *bad* plant.

◗ **Access to Water.** Let's face it: No matter how good an irrigation system is, it's virtually impossible to get the same amount of water to each plant in each location and we all do the best we can given what we have.

There are too many variables at work here for this ever to become truly predictable. I'm not suggesting that we give up trying; instead, what I'm getting at is that we must recognize the imperfections of irrigation systems, do what we can to anticipate the needs of specific plants and then take the time to follow through and make sure that what we leave behind has the greatest possible chance of success.

In all of this, in fact, I'm not advocating that we concede. What I *am* suggesting is that we need to take a holistic approach and be more selective about where we place plants within a design, try to amend the soil locally so that it provides the best possible cultural environment for the root system of each plant and design irrigation systems to support the plants' long-term needs as effectively as possible.

in the loop

What I've presented here is, of course, a very personal response to the vagaries of our recent winter here, so forgive me if what I've described is something your local climates and microclimates force you to consider on an ongoing basis. Chalk it up to the ability of events like these to focus our thinking: There's no harm to be done in giving clear thought to what we do!

I know in all of this that I will never be able to guarantee that a given plant will survive in a given location, but that I can support each one in ways that give each plant the best possible chance of thriving within the microenvironments present on the sites we touch. It's impossible to anticipate everything, but applying an all-encompassing approach will surely give the plants we select and place a better shot.

As always, the key here is communication with your clients about their expectations. The fact that a plant dies does not mean you sold anyone a *bad* plant.

Many (if not most) of us offer guarantees on plants for specified time periods, qualified by clients' provision of appropriate maintenance and care and their early communication when something happens (such as a sprinkler problem) – all dedicated to assuring the best possible outcome for their projects. Just the same, clients need to understand that plant demise is normal in lots of situations. (Most contractors I've worked with tell me that it's normal to lose up to 10 percent of a planting within the first year, although I've never witnessed devastation that widespread and have experienced only insignificant losses through the years.)

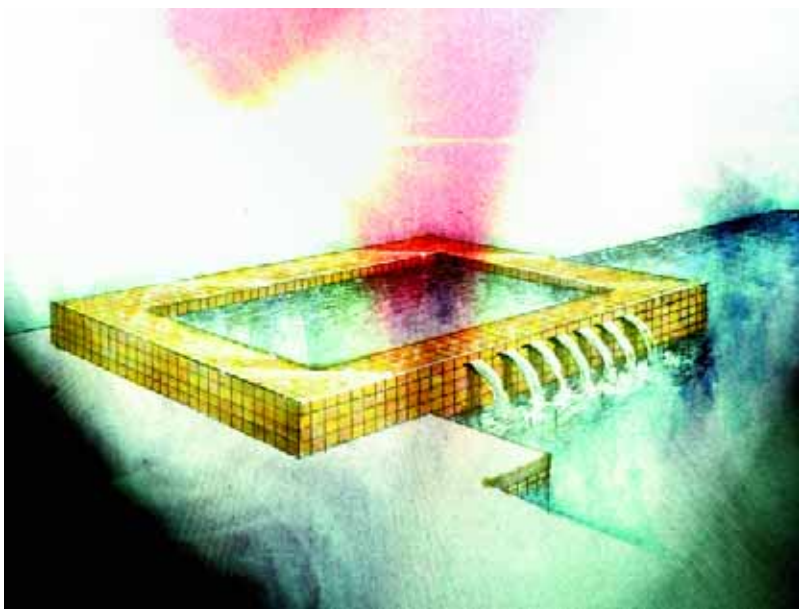
As I see it, there's no harm in preparing clients ahead of time and letting them know that differences in temperatures, soil conditions and watering will all influence the success of their plantings. This positions them to be both watchful and supportive and gives them distinct roles in assuring long-term success.

This won't help when winter wreaks havoc, but at the very least it will knock the edge off your first conversation once the damage is assessed. WS

Stephanie Rose runs Stephanie Rose Landscape Design in Encino, Calif. A specialist in residential garden design, her projects often include collaboration with custom pool builders. Stephanie is also Editor of LandShapes magazine and an instructor on landscape design for the Genesis 3 Design Group. If you have a specific question about landscaping (or simply want to exchange ideas), e-mail her at sroseld@earthlink.net.

By David Tisherman

Now Showing



Last time, I described (at great length, as you may have noticed) what happens in the time between my initial phone conversation with clients and a point just ahead of my formal presentation of a design.

It's an involved process that uses all of the information I've gleaned from my clients about what they want, what they think they need and what they ultimately expect to have in their backyard environments. It's about understanding the underlying circumstances, deciding what should be done and, finally, assembling all of that insight into a visual presentation they can understand.

This transition from a deliberative/collaborative/conversational process to a final unveiling of a design concept is obviously important: You can create the most elaborate, extensive design imaginable, but if it's not right for the site or the clients can't grasp what you're doing and you haven't been listening to them, there's little point in making the presentation: They simply won't follow through with you.

If everything's in place, however, you can proceed to the presentation with reasonable expectations that you've hit the nail pretty squarely on the head.

walk right in

When each of us works with clients, we all apply our different personal styles and ways of working with people. Speaking entirely for myself, I dress casually and basically present myself as someone who is likely to become a friend in the course of our working together – someone who will have his own special coffee cup in the clients' kitchen for the duration of the project.

I want clients to understand and appreciate the design I've developed and get a sense of the interplay of various spaces and structures as well as colors, materials, lines, textures and shapes.

That's just me, and I appreciate the fact that there are infinite numbers of ways to approach these endeavors. Frankly, I don't know how to approach people any other way. I am always professional, always dignified and distinctly focused, but my main goal in the presentation meeting (and in most other situations) is to make clients feel comfortable around me and let them know that I'm comfortable with them.

At the same time, I make no bones about the fact that I consider myself to be a talented designer and that what they're getting from me is a work of art tailored to their desires and needs. Despite the sneakers, that prime, overarching fact is reflected in the way I carry myself and in the information I present to them.

As I've mentioned before, if the project is for a couple I insist on both of them being there for the presentation – and I like it to happen in the morning, when all of us are fresh and undistracted and there's greater likelihood I'll be able to help them "see" what we're discussing.

I've also noted previously that almost all of the presentations I make are based on the thought that I will be the one building the design. This is an important distinction, because it means that there will be a number of things I will *not* be presenting – namely, all sorts of technical drawings that would be needed to put a job out for bid. I also leave out things like plumbing schematics and complete sets of structural details – that stuff comes later, when and as needed.

My goal in presentations is instead very straightforward: I want them to understand and appreciate the design I've developed and get a sense of the interplay of various spaces and structures as well as colors, materials, lines, textures and shapes. At this point, I also want them to have a general idea of what the project's going to cost based on my best understanding of site con-

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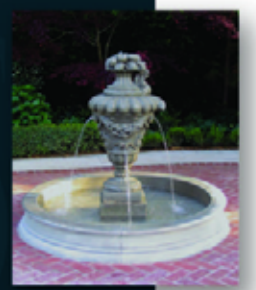

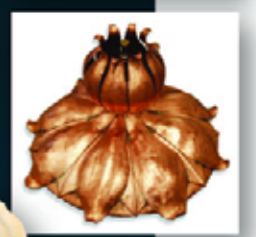

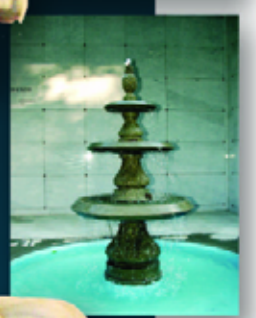

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What Clients Need

Through the years, I've been accused (probably with merit) of being self-important and arrogant. I can live with that, because I don't know too many artists who don't have an uncompromising sense of who they are and what they're about. The few of us who work at a level where watershaping becomes art *should* be sure of ourselves.

That whole psychology needs to be balanced, however, by the important observation that nobody truly *needs* a swimming pool. Nor are watershapers counted among those – including doctors, farmers or firefighters – without whom our society would come to a halt: The hard fact is the world would go on even if we weren't around to make pools, spas, fountains and waterfalls.

What we provide is a luxury item imbued with senses of beauty, comfort, relaxation and pleasure. On that level, everything that artistically inclined watershapers do is related to giving people something they *want* rather than something they *need*.

Despite that fact, lots of watershapers try to persuade clients to want items that they do not need and, when you get right down to it, don't really want. For my part, I would rather offer a system devoid of bells and whistles and instead put the value in assembling design elements that are truly suited to my clients and the site.

You can make a spa so complicated, so loaded down with features that the client may never be able to figure out how to use them all. I'd rather keep things simple, using water effects that fit the site and the clients' desires. In other words, it's not about packing a job with bells and whistles or worrying about leaving money on the table: Rather, it's about exercising restraint and common sense and delivering a design that's both appropriate and aesthetically pleasing.

This is why design presentations are so important: They enable us to zero in on our clients' value systems and assess their desires and wants. On that level, it's about inspiration and passion, not about coming to the table convinced that a perimeter overflow or vanishing edge is indispensable.

As I've been told, often it's what's left off the page that makes the brushstrokes we *do* employ truly beautiful.

– D.T

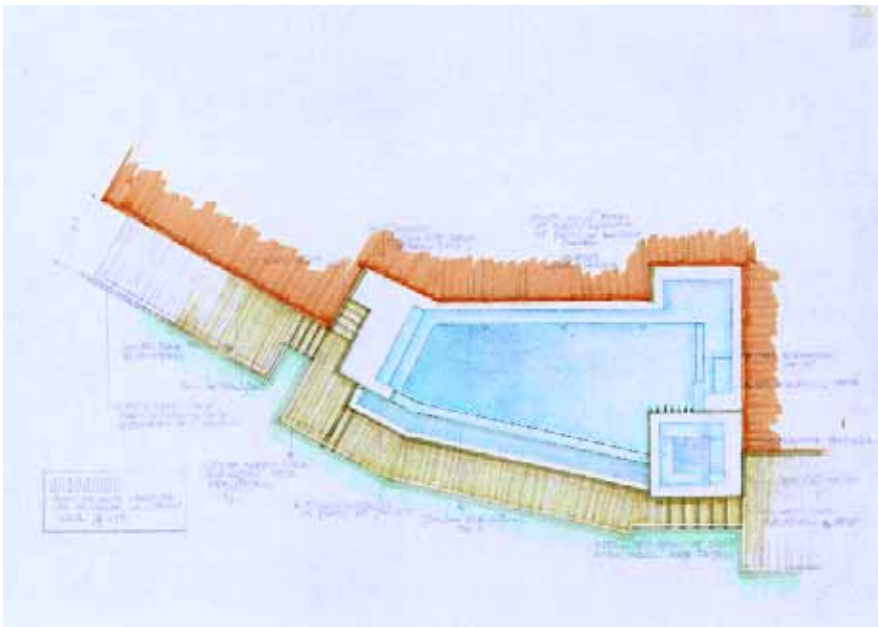
ditions and engineering principles.

With this approach, it's all about simple visualization – not about rolling through layers of documentation that would be needed for someone else to build what I've designed.

in hand

When I show up for these meetings, I'm carrying a site plan, perspective drawings, some sections, relevant materials samples and a complete breakdown of the project budget based on sets of options we'll be discussing (but excluding costs associated with the foundation, which can't be factored in until the soils and engineering work is done).

I don't believe in bombarding clients with piles of paper and observe that this approach is often used to make up for a lack of quality when it comes to renderings. In my experience, clients aren't all that interested in the heavy, technical stuff, so instead of trying to impress them by the quantity of paper I can amass, I work



I always start my presentations with a hand-drawn site plan, rendered in color. Its flat, bird's-eye view gives my clients a huge amount of information about the basic physical relationships I've established for the pool, spa, deck and any other structures that might be involved. Only when they 'see' and understand what's going on in this broadest possible sense do we move onto more specific details in our discussions.

instead to capture their imaginations with the beauty and artistry of our ideas.

To that end, the site plan, details and perspective I present are always hand-drawn and done up in color. Not everyone can draw, of course, which has given rise to the use of computer-assisted design (CAD) as a presentation tool, but too often the use of CAD results in flat, sterile drawings that might even be counterproductive when it comes to helping clients appreciate a design and understand what they can expect.

It's like a lot of other skills associated with watershaping and design. CAD is only a tool, and to use it effectively and flesh out its basic performance with a sense of visual nuance and communicative power, you need training, experience and a real understanding of system capabilities. If you can't draw, CAD can dress things up, but it will never mask a lack of basic design skill.

Not to beat the drum too hard, but I know from experience that just about anyone can learn to draw to a reasonable level of competency. And if you just can't, hire someone who can: I think the difference is that important.

In addition to the drawings, materials samples are a big and important part of my presentations. I bring in color palettes and samples of tile and stone that I've determined will be right for the project, usually in a couple forms and finishes – sawcut, chamfered, tumbled, bullnose – whatever it takes to give my clients a full understanding of the visual power of the materials we're considering. And I *don't* use catalogs: There's no way that pictures in a brochure can give anyone a true sense of what they'll be buying.

(To follow up, my clients and I eventually will visit a stone supplier to get a full sense of what's available, how it can be finished and what sort of variations of color and/or texture might be expected

Visual Record

During one or more of my early visits to a site, I invariably take "before" pictures and begin amassing a visual record of every phase of a project. I've done this with every job I've ever tackled, even in the days before digital photography made it easy.

I do so for several reasons, not the least of which is that it helps me in preparing a design for presentation. It's just too easy without photographs to look at a site from a bird's-eye view and forget, for example, the ways established trees influence a site and therefore affect placement of a watershape or other elements of a design.

The images are yet another design tool, and a valuable one at that.

– D.T.

in a large field of stone.)

As for projected costs, it's important at this point for my clients have a good sense of what we're doing and how the aesthetic decisions we make from this meeting forward will influence costs. At the outset of the conversation, we may not yet have decided between, say, an all-tile or pebble finish. What we do know, however, is square footages to a degree where I can offer pricing breakdowns for various materials relative to one another and we can begin adding, subtracting, multiplying and dividing.

perspectives

It's important that these discussions be tied to reality rather than generalities. This is *not* about selling on price: It's about advancing the design process and making significant choices among a defined set of visual options.

Indeed, there's a practical side to these cost-related issues. At this stage, we all need a firm foundation for meaningful discussions about what is and isn't going to be included in the project. On that level, it's more about balancing the reality of the budget with the aesthetic aspects of the design – an entirely different process of understanding. (For more on the dynamics of this balance, see the sidebar on page 22.)

With all of the visual presentation materials I provide, my prime objective is to get my clients to understand the way the watershape and other design elements work together in the context of the site. This is why I start off with a highly detailed flat plan: Its bird's-eye view shows the basic physical relationships I've established among the pool, deck, overhangs and other structures.

Once an adequate sense of the way

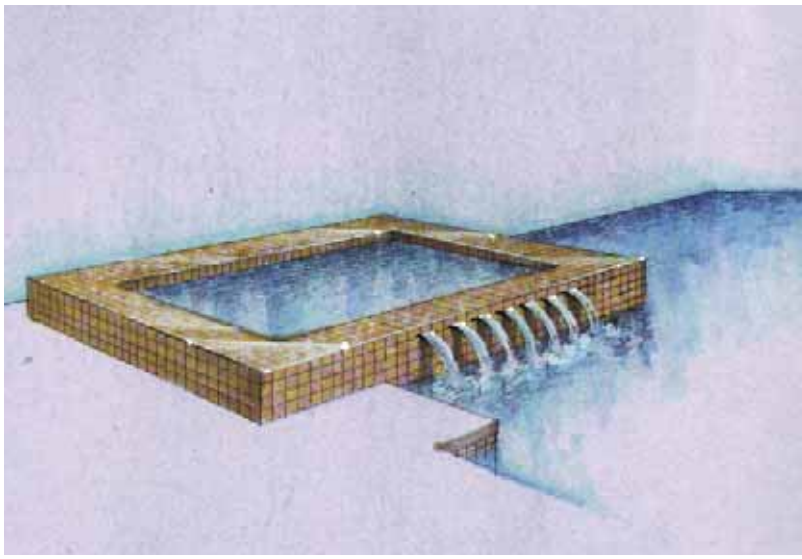
things are arranged sinks in, we move on to the perspective renderings, which show the design from key focal points and enable my clients to grasp what they'll see when they walk into the space. These sheets give them a sense of the way that the structures work within the contours and elevations on the site.

This is where being able to draw on the spot comes in handy. Often, for example, clients will ask what something's going to look like from a reverse angle, how something will appear while they're sitting in the spa or how certain intersections of materials will work. I am prepared, in other words, to meet specific questions with specific and helpful answers.

Moreover, in conjunction with the sample, these drawings give my clients a taste of what's to come with respect to color palettes, the textures of various materials and the general role of landscaping. (I'm not a landscape designer, so I never get down to specifics; rather, what I show is the way planting beds interact with the pool and other hardscape or structural details.)

Once we roll through this basic conceptual overview, we get down to specific details and sections – information on key project elements that I want them to understand, such as the way the coping and the surrounding deck will interface, for example, or how we'll hide the skimmer lid.

In all cases, I have blueprints on hand that we can mark up during our discussions. This allows us to refine the design face-to-face and helps me later on if I need to make changes when



I come prepared with a couple of perspective drawings to give my clients a sense of the elevations and how specific details fit into the overall scheme. On this level, it's all about giving my clients a sense of what they'll encounter when they walk into the space. If they have any questions about how things might look if they were, for example, sitting inside this spa or looking at it from the far corner of the deck, I will produce a quick drawing on the spot to meet the need.

I return to my studio. I also usually have some simple sections on hand so we can discuss basic structural details – but it's important to note that these are for illustration *only*: I never represent anything I'm showing them as "structural design."

bottom line

Through the years, I've found that this combination of flat plans, perspective drawings and materials samples is generally all it takes to enable us to talk and think in three dimensions and pull everything together in visual terms clients can understand. The goal is simple: I want my clients both to visualize the setting *and* appreciate what they're getting.

When the complete picture unfolds, issues of price don't disappear, but as a rule, by the time we complete our discussions they're able to see a greater value in what we're about to accomplish. They have, in others words, come to see what we're doing as the pursuit of a work of art.

Most of the time, when I've finished my presentation and have completed a run through the drawings and samples, my clients simply say "It's beautiful" and we're good to go.

That's my goal: No matter what specific discussions we might have about what features might go into a spa or which type of stone detail we'll use on an edge, I want them come away with the thought that what we're discussing is a beautiful piece of artwork.

I take great pride in the fact that many times, long after a project is complete and I visit to check on how things are going, I see the renderings I've done framed and hanging in my clients' homes. This speaks volumes, telling me that the clients value the design itself.

And when they've come to see the work I've done in that light – as a work of art – they naturally place a greater value on the reality they see outside their back door.

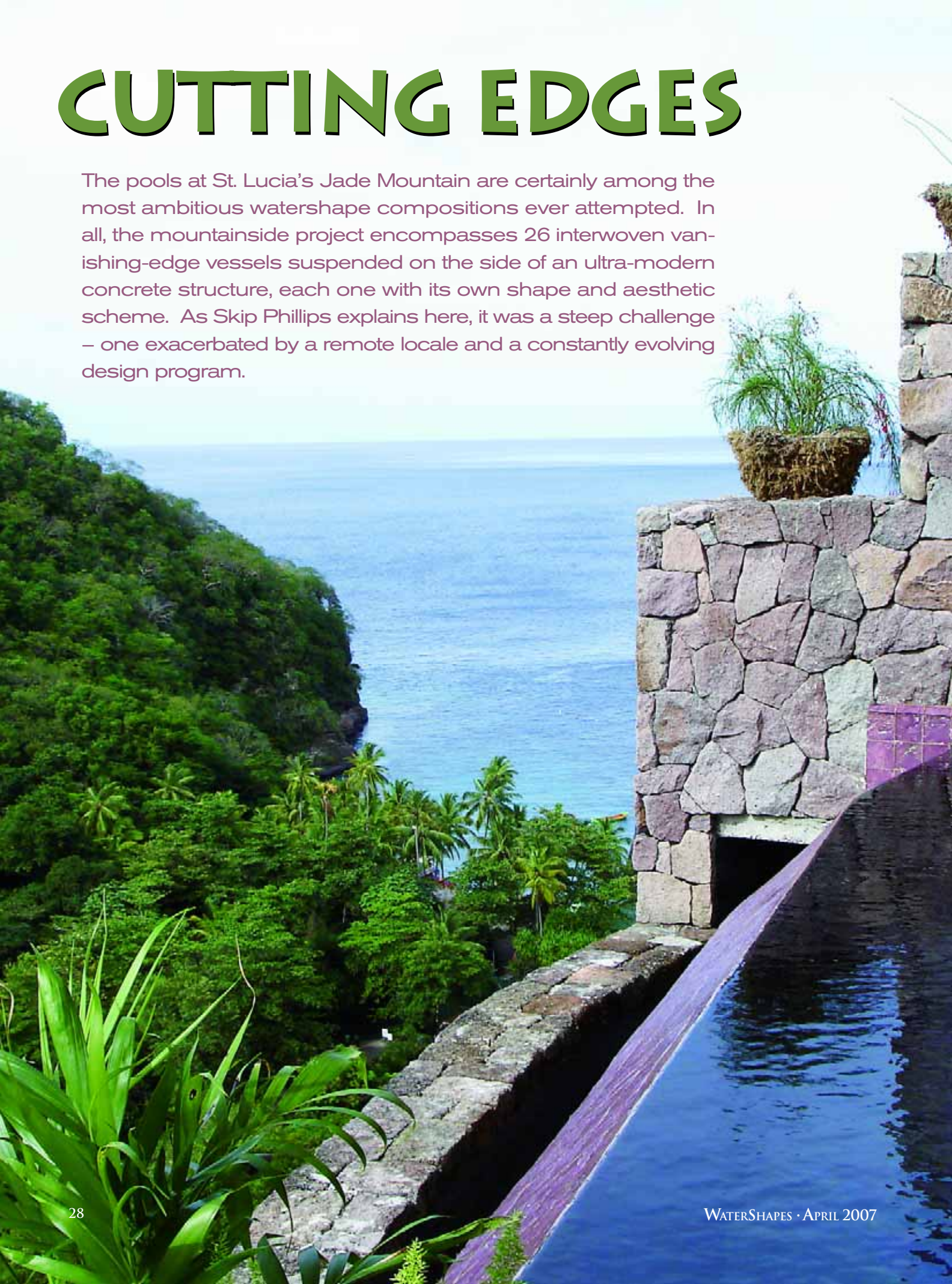
It all goes hand in hand: Their ideas, my presentation of design and the product of our endeavors all come together in a beautiful environment that makes them happy and proud. It's the culmination of a process that begins with our very first conversations, and it's in the presentation of the design that they initially get the sense that they're working with me to obtain something no one else has.

But I get ahead of myself: Between the presentation and the warm glow of satisfaction come a number of other important steps, starting with permitting and engineering – our topics next time. MS

David Tisherman is the principal in two design/construction firms: David Tisherman's Visuals of Manhattan Beach, Calif., and Liquid Design of Cherry Hill, N.J. He is also co-founder and principal instructor for Genesis 3, A Design Group, which offers education aimed at top-of-the-line performance in aquatic design and construction. He can be reached at tisherman@verizon.net

CUTTING EDGES

The pools at St. Lucia's Jade Mountain are certainly among the most ambitious watershape compositions ever attempted. In all, the mountainside project encompasses 26 interwoven vanishing-edge vessels suspended on the side of an ultra-modern concrete structure, each one with its own shape and aesthetic scheme. As Skip Phillips explains here, it was a steep challenge – one exacerbated by a remote locale and a constantly evolving design program.



By Skip Phillips

They don't come along very often, but every once in a while some of us are fortunate enough to become involved with a project that redefines what watershaping is all about.

St. Lucia's Jade Mountain was one of those remarkable opportunities, and no matter how long I'll be in this business, I'm certain there will never be another project quite like this one. For starters, it stands as perhaps the most extensive and spectacular all-time use of the vanishing edge – ever, anywhere – all set in one of the most unusual buildings ever imagined for a resort property in a location that is almost indescribably beautiful.

The brainchild of architect/owner Nick Troubetzkoy, Jade Mountain is an achievement of singular depth, range, creativity and sophistication. It is also, I might add, one of the most difficult projects I've ever touched.

Ever since Jade Mountain opened its doors late in 2006, visitors have reported being awestruck by the remarkable combination of architecture, artwork, scenic views and water – not to mention the fact that this is one of the most romantic, atmospheric places one could ever hope to visit. Before it realized that potential, however, the effort involved in crafting just its swimming pools was both arduous and astonishing.

JUNGLE PASSAGES

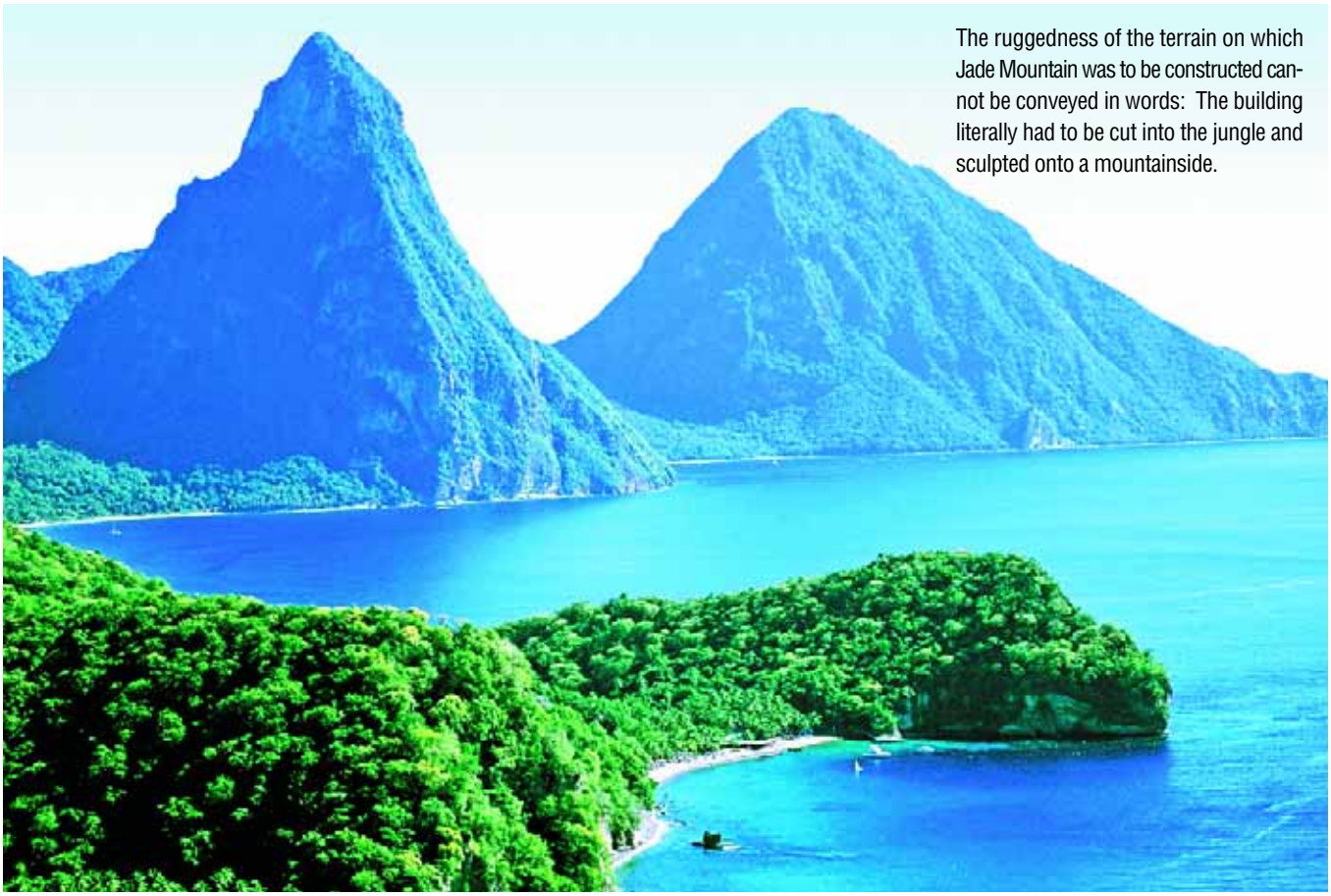
The concept alone makes a stark impression: The structure was to consist of 25 luxury suites terraced on six mountainside levels. Each room was to have its own indoor/outdoor vanishing-edge swimming pool, all of which were to be interconnected by a common system of troughs and catch basins.

The rooms were to range between a modest 600 and a luxurious 1,100 square feet, each one with a unique, distinctive design and décor. All were to be completely open to the warm tropical air, with the vanishing edges of the pools mediating between the rooms and their sweeping ocean views.

The story of how this great work of architecture and engineering actually came to pass is impressive as well – long and full of twists and turns. Indeed, I became involved nine years ago, at which point I was asked to visit the site and get together with Troubetzkoy, who was in the early planning stages of a new building that was to serve as a showpiece for what was already a beautiful resort property.

At the time, I'd never been to St. Lucia, nor did I know anything about it or the daunting challenge that was waiting for me there. When we first met, Troubetzkoy was in the midst of considering a broad range of design concepts, all of which in one way or another involved ultra-luxury rooms integrated with various types of watershapes.

The 600-acre property already boasted Anse Chastanet – in its own



The ruggedness of the terrain on which Jade Mountain was to be constructed cannot be conveyed in words: The building literally had to be cut into the jungle and sculpted onto a mountainside.

right a mind-bendingly beautiful place with dozens of open-air French Colonial bungalows scattered in the tropical rainforest.

When our first meeting started, I couldn't help noticing that my host was strapping on spiked boots – a mild indication that the loafers I was wearing probably weren't the best choice of footwear for this particular adventure. (At one point on our walk, in fact, I found myself hanging Tarzan-like over a cliff, a vine in one hand and my briefcase in the other.) With Troubetzkoy's help, I survived this and several subsequent trips to the site and came away knowing that we were onto something special.

The property faces a cliff-enclosed bay dominated by distant twin peaks known as the Pitons, both of which are wrapped in lush green and appear, it is said, to be made of jade. From the start, Troubetzkoy seemed obsessed with using that view to focus the entire design.

The 25 now-completed rooms are amazing – open to the bay but utterly private and having in common approximately the same view of the Pitons. The building itself is an asymmetrical marvel: It's a graceful composition of lines, angles, concrete, stone, wood and a sense of openness that reminds me in many ways of the organic architecture of John Lautner.

IMPROVISATIONS

As mentioned above, each pool has its own aesthetic scheme, shape and structural design, and they all flow seam-

As the structure rose above grade, each floor was an improvisation. Once each successive level provided a platform, everything was arranged to capture the best views rather than to fit some modular design scheme – which was great, but it meant that plumbing the pools could only be done *after* the base structures were already set.

lessly within the overall structure's daring architecture.

There are five separate systems that filter water for all the pools on their respective levels, but beyond knowing what was needed in basic terms, designing and engineering these systems was a radical exercise in patient flexibility. In fact, we spent years designing and redesigning the mechanical systems and, through that entire span, watched as changes in the overall program kept surfacing in ways that made it seem we might never settle on a final design. As it turned out, we were making significant changes up to the last minute.

As dynamic and fantastic an art form as watershaping may be, it is *not* typically considered a matter of improvisation and generally requires a good bit of planning. This lack of certainty was perhaps the greatest challenge at Jade Mountain: We had to find an approach to our main work on site that would allow us to become as extemporaneous in our watershaping as one could possibly imagine.

Early on, for example, we spoke of several pools associated with rooms scattered in the jungle, and at one point we even talked about including a sort of a long, winding lap pool that would interconnect them all. This concept didn't last long, however, nor did many other ideas that came and went before any design developed the necessary traction.

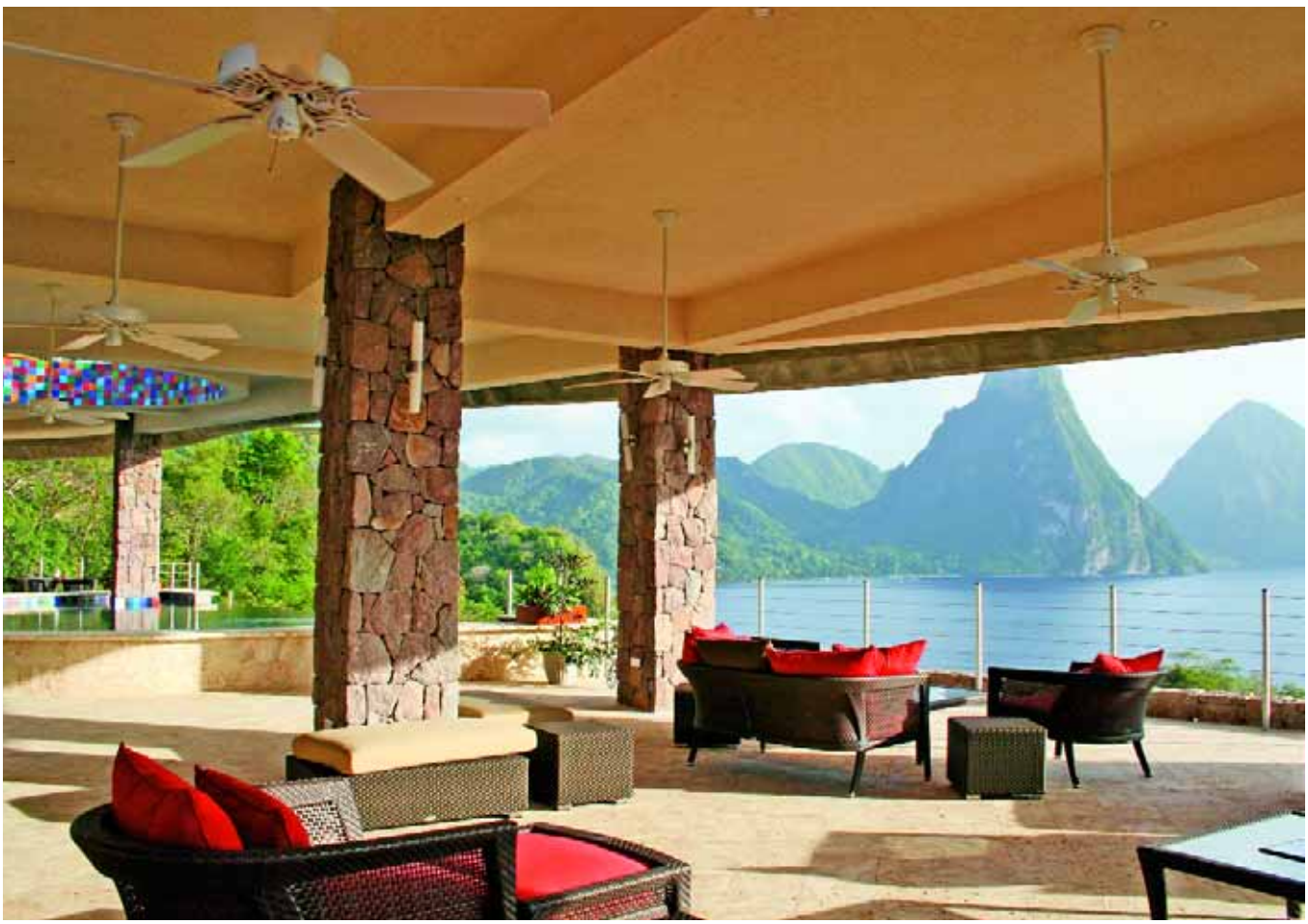
Finally, somewhere in the years-long process, the concept mutated to the point where we were pursuing a single, concrete-terraced sculpture intended as an extension of the jungle-covered mountain on which it sits. When completely finished and grown in, the entire affair would be draped in plants to achieve a hanging-garden effect – a drapery intended to make the building and its pools vanish into the rainforest that surrounded them.

Even with that key concept in place, however, the design continued to evolve and shift all the way through the construction process. We were constantly in a reactive mode, always trying to accommodate changes and refiguring ways to handle the plumbing and locate and configure the equipment.

The big problem was that we were dealing with an above-grade, poured-in-place concrete structure suspended in the air off the side of a mountain, so what happened is that final design work was occurring as each level was formed and poured. Not only was this improvisation, but it was improvisation *in a hurry*.

Probably the most dramatic example of this came when I visited the site as the basic structure was nearing completion. The building seemed taller than I had remembered, and when I asked, I was told that, right at the end of the first round of construction, Troubetzkoy had decided to add another floor to create a common lounge area with yet another pool. This meant that we had to figure out how to plumb, circulate and

A key, unifying theme of the design was the desire to integrate Jade Mountain into its environment by covering it with plants. This will take a while, of course, but the result will be a complex that, as imposing as it looks now, will eventually melt into the background.



equip swimming pool #26 – something we hadn't considered in any way, shape or form before I walked on site that day.

GUTTER LOGIC

When it dawned on me exactly what was going on with this new addition, I observed that there were no pipes for this common pool or any place to set the equipment – to which someone replied, with a completely straight face, "That's what we wanted to talk to you about."

Accommodating the improvisational aspects of the project required extreme adjustments to conventional thinking. As mentioned above, each level is linked by catch basins that work as a collective gutter that transmits water to that level's own equipment room. Throughout the early stages of the project, we figured that we'd be able to locate surge tanks to accommodate bather displacement, but as work moved forward and changes kept coming, we found ourselves extremely

The depth of the improvisational spirit of the project finds no better evidence than this top-floor lounge area and its common pool for all guests at Jade Mountain. It materialized (completely unannounced) between two of my visits, and organizing its circulation system was one of most significant challenges the design team lobbed our way.

restricted when it came to space and had to adjust our thinking to accommodate the fact that all of the surge would have to be handled by the gutters.

Although they hadn't been designed for that purpose, the troughs had been made large enough that they could handle the surge. In others words, we were plain lucky: I've always preached the virtues of oversized catch basins, but never would I have dreamed that upsizing would help them serve a completely different hydraulic function!

Finally, and this is something that was added subsequent to my last visit, the design team decided it wanted a sort of water-in-transit waterworks/waterfall/reflecting pool at the end of the building adjacent to the equipment rooms. (I'll leave the explanation of what this was all about to my colleague Chris Barnes, whose part of this story begins on page 46.)

What all of this working and reworking meant was that there was absolutely no way to make sure we had adequate plumbing running in and out of the individual pools. In fact, only the first pool nearest the equipment room on the very first level was built with plumbing actually installed before the concrete was poured: The rest were formed without any plumbing whatsoever, and we were left to figure it all out.

That approach, of course, meant we would be adding entire plumbing systems to existing concrete structures – a daunting task that meant whatever we did would have to be as simple as humanly possible. And once again, the amply sized gutter system came into play.

These are vanishing-edge pools that flow into a common trough system, so we figured we wouldn't have to worry about skimmers, bottom drains or other suction-side plumbing runs: All of the water leaving the pools would be driven by gravity and contained entirely by the almost-imperceptibly pitched troughs as it flowed to equipment rooms where it would be filtered, treated with ozone, metered and sent back to each pool individually.

EDGY DETAILS

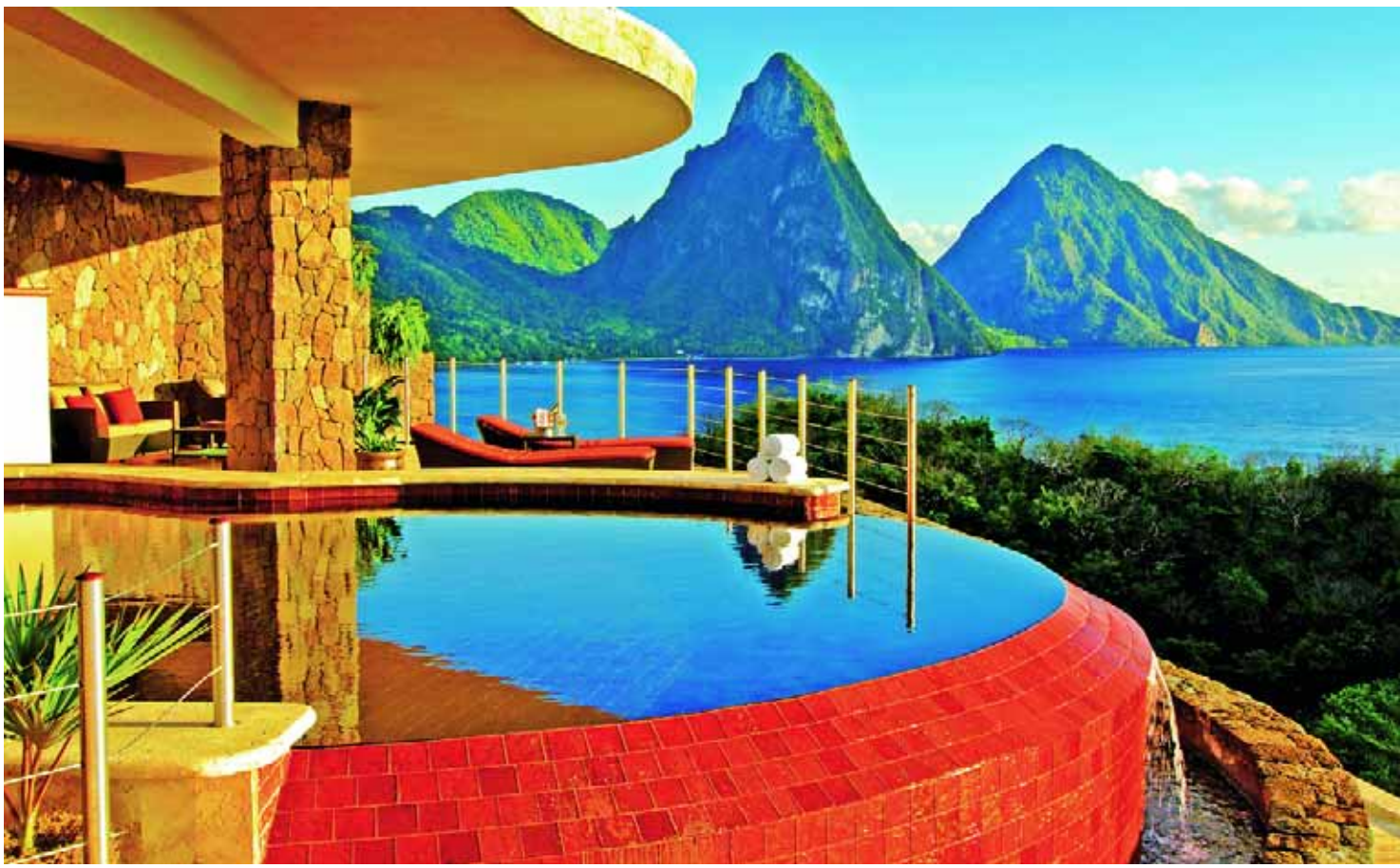
This left us, of course, with the need to get the water back into the pools – a challenge made more difficult in hydraulic terms because some of the pools were right next to the equipment locations while others were hundreds of feet away.

We were *constantly* recalculating the hydraulics and pump and plumbing sizes to ensure adequate return flows to each pool in such a way that they would all have close to the same turnover rate – no small or easy task. And then, of course, we had to decide where to run all this return plumbing.

As it turned out, the easiest thing to do was to run the pipes right along the bottom of the gutters. (At one point, there was discussion of creating a *second* trough system to accommodate all the plumbing, but we determined that the original basins were, in fact, large enough to accept the surge and house the plumbing – another fantastic stroke of good fortune.)

Now each pool has a separate return line that's hidden in the base of the gutter, with a layer of concrete serving to conceal the pipes and fittings. Each run penetrates the dam wall and provides enough flow to wet the edge constantly while ensuring a

As each level of the building was completed, we moved in and began plumbing the return system for anywhere from four to six pools that fed troughs over their vanishing edges. It took a certain amount of finesse to wrap the pipes around some of the tighter radii, and we also had to be absolutely sure of what we were doing, as we were to encase much of the plumbing in concrete once everything was in position.



As everything came together and the water finally started flowing over the beautifully tiled edges, we began to appreciate in a much fuller sense just how breathtaking this place would be.

slow turnover rate that's adequate when nobody's using the pools. When bathers hop in, the water is displaced over the edge and, in effect, more of it is sent down the trough to be filtered, treated and returned.

Along the way to these resolutions, the site itself threw us a couple curveballs. Anse Chastanet is located, for example, quite near a volcano that constantly emits sulfur. In that kind of environment, no components can contain silver of any kind, because the sulfur will cause massive corrosion. We'd never had to consider selecting equipment based solely on its lack of silver content, but in this case, it was very much part of the program.

Then there were the human factors. Troubetzkoy is a remarkable creative dynamo – one of the most adventurous architects one could ever hope to meet. He also likes to surround himself with all sorts of highly opinionated designers and encouraged a great deal of cross-talk and cross-critiquing on all aspects of the project.

This meant that not only did we constantly have to conjure an ever-shifting set of solutions to basic issues, but we also had to defend those solutions to various members of the design team – and sometimes make our case against ideas that, in many cases, made absolutely no sense at all from a water-shaping perspective.

Fortunately, Chris Barnes, who's both a pool builder and gifted hydraulic designer, was on hand to monitor the changing situation and would contact me whenever he saw challenges brewing. There were a few instances when those calls were somewhat stressed, but overall I was amazed at his ability to adapt to the ebb and flow of the process while recognizing possible problems on the horizon.

It was also fortunate with respect to physical issues that the five-level set of equipment rooms were located in a structure set apart from the main building. Water traversing the troughs crosses over a set of aqueducts (pretty amazing on its own) to the equipment building, and each level offered a substantial-enough space that we were able to move things around and pretty much configure the plumbing as needed.

All in all, we ended up redesigning the equipment sets six times throughout the course of the project. Fortunately, although the calculations shifted around quite a bit, they remained straightforward throughout: All we were dealing with was a volumetric calculation of water flowing over the combined length of the edges and along the gutter/trough system to the only suction point in the system at the very end of the trough.

The only hurdle here was mathematical: We had to convert our calculations to the metric system in setting up the sanitizing equipment, which had to be ozone-based because St. Lucia ad-

Certainly the biggest of all on-site improvisations was the last-minute decision to dress up the equipment structure into a decorative, multi-level waterworks in which one reservoir spills over to the one below in a chain of waterfalls. The result will be magnificent – and symbolic of the willingness of the design team to adjust, adapt and reconsider in the grandest possible terms.

heres to European water-treatment and health standards.

VISION TO REALITY

As beautiful and friendly a place as St. Lucia may be, it's a full three-and-a-half-hour flight southeast of Miami and is *not* the easiest place to install a swimming pool of any kind, let alone multiple systems that were this innovative and challenging.

Shipping equipment to the island took a good bit of time, for example, as did transporting provisions to the site once they arrived. The roads are rough, local supplies of basic materials are scarce and it was tough to know what skill levels could be counted on within the local labor pool.

Chris Barnes deserves enormous credit for his ability to solve problems on site and keep everything moving in a positive direction, often under extremely stressful circumstances. He was the one saddled with responsibility for ordering requisite materials and components way ahead of time – and for describing each need to project managers before the orders could be placed.

He did a masterful job of managing an ongoing, constantly fluctuating set of situations and, in my book, pulled off one of the greatest-ever feats of water-shaping I've ever seen from both the technical and installation perspectives.

When we finally started filling the pools and initializing the systems, we ran into a need for a significant amount of debugging and adjusting, but from the very start we could see the visual impression the sculpted water elements were making – an indescribable beauty and elegance that was everything Troubetzkoy had envisioned.

If ever there was a job that needs to be seen to be fully comprehend, this is it. The photos that accompany this story and the others in this issue are undeniably beautiful, but to appreciate in full just how mesmerizing this blend of water, space and scenery actually is, you simply have to be there.

Among the many wonderful aesthetic elements at play at Jade Mountain are the spectacular glass-tile mosaics created by David Knox of Lightstreams Glass Tile (Mountain View, Calif.) – an achievement he discusses on his own beginning on page 58. Each pool is finished with a unique combination of tiles, all infused with wildly reflective textures that change appearances in the shifting light.

Every room is appointed with fine furnishings, lighting and plumbing fixtures, and everything is tied together by the presence of the water, wonderful reflections and soothing sounds – genuinely unforgettable.

For my part, I know that for all the wonderful projects that will come along in the rest of my career, there simply will never be another Jade Mountain.

By Nick Troubetzkoy

For more than 25 years, architect Nick Troubetzkoy has envisioned a uniquely natural resort on the island of St. Lucia: No telephones, no televisions, no clocks – just a complete separation from the workaday world in a setting of unmatched beauty. He's realized his dreams in Jade Mountain, a marvel of organic architectural design and host to more than two dozen vanishing-edge pools and water-features set amidst hanging gardens.

I first came to St. Lucia in 1970 to work for a Canadian architectural firm based on the island. As it has turned out, I never left.

The beauty of St. Lucia's landscapes, the warmth and character of its people and the unlimited potential to create something very special here captured my imagination. It's a Caribbean paradise one must experience personally to fully appreciate and understand.

When I first encountered the property that is now home to Anse Chastanet and Jade Mountain in 1974, there was almost nothing here – a handful of small bungalows nestled in the rainforest across maybe five acres of land. Amenities included four aluminum umbrellas and four plastic lounge chairs on the sand, and there was a lady who sat at the bottom of the stairs leading to the beach. She had a cooler filled with Cokes and a bottle of local rum, enabling you to enjoy the beautiful setting and have a drink. But the occupancy rate was very low and nothing about the place beyond the setting would make anyone want to come back.

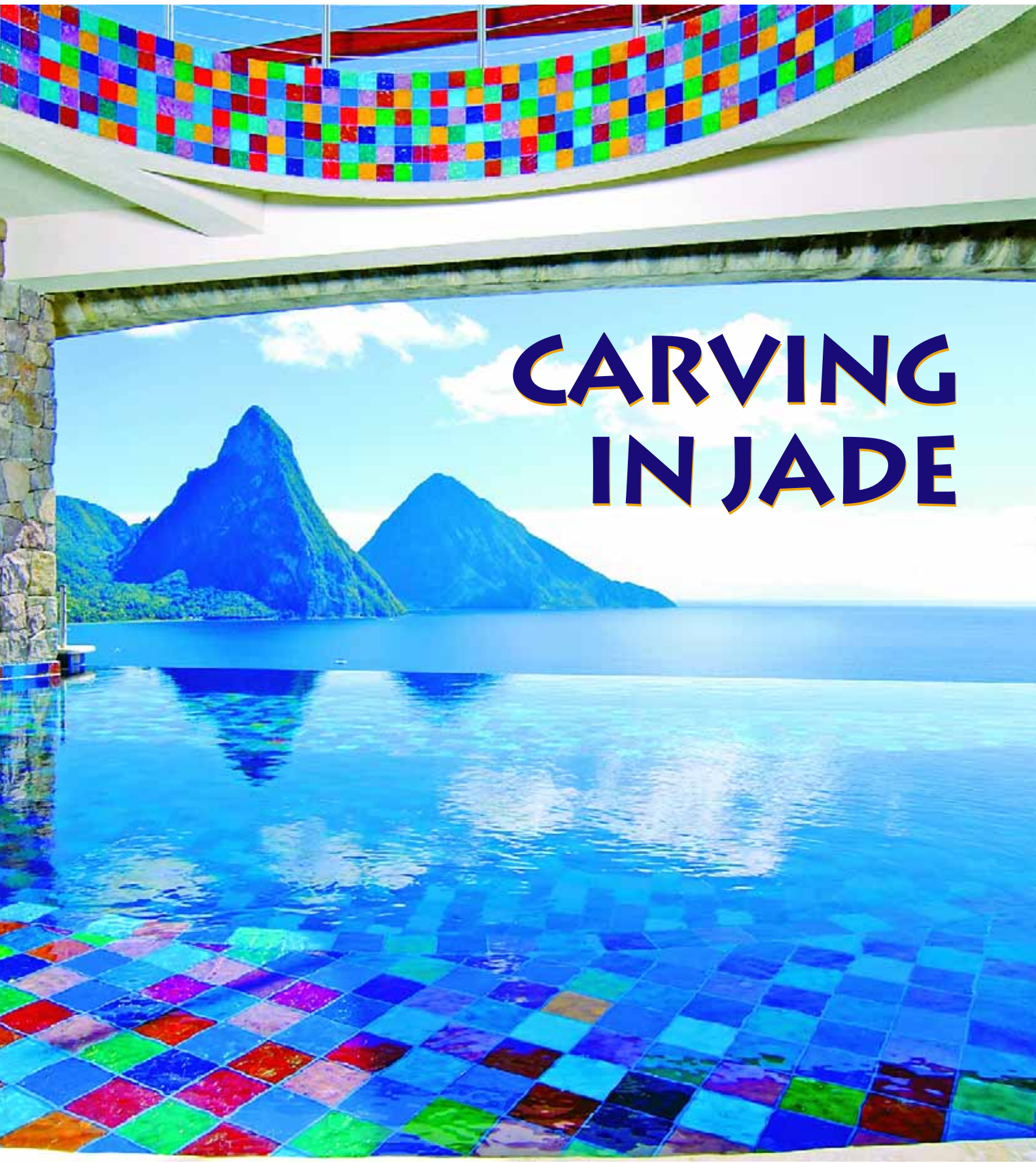
That has changed, I think, and for the better.

LOOKING OUTWARD

It was my ambition from the beginning to create an environment that fully captured the island's beauty. Whether or not I've been successful in that effort is up to others to decide, of course, but on balance, I believe that we have made this part of the island a better place since those early days while still retaining the essence of the old atmosphere when all you could do was sit by the water and enjoy a strong drink served by a charmingly hospitable St. Lucian.

The first thing we did was open up the existing rooms to the environment. Simply by knocking out large portions of the walls, we found that each of the bungalows offered amazing views of the twin peaks known as the Pitons. From the start, those two magnificent mountains, draped in rainforest green, have always looked to me as though they'd been carved out of jade.

Almost immediately, the new approach proved successful. People who came



CARVING IN JADE

to stay felt as though they were connected to the surroundings: Our guests soaked in the views, breathed the fresh, clean air deeply and found release, relief and comfort. Why anyone who has a choice would want to stay in a room that closed them off from their surroundings was a mystery to me – and a notion that would later shape our work on Jade Mountain.

The first resort we created on site – Anse Chastanet – was an extension of the original property and a tribute to the island and its remarkable beauty and tranquility. The suites could loosely be described as French Colonial, which is appropriate given the island's history, and are spread apart in various locations around the property, some by the beach, others up on the hillsides. Each is different and has its own character, but what they all have in common is an openness to the surroundings that fosters a feeling of connection to the landscape among our guests.

I was attracted to the setting for a number of obvious reasons and, through the years, used the original Anse Chastanet resort as something of a proving ground for ideas completely realized in Jade Mountain. Blowing out a wall in one of the old bungalows was one key concept: Opening the French Colonial-style suites to the outside environment was a big step we fully embodied in our work on the new building.

To do things in any other way when faced with such natural beauty just never made any sense to me at all. Through experience, however, I found that few hoteliers and resort owners saw it my way.

Indeed, the development of Jade Mountain is in some respects a response to almost every hotel I've ever visited. I'm certainly not the most well-traveled person, but I've been very fortunate to cover much of the world and have always made a point of staying in or at least

visiting the most interesting hotels and the finest suites they have available.

In most instances, I found myself being disappointed by what I encountered.

AN OPEN CONCEPT

Typically, the "suites" in most hotels are nothing more than a combined set of standard hotel rooms in which some of the dividing walls have been knocked down to create larger spaces.

Once such a space has been cleared, an interior decorator furnishes the room with quality period pieces that have been purchased and placed to set a tone. But the suites themselves, though larger, are really no different from any of the other rooms: You look out through the same windows as the rest of the guests and find yourself within the same architectural environment.

On top of this, these rooms tend to be compartmentalized and bogged down in too many furnishings as well as distracting gimmickry and gadgetry. Rarely have I seen a premium suite that featured any kind of grand space. So I'd sit on the period chairs, look out my windows and always feel confined by the standard-issue nine-foot ceilings, rarely finding anything that made me feel excited about staying in the room. This is the mode of design historically used in most hotels in most major cities – a cookie-cutter approach I've seriously come to question.

What I've really wanted to do with Jade Mountain is reevaluate and redesign the basic concept of a holiday/hotel experience. I wanted to create individualized spatial environments that would enable guests to forget about the furniture or the fact that they're in a hotel room – in essence, to forget about everything but experiencing the psychology of the space on an intuitive level.

This is why our traditional hotel corridor has been transformed into long, suspended, elevated, *dramatic* private bridges that lead each guest to a personal sanctuary, a personal vanishing-edge pool and a personal view.

We call the spaces in Jade Mountain *sanctuaries* rather than rooms or suites, basically because they are unlike anything so conventional. Even the bathroom facilities and tubs are open to the environment – something most people seem to get used to easily because of the privacy and seclusion of the setting.

My goal was to develop public and private spaces and experiences that would give guests an ethereal, spiritual lift. This is why, for example, the ceilings at Jade Mountain are all 15 feet high: There is no sense of a structure bearing down on you.

We also eliminated an entire wall from each room, opening the interior space to the glorious exterior. There are also very few right angles, giving the spaces a freer-flowing geometry in which everything moves toward the exterior environment and the amazing views. In sum, we aimed to give our guests the feeling of entering a private space fully integrated into the island's ecology.

As one moves forward in the sanctuaries, maybe at first one sees no more than a pointed reflection off the pool. But almost immediately, the view in the distance dominates the scene as guests see and become mesmerized by the Pitons – twin peaks whose green surfaces in part inspired the naming of Jade Mountain. It's a setting of almost unequaled romance and comfort.

FROM THE HEIGHTS

I came to these ideas early on. As far back as the 1970s, I remember asking our guests why we didn't see very much of them outside their rooms. Consistently, I was told that they were simply relaxing, breathing the air, basking in the surroundings and enjoying a wonderful sense of calm and peace. When you compare that experience to being boxed into a traditional hotel room, breathing recirculated, machine-processed air, the difference is enormous.

Jade Mountain is my attempt to capture this set of concepts at the highest possible level and to vest it into a structure that looks, feels and is indeed a work of sculptural, environmental and elementally indigenous art.

In turning this design philosophy into physical reality, we faced many formidable challenges, the first of the two most prominent being the extremely steep terrain. The site for Jade Mountain was chosen because of the way we could orient the structure toward the view of the landscape, the ocean and the Pitons – a prime confluence that could only be achieved on an extremely precipitous part of a mountainside.

Indeed, there was really only one spot in the entire 600-acre property that accommodated the view without any compromise: If we shifted things too far to the left or right, hillsides or cliffs would have interrupted the views. In establishing the footprint of the building, we also determined that the structure could only accommodate six rooms side to side, which meant that moving up the hillside vertically was the only way to maximize the use of the space.

That's how the structure's design emerged: It was a direct reflection of the land itself.

Early on, we had planned to locate several villas throughout

the property, but that idea fell out of favor almost immediately: We feared the project would've looked like an upscale housing development transported to St. Lucia from some urban center. In effect, Jade Mountain's structure is a grand design solution – the answer to the challenge of maximizing use of the space without consuming too much of the land that makes the overall resort so attractive.

The second formidable challenge had to do with building Jade Mountain without disrupting Anse Chastanet, which is located right alongside Jade Mountain and is fully occupied year round. We needed a special building contractor – one rigged for a silent operation and with a profound ability to twist and turn at Anse Chastanet's command as a means of preserving its business. Our solution was to start our own full-fledged construction company: This gave us total control at all times.

LEVEL BY LEVEL

Of course, building a large, multi-level building in such a locale is an extremely costly and difficult proposition. Just establishing the footprint involved constructing massive retaining walls and foundation structures. And not only was it a fantastically difficult site logistically, but there was also the problem of the physical labor required to build *anything* on a tropical island, let alone a towering freeform structure made entirely of reinforced, cast-in-place concrete.

On the design side, there's no denying my background as an architect and the influence of people I've worked for and with or have admired through the years, but to the largest extent possible, Jade Mountain is entirely original, basically because of the

From the start, Jade Mountain was envisioned as an organic expression that would reflect and amplify its tropical setting – a sense reinforced by the improvisational manner in which it was designed and built. Eventually it will be draped almost entirely in green, the better to make it visually recede into its jungle home. Note that the walkways provide staff and guests with their only access to the sanctuaries – there are no corridors here, and this is yet another way in which we ensure our guests' privacy and provide them with a sense of seclusion.

St. Lucia is a wonderful place. Its beauty and character inspired us to use local materials whenever and wherever we could. Much of the stone was quarried locally, for example, and a substantial proportion of the woodwork and furnishings were produced in Anse Chastanet's expansive woodworking shop.

DRINKING DEEPLY

When you think about the absolute "forty days in the wilderness" essentials of human existence, the baseline always comes down to air and water: We need both to live, obviously, but most of us are also aware that air and water have the remarkable ability to bring us intense pleasure.

I have mentioned how the air one breathes here is at the very core of the St. Lucia experience and how we have sought to create spaces that make the mere process of breathing special. In the same vein, water is also a key component in creating that sensation of being removed from everyday life.

From the start we wanted every sanctuary in Jade Mountain to have its own vanishing-edge pool, the thought being that one can breathe and bath freely in complete privacy while still being intimately connected to the environment. That idea is at the heart of the design at Jade Mountain, but as the project developed, the pools underwent the same sort of incremental design process as the rest of the structure.

If there's a common design element among the pools, it's that all of them have their walls raised 18 inches above floor level. To me, there's something intrinsically intimidating about looking down into water 6 inches below the level of your feet, so we raised the pools above floor level to bring them fully into the human geometry of the interior spaces.

Guests can now lounge on pillows on the edge of the pool on two-foot-wide copings that act as benches, casually run their hands through the water while sitting in chairs, get in easily or remain dry instead. You can be in the water and intimately interact with someone who's not – and vice versa.

To me, these raised basins create a sense of intimacy with the water, a real invitation to enter and interact. They also mean the wonderful reflections that occur on the pools' surfaces are brought that much closer to the viewer and become a greater part of the experience.

When you combine the water with the air in this way, I believe you unlock a profound potential for an almost magical level of enjoyment and celebration – a magic that may well be the ultimate achievement at Jade Mountain.

To me, however, Jade Mountain embodies a task so large that it will probably never be "finished" in some respects – but I'm comfortable with that. I take great pleasure in seeing it as a grand, organic work of art growing in the landscape, and I treasure the restlessness that's involved with a project of this scope and complexity.

Most of all, I prize the spirit of ongoing creation that has for me always been the heart of this beautiful place. If we have captured a portion of the island's beauty and quality of life in our work here and can share it with visitors, then I think we've done something of real value.

– N.T.

way it responds to its site.

In fact, the final design only began to unfold during the construction process: We created forms in which to place steel and pour concrete one level at a time, essentially improvising as we moved upward. With each level, in fact, a large part of the creative process occurred as we were placing the freeform plywood plates upon which we set the reinforcing steel and hand-poured the concrete.

Simply put, a number of elements within Jade Mountain defied architectural convention. There are, for example, very few dividing walls that are directly on top of other walls. There are some, of course, but for the most part each room and each level are completely different from the rest, and there is no structural patterning of the building in the traditional sense.

This unusual approach forced us constantly to consider the structural aspects of the building and adjust our structural- and design-component interactions as the work progressed. Structurally this meant that we had to develop some extremely creative mechanisms for transferring the weight of locomotives (in the shape of swimming pools) from vertical walls to horizontal floors and across significant spans.

One of many problems facing those who worked on the project was that the building appeared to be in a constant state of change. But in this case, "change" didn't mean ripping things

Our self-sufficiency is reflected as well in the plants we're introducing throughout Jade Mountain. We have an extensive, on-property nursery system and grow everything from ferns and groundcovers to flowering and large potted plants. We've also developed a reservoir system to collect rainwater and free ourselves from reliance on municipal water supplies and have opened our own water-treatment plant.

out and starting over or going backwards. Instead, we were very careful in the choices we made and were sure, by the time we took each incremental step, that we were making the best possible decision.

In a sense, it was as if the structure incrementally *evolved*. This procedure required intense and constant site supervision by the entire team.

SCULPTURAL FORMS

For me, however, it was always about the rooms, the sanctuaries: In everything we did, we kept the experience of living in these spaces in the forefront.

As we progressed up to each successive level, we also examined everything with site lines and viewpoints in mind and established the design parameters for each successive level in advance of starting any new level's formwork. As the design unfolded and the building grew floor by floor, we were essentially sculpting shapes out of concrete with the wooden formwork as our tool.

From an engineering standpoint, this approach meant that we had to create the structure in such a way that we were never limited by any lack of structural strength in the levels below. In other words, we literally had to stack the deck to give ourselves the freedom to create whatever we wanted on the upper levels.

This is an unusual way to work in a day and age when modular, stacked construction is the norm, and it meant that all of the collaborating designers, engineers and project managers had to be on hand to accommodate emerging technical needs. The resulting design tended to include lots of curves and few sharp angles, and most of the design elements are free-flowing, including the pools. It was extremely demanding, but we took no shortcuts in the form of repetitive design elements or structural motifs.

Because of the remote and precipitous location of Jade Mountain, there was no way to deploy the usual armada of concrete-delivery trucks. In fact, the entire structure, which encompasses tens of thousands of cubic yards of concrete, was all prepared in countless batches in household-size concrete mixers scattered around the site on small ledges carved out of the hillside. All of the concrete was "delivered" by means of chutes and wheelbarrows and poured by hand into the formwork.

It was an incredible process that called on hundreds of intrepid workers all drawn from the local community. They put in thousands upon thousands of backbreaking hours in building the forms and mixing and pouring the concrete. It was remarkable: On the one hand, we had this unusual, improvisational design and engineering work going on each step of the way, with all sorts of lively give and take among some brilliant and creative people. On the other, we had a determined labor force crawling all over the mountainside, constructing Jade Mountain one plank, one nail and one shovel's worth of sand, cement, gravel and concrete at a time.

For much of the project, it really did seem as though we were

attempting the impossible.

MATERIAL ESSENTIALS

From the start, we always wanted Jade Mountain to feel like a natural extension of and a tribute to its island environment and the Caribbean. That ethos influenced every aspect of the design, especially when it came to the selection of materials.

Basically, we decided to look down at the ground and use what we found at our feet, allowing the island itself to dictate much of the color palette and materials selections. The sand and gravel we used for the concrete, for example, is drawn from the property itself. We set up our own mining and rock-crushing sites – a tremendous advantage because we didn't have to import all that material. The rose-gray, hand-split stone cladding material used throughout was also sourced on our property and from other sources on the island.

And when it came to materials we couldn't find close to home, we turned to our Caribbean neighbors, bringing in blush-colored coral finishes found in Barbados, various tropical hardwoods from Guyana and an array of coral tiles from the Dominican Republic.

All the water used to fill the pools and supply the rooms will come from our own system of reservoirs, which have been designed to hold three million gallons of water and feed our on-site water-treatment plant. And all of the water comes to us in the form of rainwater that feeds an extensive year-round system of streams.

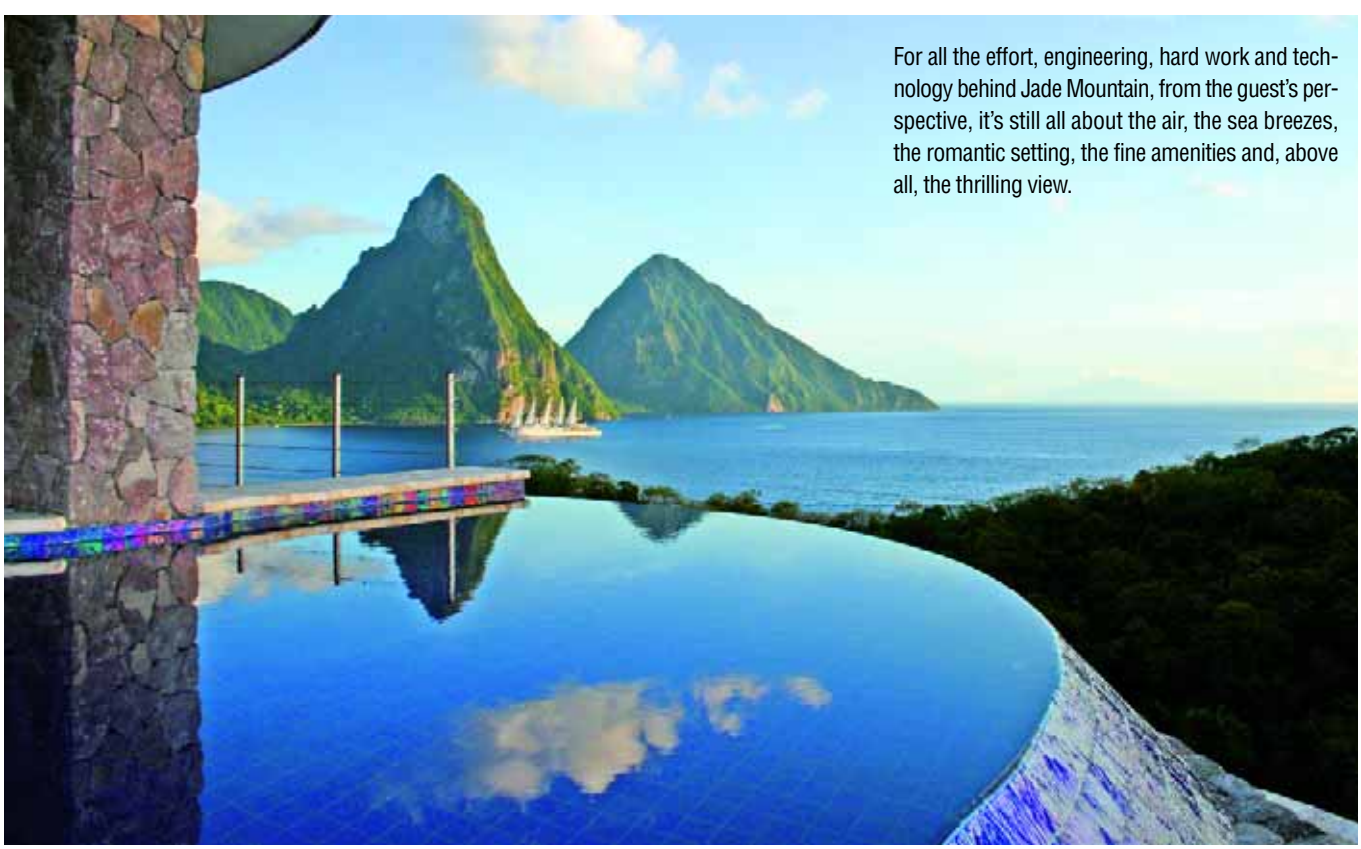
We also established extensive millwork and fine-woodworking operations on site, and most of the woodwork and many of our furnishings were made here using dense tropical hardwoods. (This material was harvested in Guyana using principles of sustainable forestry.) More than two dozen fantastic wood species have lent their subtle colors and textures to Jade Mountain in rich and sometimes surprising ways, including Bloodwood, Cabbagewood, Etikburabali, Taurino, Locust, Ebony, Snakewood, Futukbali, Mora, Kabukali, Purpleheart, Monkey Pod, Satinwood and Rosewood.

Our woodworking facility turned out thousands of custom wooden components, including every door – some of them 12 feet tall. And every louver window was handmade right here.

We also have our own garden nursery, where we're currently propagating thousands of tropical plants that will be used to landscape the building and the surrounding areas. This process in particular will take an indefinite period of time, as our goal is to drape the structure in greenery in ways that will evoke images of hanging gardens and of the iconic Pitons themselves.

In all cases, we've dedicated our efforts to environmental conservation and preservation: We have used absolutely no clear-cut wood, for example, and we set up our quarrying operations to occupy the smallest-possible footprints. We even treat our own sewage, sending it to aerobic reed beds and preparing it for safe use in our irrigation systems.

What I've covered here, of course, is nothing more than a scratching of the surface, a taste of what the project has been about through the past 25 years. There are so many other things I might have discussed, so many details that will make our guests want to return again and again, but space won't permit it. Let me conclude by letting you know it's a special place – one you should probably see for yourself.



For all the effort, engineering, hard work and technology behind Jade Mountain, from the guest's perspective, it's still all about the air, the sea breezes, the romantic setting, the fine amenities and, above all, the thrilling view.

By Chris Barnes

TROUGHS AND TRENCHES

The design and installation of the circulation, filtration and chemical-treatment systems for the pools at St. Lucia's Jade Mountain was a task of monumental proportions and extreme technical, physical and logistical difficulty. The effort was spearheaded by watershaper/hydraulics expert Chris Barnes, who spent months on site installing precision systems engineered to provide years of nearly maintenance-free service.

Installing the circulation systems for the pools at Jade Mountain was a challenge unlike any other.

I was first approached about the project by my good friend, Skip Phillips, who explained that he had already been working on the project's design for several years and indicated that it was going to be something truly amazing. He observed that the owner and his design team didn't have anyone in place with any experience with the installation of extremely complex watershapes and suggested that I might be the one to step up to the challenge and keep the work flowing smoothly.

Although I had previously amassed a great deal of experience with top-flight commercial and residential projects – everything from Olympic and resort pools to fountains and baptismal fonts – I had never ventured quite so far beyond my southern California base. I'd worked on projects in other parts of the United States, but St. Lucia was way off the reservation and confronted me with all sorts of unknowns and variables.

As I learned more about the project, the vision of the owner and the island of St. Lucia itself, however, I became more and more intrigued – and just a bit intimidated. But knowing that jobs like this

one might never come my way again if I didn't jump in right away, I decided to take the plunge.

Starting with an initial site visit in February 2005, I ended up spending more than four months on site in four separate trips as the work progressed. During that time, I pushed myself to the limits of my technical and organizational skills, patience and flexibility – not to mention my physical endurance.

A GOOD EXAMPLE

The scope of work was quite well defined: My crew and I were to install all of the circulation equipment and plumb the pools.

That sounded straightforward enough, and in fact, the original idea was that I would install only one of the systems for just one of the five floors and that, armed with procedures I'd established, the staff would simply replicate what I had done for the other four levels.

As described elsewhere in this sequence of articles, each floor has four to six pools housed in individual "sanctuaries" linked by a long collection trough that runs across the front of a line of vanishing-edge pools on each of the building's floors. Circulation for each level was to be handled by its own system, each one located in a separate equipment building situated adjacent to Jade Mountain's main structure.

Although unusual by any standard, it initially made sense that a model system might be replicated on other floors and that my main task would be to create a reproducible prototype. Unfortunately, that idea didn't last.

I could see even on my first visit that the equipment rooms were *not* going to be even approximately uniform in anything but the physical space made available on each floor of the structure. The fact that the number of pools wasn't the same from floor to floor and that distances from the pools to the equipment were variable made that impossible. Yes, basic functionality of each system was more or less similar, but there

It is surely the most unusual job site I've ever seen, and in all the times I was on hand to work on the hydraulic systems for Jade Mountain's two dozen vanishing-edge pools, I had the sense of working in a beehive of activity as we moved step by step through a process that was highly improvisational while also demanding the highest levels of quality.




The verticality of the spaces in which we worked always impressed me: In our portion of the project, we were always on the edge in more ways than one, and the way crews moved concrete from place to place using corrugated-metal sluices was a constant source of wonder and amazement.

were numerous details that would be quite different from floor to floor.

The upshot was that my first working visit in August 2005 – which was supposed to last two to three weeks – ended up with me on site for more than two months.

As our work moved forward, we kept running into seemingly small distinctions that made big differences. The site, for example, has 50-cycle power service instead of the 60-cycle service we were familiar with back home. In the early planning, we were going to have two-horsepower pumps achieve flow rates just shy of 500 gallons per minute to drive water over the edges along the collective length of each floor. When Skip Phillips recognized the 50-cycle service and its implications, we had to redesign around *three*-horsepower pumps, which had all sorts of hydraulic and physical ramifications.

Right from that first visit, in other words, the systems were in an almost constant state of evolution and revision.

LEARNING THE ROPES

There was much more improvisation where that came from.

Originally, for example, Skip Phillips had designed the system to use cartridge filtration, the aim being to elevate the system's ability to capture small particulates and enhance overall water quality. That would have meant more maintenance in taking apart the filters and cleaning them, however, so the project team opted instead for sand filters and their simple backwash routines.

Another cluster of issues surrounded the need to cope with the sulfur-tinged air and the salty seaside environment: This meant we had to hunt down fittings, anchors and components made exclusively of stainless steel and fiberglass-reinforced plastic – a taller order than any of us thought it would be.

Every step of the way, we were told to go for reliability and durability and never to cut corners. As a result, all systems have been fabricated with schedule 80 plumbing, true union and flange fittings, stainless steel bolts, heavy-duty valves and a host of other components that went as far as we could go toward guaranteeing long-term performance with low maintenance. The desire was to avoid any downtime of the sort that can spell disaster for resorts at any level, let alone one so high.

Finally, during the project (and actually toward its end), the design team decided that the systems flowing to the equipment

To say that working in this environment could be precarious is something of an understatement, as these interesting catwalks (and their ability to support the project's army of concrete-laden wheelbarrows) clearly demonstrate. But all who worked here were fully aware of their surroundings, and it is with no small pride that we can say we all managed to come through unscathed.

rooms needed to feature complex sets of reflecting pools and waterfalls both to beautify the equipment building and mask the operating noise of the systems. This addition brought an entirely new set of wrinkles to the systems, all of which required on-site design on a deadline.

When it's all added up, these factors and design objectives required hands-on installation and project management throughout system development, and I was elected.

Fortunately, none of the mechanical systems we deployed were terribly unusual or overly complex. The three-horsepower pumps, for example, were stock items from Hayward Pool Products (Elizabeth, N.J.), while the sand filters were made by Pentair Water Pool & Spa (Sanford. N.C.). The ozone-generation system was produced by DEL Ozone of San Luis Obispo, Calif., while the salt chlorinators came from Auto Pilot (Fort Lauderdale, Fla.).

In all, we installed 25 pumps, 18 filters and five ozone- and chlorine-generating systems along with hundreds of valves, countless fittings and thousands of feet of pipe.

ACROSS THE SPAN

As Skip Phillips mentioned in his article in this issue, there are no suction lines on these pools. All water for each level runs back to the equipment rooms via the troughs, then spans a large gap between the main building and the equipment building via suspended aqueducts. Near the equipment rooms (but still outside), the water collects in separate 25-foot-long, eight-foot-wide, four-foot-deep reflecting pools associated with each respective equipment block.

The return lines, which in some cases run for several hundred feet, are all encased in concrete in the floors of the troughs. But first, the filtered water is sent through the 12-inch-thick, poured-in-place concrete walls of the equipment room and into collection pools placed atop the equipment rooms before recrossing the aqueducts and heading back to the individual pools in the guest suites.

The addition of the waterfeature complex by the equipment rooms was by far the biggest change and among the largest technical challenges we faced. We were somewhat taken aback by what was, after all, an afterthought of amazing scope and dimension, but on some level, I suppose it was the kind of shift we'd come to expect in the course of the project.

The whole area was built without any scale drawings and took advantage of the fact that the equipment rooms were terraced. Now, in front of each walkway, there's a sheeting waterfall that flows from a pool above to another pool on the next level down. In each case, water from what amounts to yet another set of vanishing-edge effects is pumped back up a level before it is filtered and treated.

Equipment for the new systems, of course, had to be contained within the existing equipment rooms and spaces already packed with other gear. Each of the new waterfeatures is driven by a seven-and-a-half-horsepower pump with eight-inch plumbing that runs in new troughs we dug into the hill-

side behind the equipment rooms.

We hadn't anticipated all of the penetrations in the roofs of these rooms, and it meant we had to go to extreme lengths to create watertight seals for the plumbing runs – including systems of "link seals" at the tops and bottoms of the penetrations along with urethane water-sealing membranes.

In all my years of constructing watershapes of all shapes and sizes, I've never been asked to create an added system so extensive so late in the game, but that's exactly what happened here – and the results, I must say, are magnificent.

MOVING MATERIALS

In rolling through all of this, one of the points I keep coming back to in my mind is the fact that all of this evolution and revision was happening on an island far away from easy sources of supply.

Indeed, one of our biggest challenges involved getting the materials and equipment to the job site. We had to plan out systems in great detail and order everything from sources in the United States down to the smallest pieces of hardware. Everything had to be relayed to a shipping terminal in Miami,

No matter where you worked at Jade Mountain, there was a constant sense of visual grandeur, whether it was in the aqueducts that carried water from the main building to the equipment rooms or the walkways that offered access to the suites or the mass of the main structure itself. It was quite a place to work, believe me.

where it was all loaded into containers and put on boats. From there, the voyage began to St. Lucia – a trip that takes about a week.

When they arrived on the island, all containers were opened and the materials inventoried against the manifests down to the smallest item – a process that left all the materials in jumbled chaos. If there were any discrepancies, an entire shipment might be held up for as long as a month as miles of red tape were accommodated.

Try as we might and especially at first, we made occasional, minor mistakes in the paperwork, and there were a few occasions where we were never able to recover the materials at all: They just disappeared into various storage areas and warehousing facilities along the way. It didn't take us long to appreciate just how critical it was to pay attention to the slightest paperwork details. There was, quite literally, no room for error.

Even when things went smoothly, it took a full month to get material from Miami to the job site. And once it arrived at Anse Chastanet, we faced issues getting the materials we needed through their receiving department and storage facilities and out to the site. It was a context in which we always had to plan

Although it wasn't part of our mission, we worked in fairly steady contact with the crews installing the glass tile on Jade Mountain's pools. The heat was sometimes oppressive, necessitating the use of shade frames and tarps to allow the tiles to set properly.

The whole structure is poured-in-place concrete and not much was anticipated by way of penetrations or chases or any other accommodation for plumbing. The bathrooms, for example, were handled by running pipes under the wooden floors, and we plumbed the pools by core drilling as needed through the shells into the troughs. But sometimes getting pipes from place to place was an interesting study in geometry and simply making things fit.

our work as methodically and accurately as possible.

Added for good measure was the piecemeal way in the buildings themselves emerged on the mountainside. We were seldom able to move smoothly from one phase to the next – my strong preference and long-time practice on large jobs – but instead had to jump around to accommodate the various and ever-changing stages of construction. It was a level of improvisation to which I was completely unaccustomed, and I can't say with confidence that I became any more comfortable with it as the work progressed.

Truth be told, once we were into the installation process, we rarely knew from one day to the next exactly what we would be doing. No two days were ever remotely the same, and it seemed that there was always some sort of large technical question or logistical issue that had to be solved each and every time I turned around.

HILLSIDE HIVE

And of course, we were not alone in this.

We pursued our tasks as a subgroup within a massive beehive teeming with manpower, materials and equipment, often under a burning-hot tropical sun. Simple issues of staying hydrated and cool enough to concentrate were constant challenges, and there's no denying that this was a hazardous job site, with scores of people working on narrow planks and scaffolds suspended on the face of a cliff. If you weren't mentally sharp and physically up to the challenge, you put yourself at significant physical risk.

Amazingly, no one in my crew (or on any others) suffered any sort of serious injury. And somehow, in some way, all the materials we needed made it there: We completed our work, and everything worked perfectly when we turned it all on. Thinking back on the mental, physical and logistical ordeals, I almost get tired just remembering the long, winding, tricky path we followed to reach that point.

But I'm getting a bit ahead of myself, because that start-up process was a major challenge in itself – one that required even more patience and ingenuity. Getting chemicals on site, for example, became a major issue. We needed the usual – salt, chlorine, clarifiers, cyanuric acid, pH adjusters and the like – but we had a devil of a time clearing things through the import process and doubted we'd get everything there in time to open the pools on schedule.

To get around that problem, we told the staff what we needed and they fanned out over the entire island to every available source of swimming pool chemicals – in the process depleting St. Lucia of all available supplies for a while. I don't know what strings had to be pulled or how much was spent, but knowing the place as I do now, the effort must have been *epic*.

Water for the entire resort is currently supplied by the local municipality and is expensive, of low volume and has unpredictable downtimes. To get around that situation, the resort is developing a series of reservoirs and treatment systems. We used collected rainwater, for example, to fill the pools, but it had been stored, untreated and unfiltered, for an extended period. By the time we were ready to go, most of it was rife and green with algae.

At first, we backwashed the filter sand thrice daily, adding chemicals and testing and retesting the water several times each day. We knew immediately that the systems were working and that the water was slowly improving, but the process was taking weeks and we were uncertain about how pristine we could make it by the deadline the owner had established. Happily, the chemical treatment/filtration regime grabbed hold: By the time

ABOVE AND BEYOND

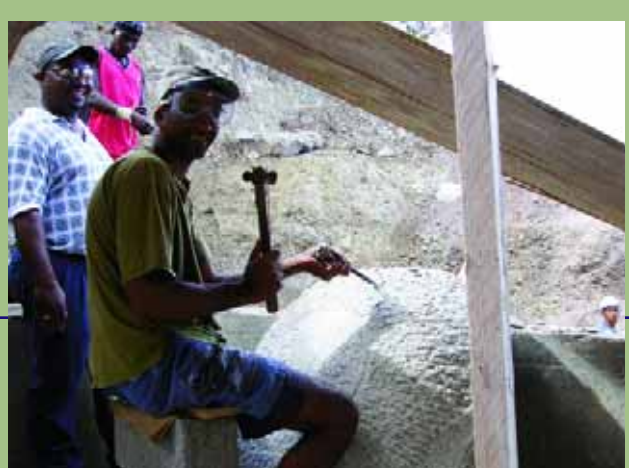
As difficult as our work was in developing the pools for Jade Mountain, our endeavors paled in comparison to the herculean effort required to build the concrete structures that make up the main building and the equipment rooms.

I've truly never seen anything like it: Everything was done with dozens of small cement mixers and hundreds of laborers, with concrete moving down the cliff face via a system of corrugated-metal chutes. The wheelbarrows were filled, rolled to the structure and poured into the forms – a process repeated tens of thousands of times.

The laborers, all of whom came from the island's population, moved up and down the slopes and over and around the structures carrying unbelievable heavy loads with seeming ease. The sheer physicality of the work was mind-boggling, and I was amazed by the range of their ages, from 15 to 50. I was awed by men who were able to walk up steep slopes carrying bags of cement on their heads while negotiating incredibly treacherous footing.

Superhuman: That's the word that best describes what they did.

– C.B.



the rooms were opened for guests, the water was crystal clear.

BRINGING IT HOME

In considering the nature of this project, I'm mindful that it is a story involving such enormous effort and complexity that it could probably fill a book of several hundred pages. Every day on the job was its own new adventure, and there were times when I wondered if we'd ever truly be finished.

Eventually, however, our toil and struggle resulted in watershape systems of the most sublime artistic beauty and dazzling sensuality – an accomplishment that may well exceed what anyone could have conceived or imagined. I'm proud of the fact that my crews and I and were up to the challenge: Not only did we get the job done, but we did it well and managed, despite the rigors, to get caught up in the general spirit of fun and excitement that permeated the atmosphere on the job site.

I know it's unlikely that the people who dip their bodies in these beautiful pools will ever have a real idea how much effort it took to create those environments, but I am certain to the core they will get a clear sense that they, too, are partaking of something very special.

The relative chaos beyond the equipment room settled into complete normalcy and formality once we crossed into that space, basically because our charge was to maximize ease of maintenance and minimize any potential for downtime. There was little room to spare with the original array of equipment, and things became tighter still when we added the big pumps and plumbing (seen at right) to drive the equipment structure's decorative water system.

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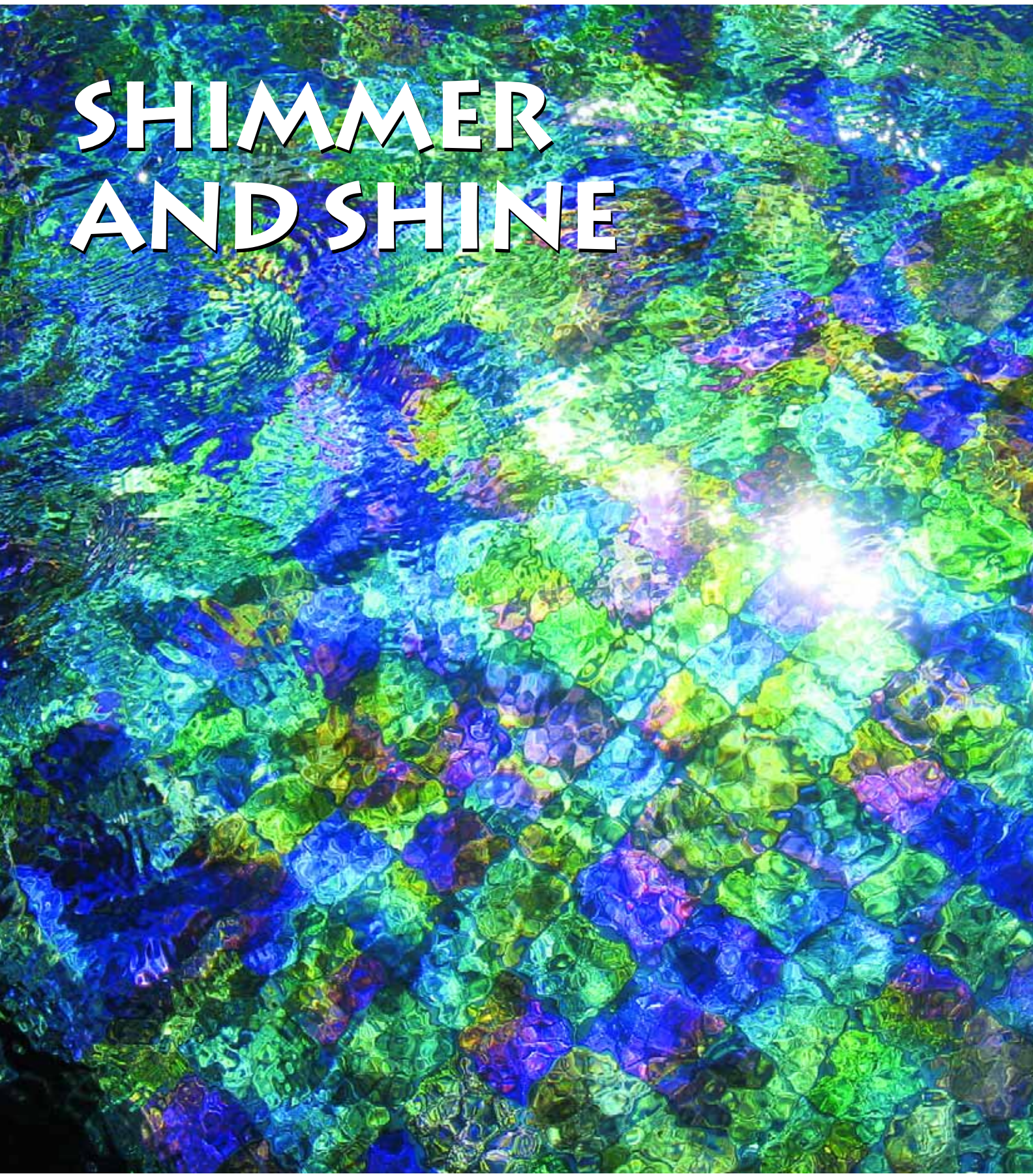
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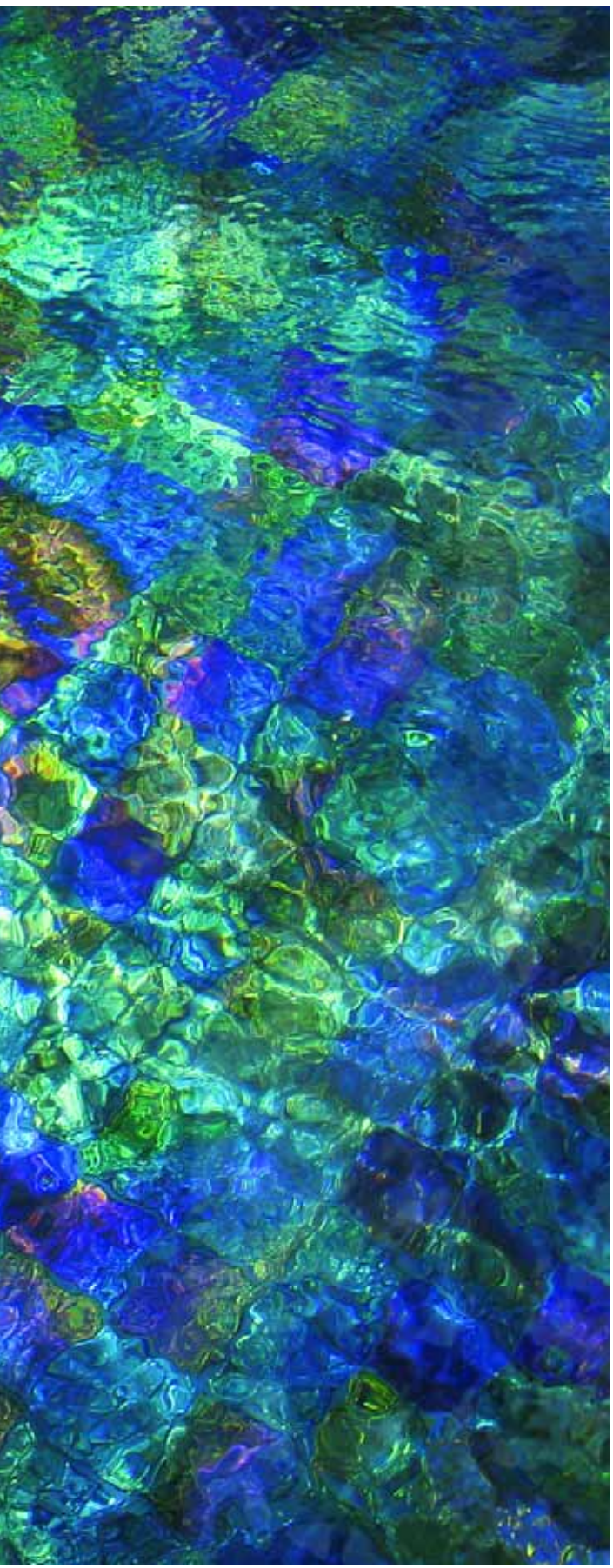

By David Knox

Looking for a surface material as unique as the resort itself, the designers of Jade Mountain turned to David Knox of Lightstreams to create completely original tile products for use in the structure's 25 vanishing-edge pools, with each one to have its own unique colors and optical qualities. Here, Knox describes the process of deploying glass tiles throughout one of the world's most unique and extensive watershape environments.

For me, Jade Mountain is not simply a resort in St Lucia: It's more of a spiritual and artistic achievement – and one I helped fashion through a period of 15 months.

I felt that sense of operating on a higher plane during my first visit to the parent resort, Anse Chastanet, in March 2005. There was something different about the project, just as there was something unique and fascinating about the owner/architect, Nick Troubetzkoy, and his design team: I could see it their eyes, I could see it in the building, and I could hear it in the stories they told me about the project.

I listened to tales of the ten-year project and the endless evolution of its design; I also heard about the self-sufficiency and improvisational necessities forced upon their efforts by the island's isolation and limited resources. To a person and through it all, they believed in Jade Mountain even though they did not know exactly what it would look like when complete or how exactly they would get it done.

When I first became involved, in fact, the project didn't even have a name. As recently as two years ago, Karyn Allard, the project coordinator, was still referring to it as Silver Cloud, which had been Troubetzkoy's code name for the emerging concept. The only certainties were that it was happening and that they would somehow get it finished.

Once involved, I suddenly found myself in the same sort of personal voyage: I had produced a prototype glass tile and had been given the go-ahead, but at that point I had no clear idea how I was going to produce it in the mass quantities of tile that would be required and that I was now committed to making. All I had was a single piece of glass I had finished the day before I left for my first visit.

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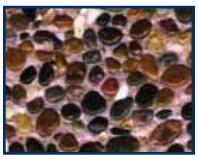

WETEDGE TECHNOLOGIES offers Pearl Matrix, a pool finish made by mixing natural, carefully graded pebbles collected from sites around the world into more than a dozen standard color combinations. Application of the pebbles in an exposed-aggregate system results in a softly textured, stain-resistant surface that will withstand years of service in harsh pool/spa environments. **WetEdge Technologies**, Mesa, AZ.

Pump Strainer

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PROFLO offers ProStrainer, a high-capacity pump strainer that removes debris from the water without impeding its flow the way conventional pot strainers do. As water enters the strainer, its large diameter slows the water's flow rate, letting debris settle into multiple strainer baskets on the floor of the strainer body. This eliminates resistance as the water passes over and around the collected debris. **ProFlo**, Littleton, CO.

Whimsical Lighting

Circle 137 on Reader Service Card

KICHLER LIGHTING has expanded its popular Garden Collections line to include the Cotswold Collection. Designed to incorporate an English-garden flair, the new fixtures lend a graceful, earthy, whimsical element to outdoor décor with items including garden gnomes and elegantly lit birdbaths along with a variety of tiki, deck and path lights. All have aged-bronze powder-coat finishes. **Kichler Lighting**, Cleveland, OH.

Pool/Spa Controller

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BALBOA DIRECT offers PoolValet, a comprehensive, customizable pool/spa automation system. Designed for new work or retrofits, the wireless device installs easily to monitor pH, ORP and TDS as well as filter pressure while managing pH and chlorine levels. It also controls heaters, pumps, blowers, lighting, jets, fountains, spillovers, pool cleaners and more, including entertainment systems. **Balboa Direct**, Tustin, CA.

Butterfly Valves

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ASAHI/AMERICA has introduced the Type 57 Butterfly Valve. Available in sizes from 1-1/2 to 14 inches and designed for minimum flow resistance, the devices include a flange stopper that lets the valve liner avoid over-compression as well as a molded-body absorption channel – innovations that work together to eliminate seat compression from stem torque, thus resulting in higher cycle life. **Asahi/America**, Malden, MA.

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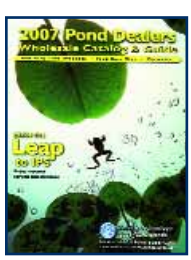

INTERNATIONAL POND SUPPLY has published its 2007 product catalog. The 76-page, full-color booklet highlights more than 100 new products and the company's established lines of pond filters, pumps, UV systems, pond packages, waterfall systems, fountains, fittings, valves, submersible lights, liners, test kits, water treatments, fish-care products, fish food and more. **International Pond Supply**, Santa Fe, NM.

Fountain Rings

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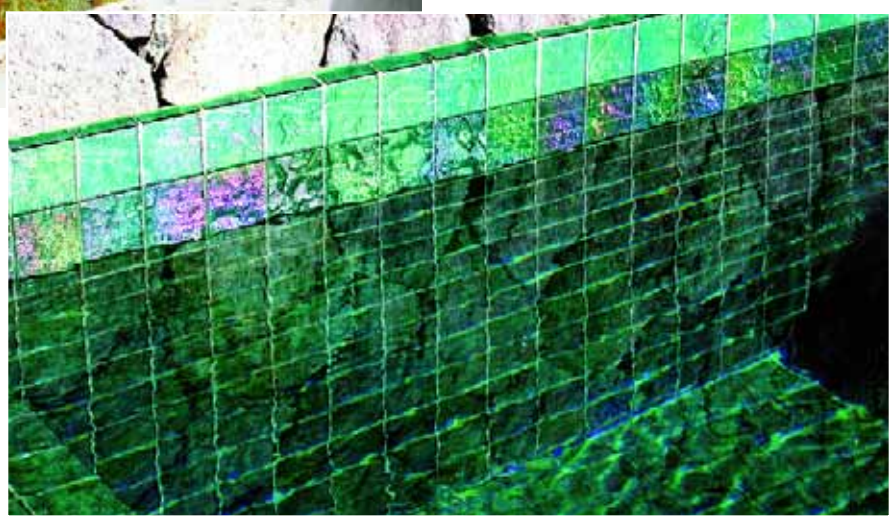
RINGTRU FOUNTAIN SPRAY RINGS offers thick-walled, schedule 80 PVC spray rings for applications with fountains and swimming pools. Designed as an affordable, durable alternative to copper fixtures, the plastic rings are heat formed in any desired diameter and come with a choice of adjustable Delran or brass nozzles and options including union or slip connectors. **RingTru Fountain Spray Rings**, Roswell, GA.

Entry-Level Controls

Circle 142 on Reader Service Card

PENTAIR WATER POOL & SPA has introduced the SunTouch family of controls. Designed as entry-level systems offering one-touch function control, the devices allow for the programming of a pool, a spa and two additional features. One model monitors and adjusts flow and temperature for solar panels, and all models interface with the company's most energy-efficient products. **Pentair Water Pool & Spa**, Sanford, NC.



The tile for Jade Mountain is all made in a way that allows observers to see fascinating color changes across large sections or fields. It all depends on lighting and the observer's angle of view: The actual and reflected images of the waterline tile, for example, often appear to be quite different. Even physical dimensions can appear to change: The tiles are uniformly four inches square, but underwater at certain viewing angles, they appear as rectangles.

NO ILLUSIONS

If you read my article in the June 2006 issue of *Watershapes* ("Light Dances," page 50), you may recall that I have a background that includes 20 years of laser and optical-system design and development.

As a consequence, I see light in mechanical terms as a limitless sea of tiny, invisible balls of photonic energy that appear to us as color only when the balls decide to dance together in a wave. The cones and rods in our eyes are able to perceive those waves of light when they range in physical length from 400 nanometers (violet) to about 800 nanometers (red).

I've spent my professional life consciously manipulating these infinitesimally small balls of light so they dance together in waves to form specific colors. In the laser industry, our goal was to create very narrowly defined waves – what is known as single-mode operation – to produce only one exact "color" at any given time. (Just imagine formal military brigades marching in lock step.)

In making glass tiles, the goal is *very* different and is about making light dance in many waves to produce ever-changing colors.

My design vision for Jade Mountain was to create a tile that would be well balanced in reflecting and transmitting light while being randomly prismatic. In layman's terms, I wanted a certain amount of light to pass through the glass and a certain amount to reflect back from its front, back and internal surfaces. I also wanted the glass to create different colors at different viewing angles (just as a prism creates a rainbow), but I wanted that phenomenon to operate in an unpredictable manner so it would always be surprising.

If I could achieve this optical design, I was reasonably certain the resulting fields of tiles would have what I call day and night moods: a colorful, shimmering bikini by day and an elegant, black cocktail dress by night. The pool water would also act to optically amplify and synthesize the effects, the result being a living floor of watery, moving color.

While I metaphorically thought of the new glass as a radiant, transparent stone, I did not realize until masses of it were assembled just how much it actually *looked* like transparent stone. The fundamental design assured not only achievement of the random prismatic effect I desired, but it also guaranteed that each and every tile would be unique in terms of texture and appearance, just like natural stone.

NATURE STUDY

Spending a week at Anse Chastanet gave me time to get a feel for the environment and a good sense of the light and native colors.

Our hosts aided in our assimilation of those details by hav-

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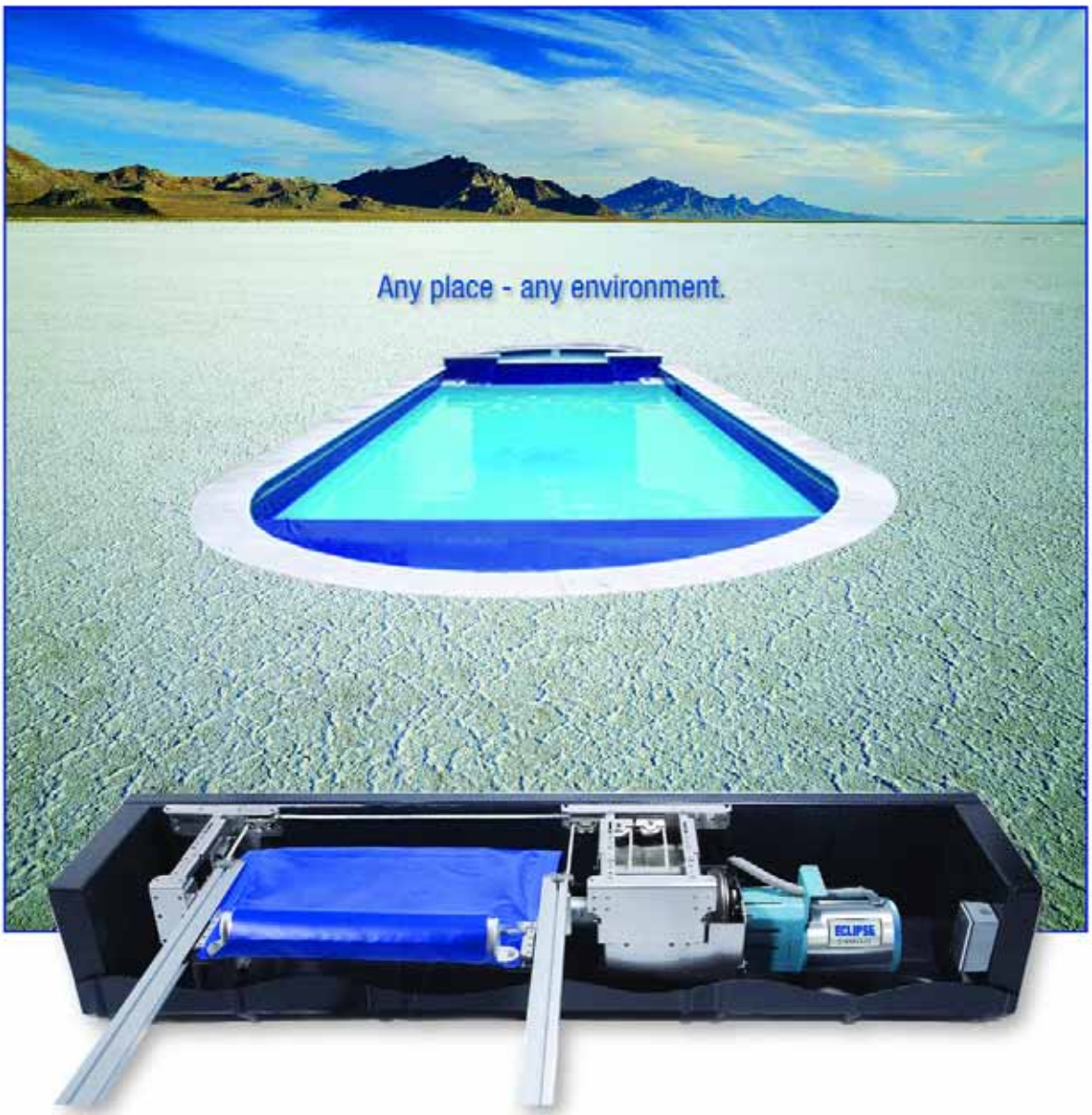

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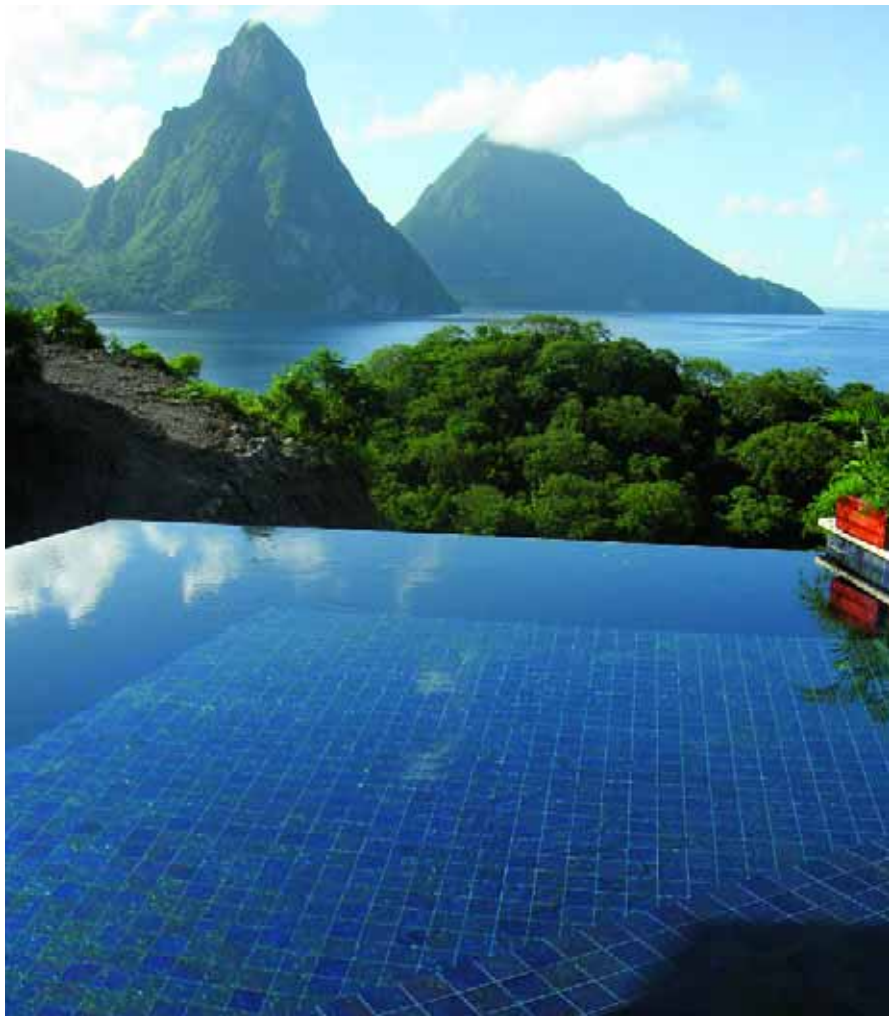
ing us stay in a couple of different guest rooms to get a feel for architectural style and the overall mood of the resort. This was important, because each room – every one of them huge with open showers, beautiful woodwork and private views – was entirely unique, a characteristic that would be crucial to the program for Jade Mountain.

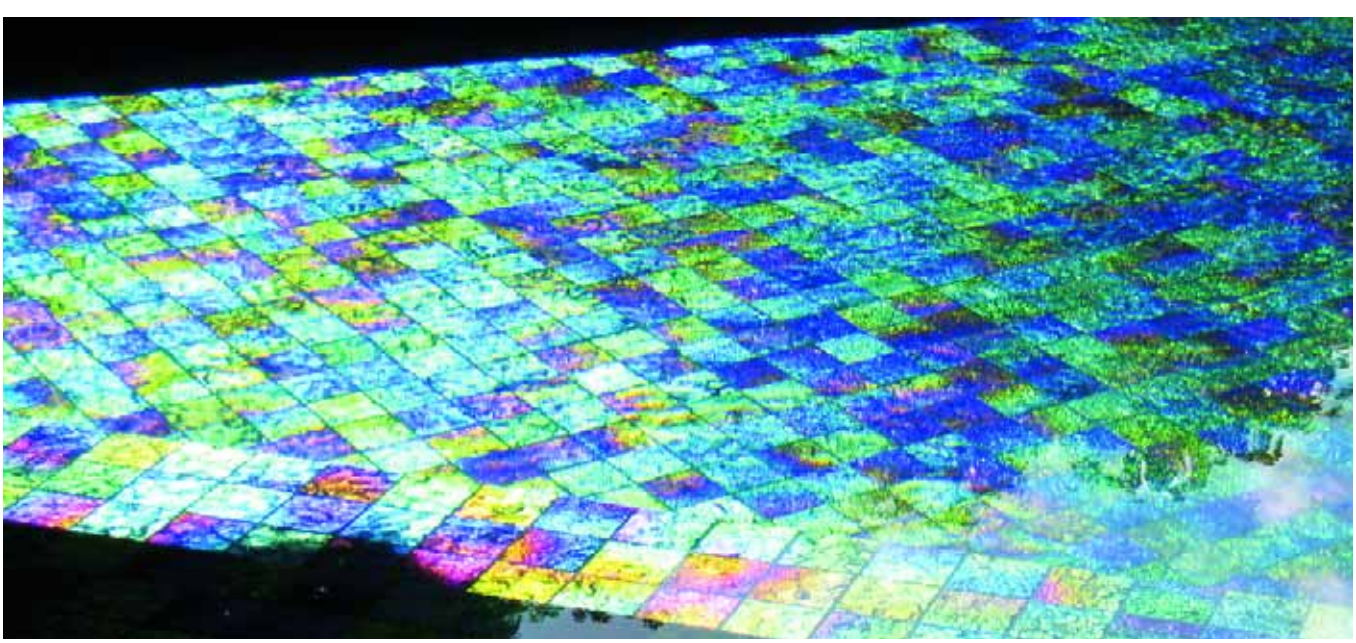
While there, we met daily with the staff of architects, designers and project managers in both formal meetings and casual social gatherings. In a project of this scope, we all shared the sense that it was important to know each other and, in my case, become comfortably familiar with the project's goals. I devoured everyone's stories and spent a good bit of time with Troubetzkoy, developing a sense of his artistic philosophy and observing what he had already created.

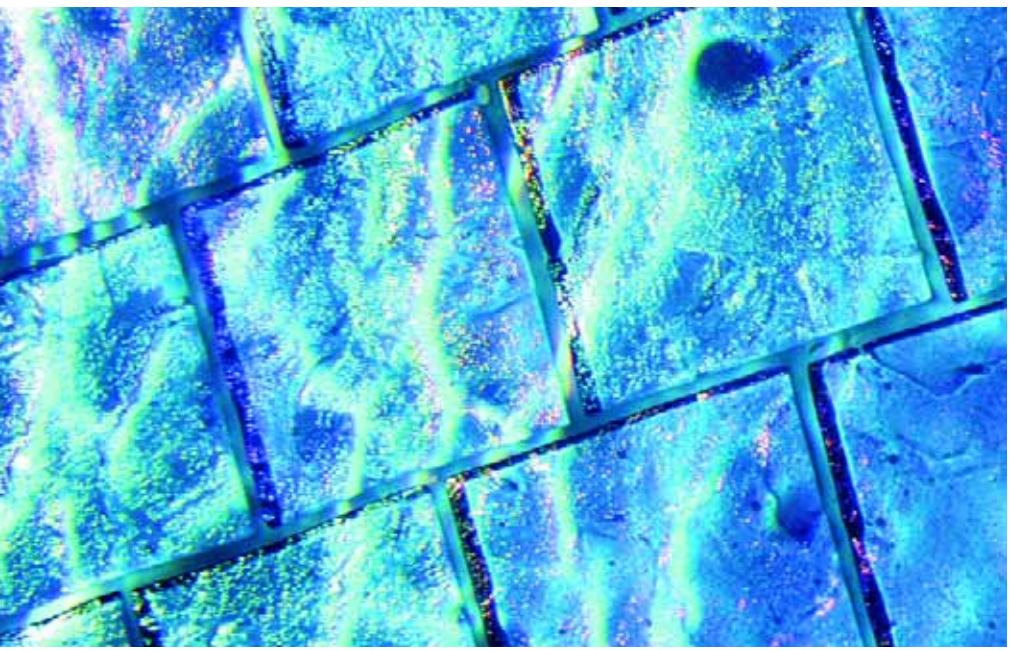
Quite frankly, I had never seen any project on this scale that was as organic in execution as this one. It was the antithesis of the staid architectural process of endless documentation and meetings, and I soon developed the sense that Jade Mountain was more a sculpture than a building to Troubetzkoy. It would, I felt, be his masterpiece, a vision that was hard to convey to others because it was based in feelings – more a primal utterance than a blueprint.

As we came to know one another, Troubetzkoy and I also discussed my op-

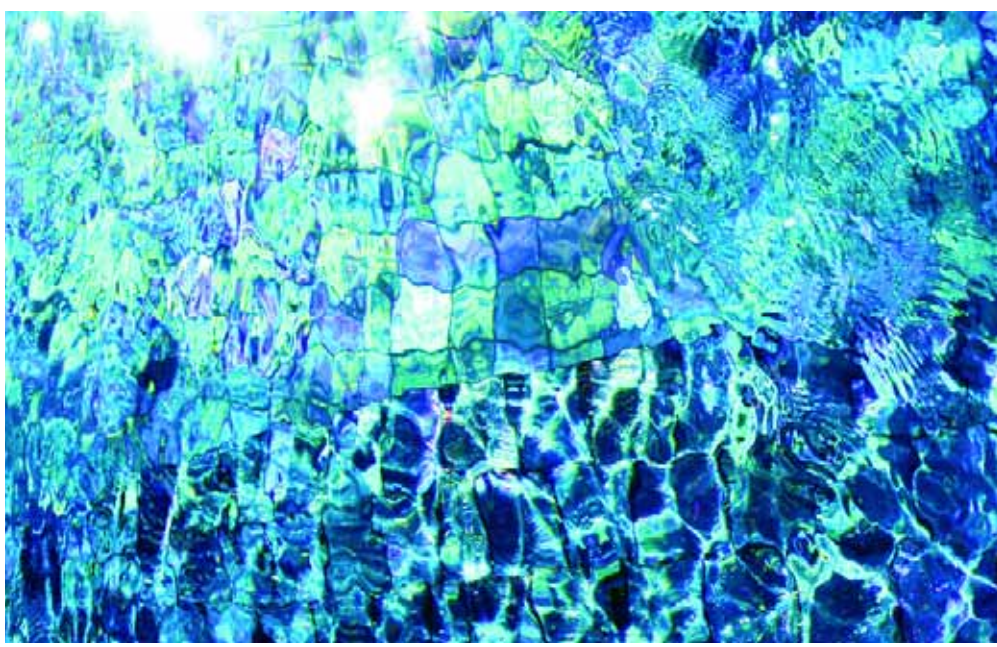


The transformations in appearance can be quite impressive. Here, for example, the deep-purple tile of this pool becomes a patchwork of dozens of colors when the viewer looks on from the right angle at the right time of day.





In still water, you can actually see the internal and surface reflections within the glass as the light skips across the surface but also glows within the glass. When the water is rippled, the optical effects are magnified and synthesized by the water, producting spectacular (but momentary) shimmering fields.



tical designs and my aim of balancing transmission and reflectance of light in the glass. In the bright sunlight, we both saw as the deep blue-green color of the prototype tile became saturated and appeared very transparent, a trick of vision that changed the amount of reflection from the textured, iridescent surface.

I could see a light go off in his head: From that moment forward, he understood the nature of my work in glass, understood how and why each color would be affected differently by the light and had a keen eye for how he would design with it. Things moved fast, and we began to sort through the potential palette with a new understanding of what was to come.

We all began to see that the prototype – just an isolated, detached piece, after all – was in fact becoming more optically dynamic and radiant the more we studied it. It was truly exhilarating, and I proposed using the prototype formula to create a palette similar to the palette his watercolor renderings of the building had used. The goal was for each of the 25 rooms to have its own color.

FLYING CARPETS

With only that single prototype tile in existence, the project commenced.

Before we finished, it would encompass 27,000 square feet of custom glass tile in two dozen different colors, all to be delivered within six months of final color selection. I went right to work creating samples, made a few adjustments to the textures and, within six weeks, everything was settled. We named the final glass design for the project our "PNT formula," the initials standing for Prince Nikolai Troubetzkoy to honor his heritage and title.

My vision for the glass-tiled pools was that they should appear as watery, oriental carpets of light floating in space – surreal tapestries of color that would entertain the senses without competing with the magnificent, omnipresent views of the Pitons just beyond each room. The pools were to be subtly dynamic as a counterpoint to the static presence of the awesome green mountains.

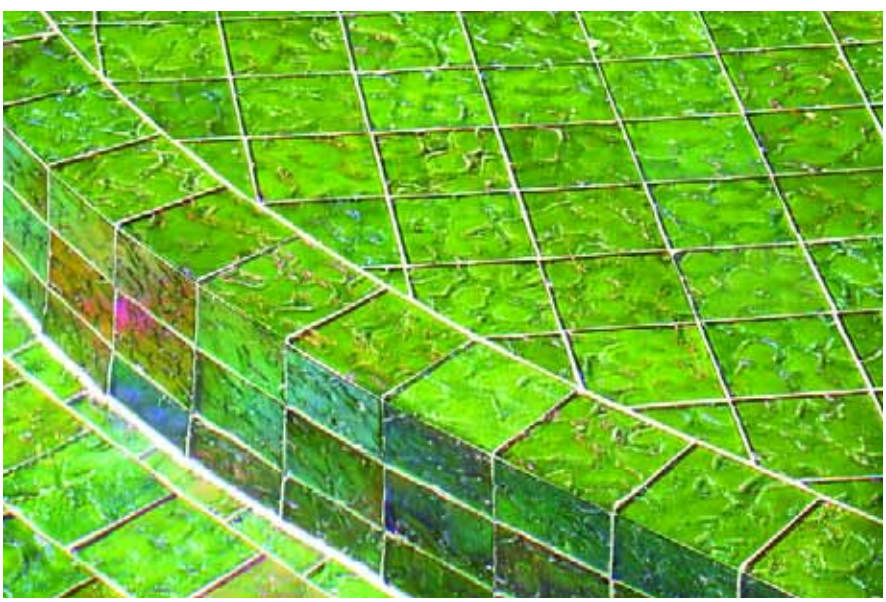
Individually, each glass tile is a complex optical element that manipulates light in a sophisticated manner to create colors. As laid out collectively at Jade Mountain, however, I created a field effect by having the tiles operate as a visual whole. On that level, Jade Mountain may be the world's largest installation of

optical, environmental art fully integrated into its surrounding architecture.

While utilitarian in purpose, each tile field is much more a statement of color than a simple surface finish. And again, it's about counterpoint: The tiles are one of only five surface finishes used in the resort, the others being exotic hardwoods, coral-stone tile, natural rock and cast concrete. The colors of those materials operate in a limited range, opening the door to brilliantly colored juxtapositions with the glass tile.

The chameleon-like color changes we achieved throughout the building are unlike anything most people have ever experienced.

They have been described as both mesmerizing and elusive, like a beautiful fish moving through the water except that the beautiful fish can suddenly transform into an incredible school of fish amid a patchwork of colors. Moments before or after, the colors can also be simple and static in a state I call their "dormant phase." The shifting back and forth from dormant to dynamic is constant and fleeting, an active dance of light in which the viewer participates by viewing the fields at different angles.



MOVING IN LIGHT

By design, each piece of glass tile we produced for this project is both completely unique and fully reversible. While each four-by-four piece of glass tile is beautiful and offers its own unique optical choreography, however, the art comes when the fields of tile work together. They are all transparent, but one side has a textured iridescence and the other a smooth finish with a mildly undulating surface.

The iridescent side of the glass was used exclusively on the pool's surfaces, while the smooth side in the same color tiles was arrayed on the walls of the open bathrooms. Every piece was done in a four-by-four-inch format to give us large optical apertures for capturing light while reducing the presence of grout lines. Stylistically, we wanted the look to be far

The outcomes of these visual transitions can be spectacular. In this avocado-green pool, for example, you can see inklings of something beginning to happen in this view of the top step. With a simple turn of the head, the vanishing-edge wall becomes a blaze of dancing color against the visual solidity of the wooden coping and the stone deck.

removed from that of conventional glass-mosaic tile.

At base, what we were after was about more than the tiles or even the apparent colors of the tiles. Instead, the work was about what the tiles would do to the light – about how they would manipulate the endless stream of invisible balls of primary, cosmic energy that constitute light. In doing so, we assembled a bold collection of colors, from avocado green and ruby red to purple, emerald, bronze, root beer and deep, deep blue – but the specific colors are more the spirit or mood of that color than a definition of it. The tiles change the light, randomly and constantly, and make it dance in waves of color.

Each field is centered in the static, dormant color (Chinese red, lime green, medium blue and so on), but more accurately, the base color is a point of departure and return for a dance that spans a wide and highly detailed spectrum of colors. In creating them, I hoped to capture the sublime and elusive spirit of the island itself and create a subtle, mystical experience for Jade Mountain's guests.

The mystical part of the composition is how the colors move and exactly when and where they really exist. In other words, unlike fish who swim through the water and thereby change reflected angles of light with their movement, the tiles are perfectly still, mortared firmly to each pool's surface.

This is the instant-by-instant nexus at which the experience becomes magical.

The colorful movement one experiences with these pools is the result of the light that the glass gathers and manipulates as it reflects back to our eyes. No significant movement by the viewer is required for the field to operate visually: It just needs light and an eye to observe it. The clarity and complexity of the glass design permits even the slightest change in either light intensity or viewing angle to alter the composition, sometimes dramatically.

SIGHT SPECIFIC

To be sure, the shimmering fields of color produced by the tiles are beautiful, but just as important to the overall de-

The pools and their tile also work into the overall design scheme for the rooms, with the tonalities of this ruby-red version picked up in the furnishings and even the plants. But there's always another view available, another angle that changes the scene and puts everything in a new context. And sometimes those effects are both dazzling and mesmerizing.

sign is their ability *not* to shimmer – a visual dormancy that is indeed critical to the design.

The dormant phase – that is, moments when the pools just look like the basic color of the tile – is driven by the eye's viewing angle and the angle and intensity of the ambient light. Had I designed the glass to be apparent and mind-blowing all the time, the pools might have become a visual distraction.

A sunrise is special because each is unique and momentarily beautiful. With that in mind, I designed the tiles so they would not overwhelm, but would instead fascinate – a subtle distinction that leaves most guests unaware of the intricacy of the experience but still filled with a sense that, for whatever subliminal reason, it feels good. That is precisely the effect for which I was hoping: a sense of well being, not a sense of distraction.

In going into some detail on the effects the tiles achieve, I may have gone too far and explained away their magic: After all, the show at Jade Mountain is not the tiles or the pools or even the amazing building. Rather, it's about the environment as a whole, the tropical backdrop, the warm, fresh air and the perpetual visual wonder of the Pitons.

It would have been far easier to create conventional tiles that predictably reflected light the same way every time, but I was fully aware that Jade Mountain would have no televisions, no phones, no elevators, no windows and no fourth walls and that we were creating incredible, magical environments amid a timeless, indefinably organic architecture.

In that sense, the pools are like orchestra pits sunken a bit below a great stage, emitting symphonies of light in meditative homage to and in transient reflection of a compelling world beyond.

Just amazing.

The royal-blue pool is among the most remarkable of all the watershapes on site. You get a hint of what's going on away from the pool, where the tile on the wall of the bathroom begins to reveal the dormant tile's potential. When the light and angles are right, the view across the vanishing edge completes the picture for anyone and everyone to see.

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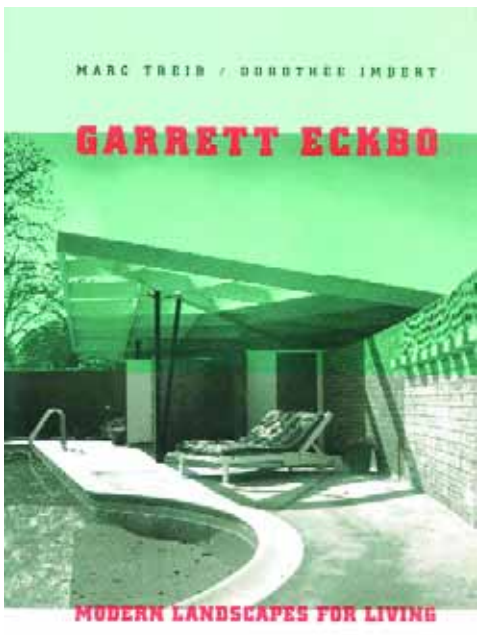
By Mike Farley

Modern Living



By now, we all know that pools and certain other watershape forms have been around since ancient times. It's my strong suspicion, however, that most of us who design and build backyard swimming pools today would fail a pop quiz about those who pioneered the 20th-century genre of pool design.

I was among you in not knowing, for instance, about the seminal role played in this arena by a man named Garrett Eckbo – this despite the fact that he's one of the icons of landscape architecture.

As a founding member of (and the "E" in) EDAW, Eckbo was responsible for some of the grandest public spaces in the United States. He was also, it seems, an innovator in residential garden and pool design who put his stamp on just about every basic pool form we use today.

I picked up this knowledge from a book by Marc Treib and Dorothée Imbert called *Garrett Eckbo: Modern Landscapes for Living* (University of California Press, 1997). The 190-page volume covers the major career phases of a California-based designer and longtime professor who in turn studied under Walter Gropius and worked with the legendary landscape architect Thomas Church, among other luminaries.

The book divides Eckbo's career into two distinct parts, an early one (but actually the second half of the book) in which he worked for Franklin Roosevelt's Farm Security Administration developing (among other things) housing camps for migrant workers and public parks, and a later one in which he focused on residential landscape design. He was, it is clear, a force to be reckoned with on both sides of the equation.

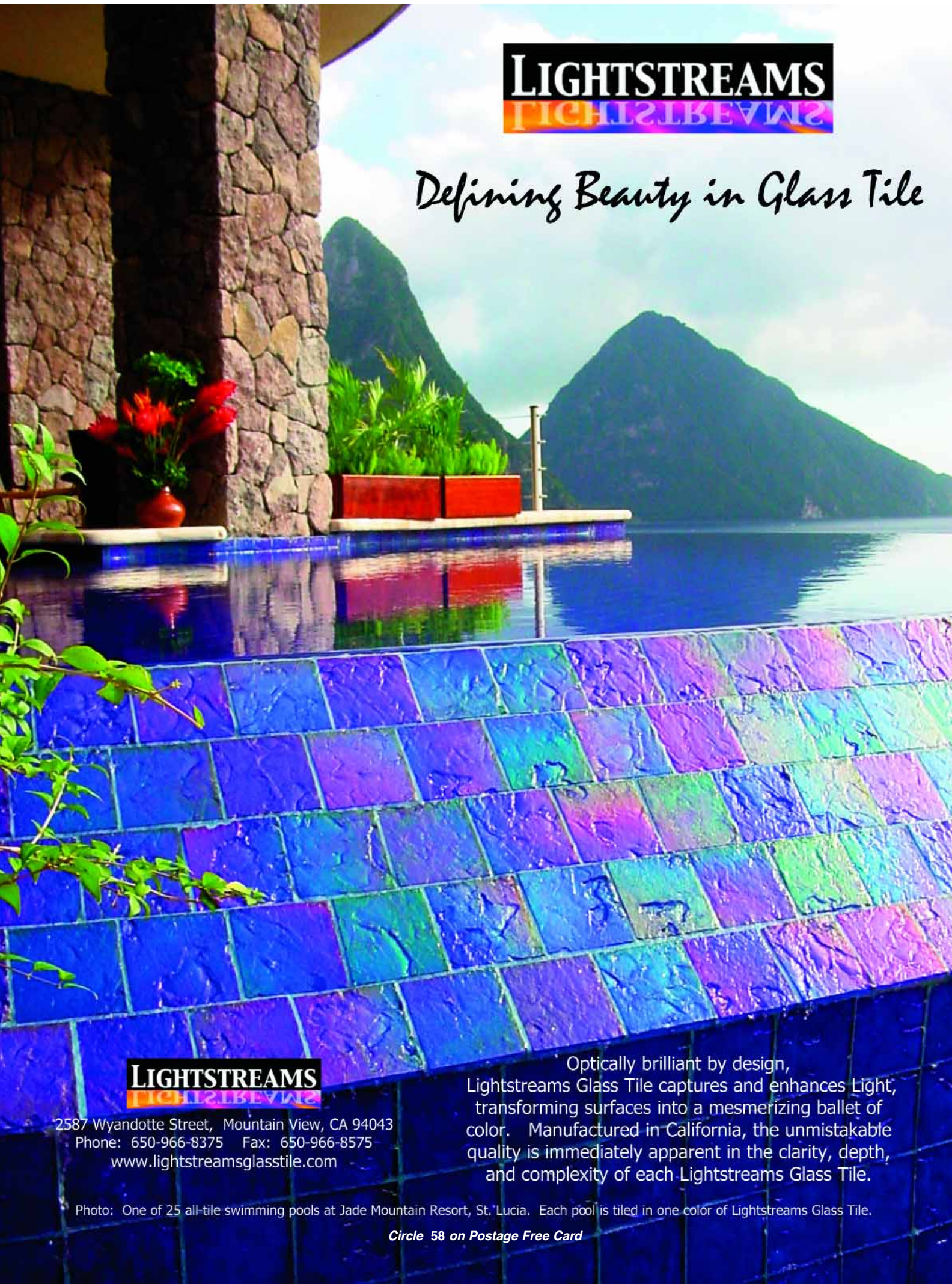
Indeed, his work in residential settings is exceedingly important. He is the one who devised not only the kidney-shaped pool, but also the lazy "L" – and in doing so pretty much set the stage for all residential pool design through the middle of the 20th Century. To this day, much of what we do is still a tribute to Eckbo's vision of utilitarian design suited to the needs of the American middle class.

It all may look a bit "retro" at this point, but in his day his work was distinctly unconventional. He completely abandoned classicism in favor of angular geometry and simple materials (mostly concrete and wood) and was noted for his ability to produce sublime results in postage-stamp backyards. His use of trellises, raised planters, deck spaces and basic shapes is at the heart of what most everyone thinks of as the classic backyard pool environment.

His favorite idea, the circular pool, never caught on, but he blazed many other trails we all follow today – a succession of ideas this book ably captures. At base, Eckbo's is a legacy of hard realism: Like nobody else, he faced down the limitations of the modern suburban environment and had the imagination needed to make the most of its limited canvases.

As I see it, there are many legends of modern architecture (Frank Lloyd Wright, Le Corbusier, Ricardo Legoretta and John Lautner, to name a few), but the registry of landscape architects who rise to that level is much shorter. Garrett Eckbo definitely belongs in such a pantheon: He was one of our greatest designers – and a *watershaper* to boot! WS

Mike Farley is a landscape architect with more than 20 years of experience and is currently a designer/project manager for Claffey Pools in Southlake, Texas. A graduate of Genesis 3's Level I Design School, he holds a degree in landscape architecture from Texas Tech University and has worked as a watershaper in both California and Texas.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