Inside: Bruce Zaretsky on Defining Value

WaterShapes

Design • Engineering • Construction

Volume 9
Number 8
August 2007
$6.00

The Art of the Droplet

Using water to convey graphical forms and messages

Integrated Impressions

A design that defines a total outdoor environment

Plus:
Touring a state-of-the-art center for aquatic exercise

It's about performance

No one puts the total performance package together for commercial pools like Pentair. We offer complete, integrated system packages for pools in the 60,000 gallon and larger class. That means a single source for system designs that install fast and work right.

Filters

THS Series® Horizontal Sand Filters – NSF approved 50 psi rated tank with flow rates up to 535 GPM in a single tank. Smooth, attractive Paracote® exterior finish; exclusive interior coating protects wet surfaces.

Stark™ Filters – For all commercial applications including aquariums, zoos, waterparks, swimming pools, aquaculture and water treatment. 100% corrosion resistant fiberglass construction for dependable performance and ease of operation. Self stacking modular design for fast installation and lower construction costs.

Pumps

EQ Series® High Performance Pumps – The only non-corrosive, all plastic pump designed exclusively for commercial pool and water applications. Extraordinary electrical and hydraulic efficiency.

Berkeley® Pumps – A top name in water systems for decades, these Type B End Suction pumps are ideal for most applications requiring high performance, easy maintenance and moderate initial cost.

Aurora® Pumps – For flooded suction applications in commercial pools, water features, and waterparks. Quiet and smooth running with modern, clean design for maximum application flexibility.

Heaters

PowerMax™ and MegaTherm™ – Peak efficiency, simple maintenance in both indoor and outdoor applications. Over 82% heat transfer efficiency, the highest available from a non-condensing burner. Dual thermostats prevent overheating; exclusive flow valve senses water pressure for optimum flow.

Chemical Controllers

Acu-Trol® Programmable Controllers – Automatically monitor and control temperature, pH, and sanitizer levels to reduce chemical and maintenance costs and extend pool life. Microprocessor-based technology, with models that can control up to 8 bodies of water with one master control.

Deck Equipment

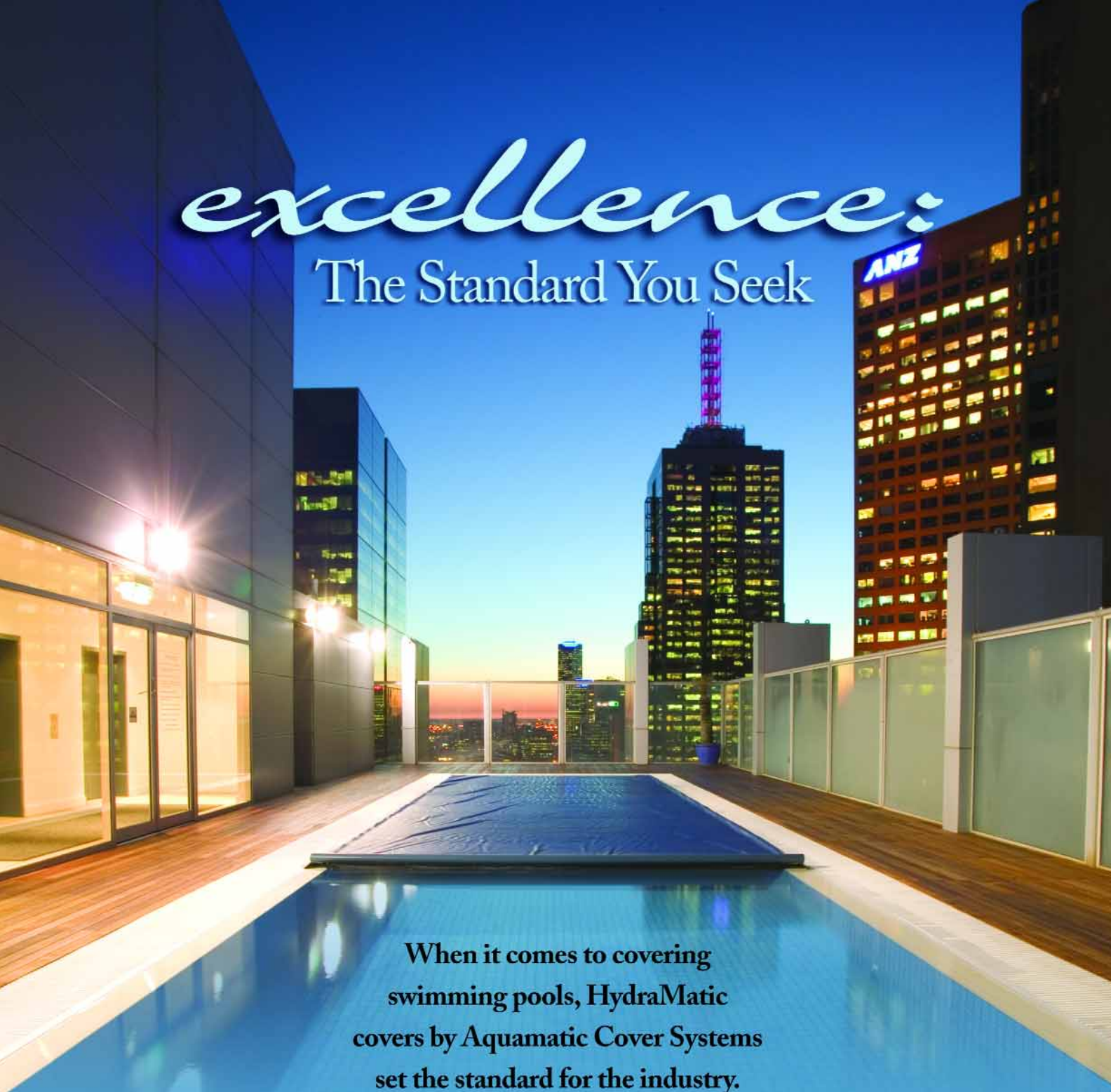
Paragon Aquatics™ – An extensive line of competitive and recreational swimming pool deck and under-water equipment. Total system solutions including starting platforms, lifeguard chairs, diving stands and towers, grab rails and ladders, custom railings, underwater windows, lights and speakers.

Whether your project involves a single large community pool or a multi-pool resort complex, Pentair experts are here to help and Pentair products can deliver the performance. Call 800.374.4300 for more information.

pumps / filters / heaters / heat pumps / automation
lighting / cleaners / sanitizers / maintenance products
www.pentairpool.com

Pentair Water
Commercial Pool and Spa™
800.374.4300

Circle **49** *on Postage Free Card*



When it comes to covering swimming pools, HydraMatic covers by Aquamatic Cover Systems set the standard for the industry.

HydraMatic covers focus on safety, energy, savings, ease of use and aesthetics. Featuring a full-fluid hydraulic drive and carrying a 20-year mechanism warranty, they can be customized to fit most swimming pools. Remember to check with Aquamatic Cover Systems for any special engineering requirements. When you want something better, ask for HydraMatic! EZ-Covers and HydraLux automatic covers are also available. Visit our website.

QB 2007 Quality Buy Pool Spa

AQUA MATIC COVER SYSTEMS

200 Mayock Road, Gilroy California 95020

www.aquamatic.com 800.262.4044

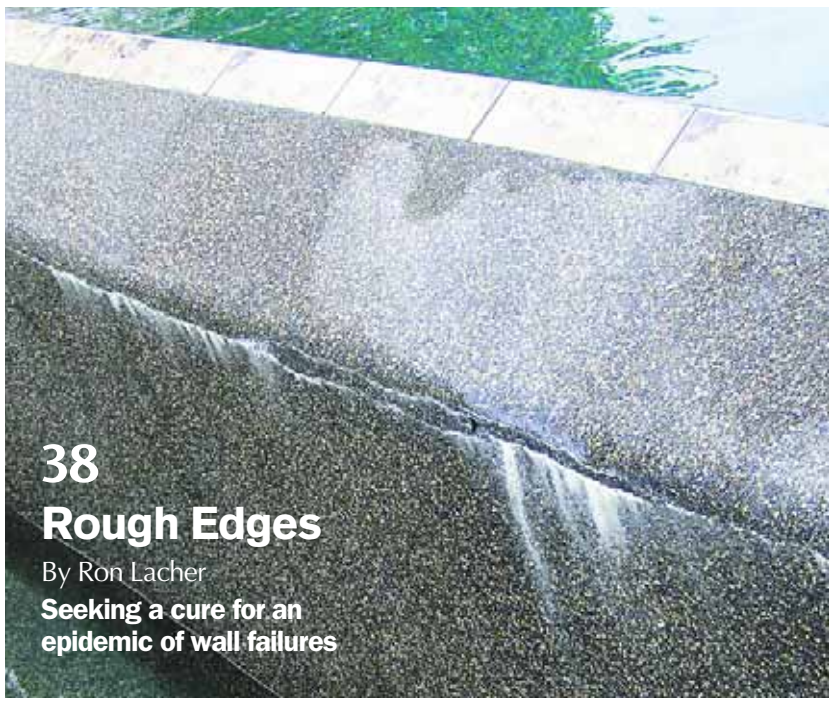
Circle 3 on Postage Free Card

contents

August

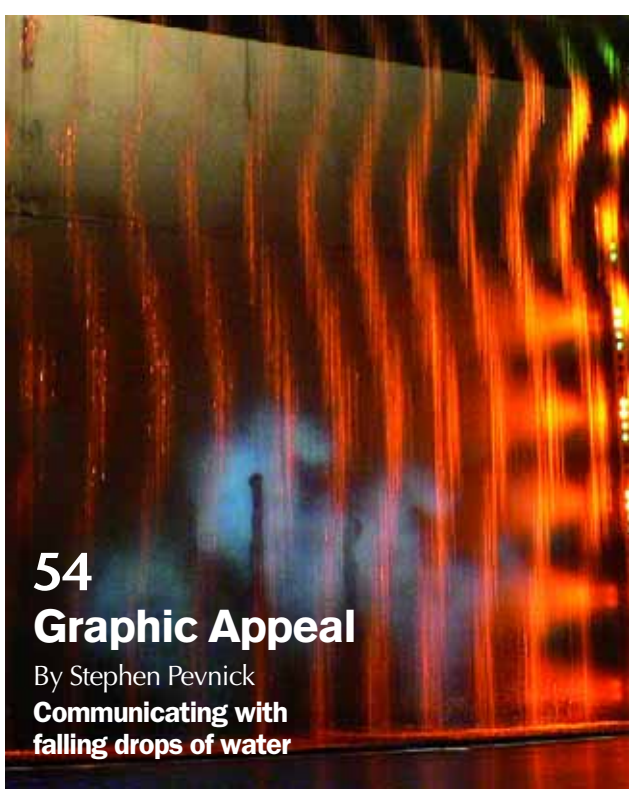
features

30
Integrated Impressions
By Melanie Mackenzie
A design that embraces the total environment



38
Rough Edges
By Ron Lacher
Seeking a cure for an epidemic of wall failures

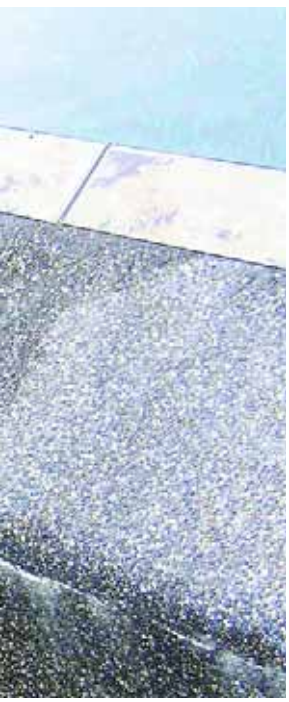
46
Healing Waters
By Belinda Stillwell
A look inside a special aquatic-exercise facility



54
Graphic Appeal
By Stephen Pevnick
Communicating with falling drops of water

WATERSHAPES

Volume 9 • Number 8 • August 2007



columns

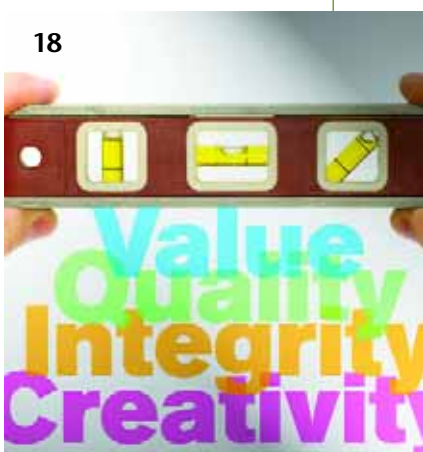
6 Structures
By Eric Herman
Marrying design to suitable construction

10 Aqua Culture
By Brian Van Bower
Just how ridiculous can regulations get?

18 On the Level
By Bruce Zaretsky
A new columnist sets a fresh course

22 Detail #79
By David Tisherman
Approaches to hillside excavation

66 Book Notes
By Mike Farley
Recent books with an international flavor



departments

8 In This Issue
58 Advertiser Index
58 Of Interest Index
64 Of Interest

Photo courtesy Stephen Pevnick, Pevnick Design, Milwaukee.

WATERSHAPES (ISSN 1522-6581) is published monthly by McCloskey Communications, Inc. 6119 Lockhurst Dr., Woodland Hills, CA 91367. A controlled circulation publication, *WaterShapes* is distributed without charge to qualified subscribers. Non-qualified subscription rates in the U.S., $30 per year; Canada and Mexico $48 per year; all other countries $64 per year, payable in U.S. funds. Single copies $10 per issue in the U.S. and Canada. All other countries $15 per issue. Subscription requests must include name, job title, business location, address information and a signature and date.

POSTMASTER: Send address changes to *WaterShapes*, P.O. Box 1216, Lowell, MA 01853-9930.
Periodicals postage rates paid at Woodland Hills, CA 91365 and additional mailing offices.

By Eric Herman

Delivering the Promise

Thomas Edison once said, "Genius is one percent inspiration and ninety-nine percent perspiration."

That may be his most famous utterance – and for good reason: A good idea is important in just about any creative endeavor, but without dogged pursuit of appropriate execution, the best concept is little more than a mental exercise.

The basic truth of Edison's observation applies across a vast spectrum of pursuits, and there's no doubt that watershaping belongs on that list in a big way. Indeed, watershapers' marriage of ingenious design to suitable construction – inspiration to perspiration – has always stood at the heart of this magazine's coverage of what you do. Simply put, the best watershapers are versed in both ideas and execution, whether as design-savvy builders, designers who understand construction or designer/builders who handle everything.

Every once in a while, however, there seems to be a disconnect – an area in which the general understanding of construction processes isn't adequate to service the ideas being used. There's a case in point in this issue on page 38, where you'll find "Rough Edges" by engineer Ron Lacher: It's a description of what happens when key construction principles aren't applied — and a specific (and popular) form of watershape tends to fail as a result.

For the past few years, Lacher has searched for reasons why he's seeing such a large number of vanishing-edge dam walls fall prey to delaminations, cracks and wholesale leaking. After examining dozens of failed projects and closely observing installation practices, he has identified a list of construction issues that appear to form the core of the problem. I'll leave it to Ron to lay things out for you; suffice it here to say that it's a sobering discussion, given just how *basic* some of these missteps seem to be.

His discussion reaches well beyond the immediate reputation issues the watershaping trades and the pool industry in particular have faced through the years. What I find so disconcerting in this case is that vanishing-edge pools are a high-profile, upscale expression of the watershaper's art, and it's unfortunate to see such rudimentary errors afflicting the industry's production of its best designs.

Vanishing-edge pools may be more common today than they were a decade ago, but it's painfully clear from Lacher's discussion that without competent execution, they are as subject to failure as any other vessel. In other words, if their builders don't "sweat" the details here, trouble surely follows – and more painfully when it saps the performance of our most recognizable and marketable designs.

▼ ▼ ▼

On a sunnier note, it is with great pleasure that I introduce a new column and columnist in this issue: On page 18, please find the first installment of "On the Level" by watershape and landscape designer/builder Bruce Zaretsky.

Bruce's work and guiding philosophy offer a prime example of what it means to work at a high level at all stages of the design and construction processes across a broad range of project types. In his first column, he sets the stage for what promises to be a dynamic, practical addition to our monthly lineup.

Enjoy!

WATERSHAPES

Editor
Eric Herman — 949.494-4533

Associate Editor
Melissa Anderson Burress — 818.715-9776

Contributing Editors
Brian Van Bower
David Tisherman
Stephanie Rose
Mike Farley

Art Director
Rick Leddy

Production Manager
Robin Wilzbach — 818.783-3821

Circulation Manager
Simone Sanoian — 818.715-9776

National Sales Manager
Camma Barsily — 310.979-0335

Publisher
James McCloskey — 818.715-9776

Publishing Office
McCloskey Communications, Inc.
P.O. Box 306
Woodland Hills, CA 91365
Tel: 818.715-9776 • Fax: 818.715-9059
e-mail: main@watershapes.com
website: www.watershapes.com

Printed in the U.S.A.

Scoop up more income

Pebble surfaces are the hottest trend in pool finishes today. If you're not installing it, you're missing out on big profits! NPT Pool Finishes are a unique, scientifically formulated surface system that's the ideal choice for interior aggregate finishes. Our exclusive, proprietary process ensures consistent color and results. And installation is so easy, a typical plaster rig is all you need to get started. We carry any additional equipment you may need, and can help set you up. **Ask about our training options for your crew!**

NPT Pool Finishes – versatile, consistent, durable and easy to install and a great profit source for you!

Call (888) 411-TILE for information and brochures!

NPT Pool Finishes

NPT Pool Tile, Stone and Decking

NPT BBQ Islands

Circle 4 on Postage Free Card

888-411-TILE

nptg® POOL TILE & STONE
POOL FINISHES
BBQ ISLANDS

www.nptgonline.com

Pentair Water Pool and Spa

• Anaheim, CA • Cathedral City, CA • El Cajon, CA • Sacramento, CA • Livermore, CA • Tempe, AZ • Tucson, AZ • Las Vegas, NV
• Dallas, TX • Houston, TX • Longwood, FL • Naples, FL • Pompano Beach, FL • Sarasota, FL • Norcross, GA • Montgomeryville, PA

August's Writers

Melanie Mackenzie is principal designer and founder of Biomirage Landscape & Garden Design in San Diego, Calif. She entered the business in 1980 while pursuing a career in fine arts in Sedona, Ariz., discovering great creative possibilities in blending her background in the arts with the technical elements of construction and horticulture. Returning to school to study landscape architecture, she accepted an internship at Wiley Group Landscape Architecture in San Diego, where she worked and studied for eight years. Mackenzie started Biomirage in 1992, focusing her efforts on creating highly personalized, custom residential watershapes and gardens.

Belinda Stillwell is an assistant professor at California State University, Northridge, and director of aquatics at the university's Brown Center, a facility devoted to adaptive therapy for people with disabilities. She holds a PhD in physical education/curriculum and instruction from Arizona State University in Tempe and a masters degree in physical education from California State University, Dominguez Hills, along with a range of professional credentials and aquatics certifications, including lifeguard training from the American Red Cross and an Adapted Aquatic Master Teacher Credential from the American Association for Physical Activity and Recreation, among others. Her background in aquatics encompasses lifeguard and disaster training, multiple sclerosis aquatic specialization, U.S. Coast Guard boating and seamanship certification and a credential in water aerobics.

Ron Lacher is president of Pool Engineering, an Anaheim, Calif.-based structural engineering firm focusing on pools. A speaker, educator and author on proper trade practices and structural engineering in pool construction, he has written numerous articles on proper construction techniques and is a frequent seminar presenter at national and regional trade conferences. He graduated from California State Polytechnic University with a degree in civil engineering and is a licensed professional engineer and pool contractor in California. In addition, he's also a member of the advisory board of the National

Pool Industry Research Center at California Polytechnic State University, San Luis Obispo; of the American Shotcrete Association, where he serves on the pool/spa committee; and of the Association of Pool & Spa Professionals, for which he serves on the Builders Council's education committee. Lacher is also an APSP Certified Building Professional (CBP), one of only 150 pool professionals to have attained that certification.

Stephen Pevnick is founder and president of Pevnick Design, a firm dedicated solely to creating Graphical Waterfalls, a unique system that uses precisely controlled sheets of falling water to form letters, words and graphic illustrations. Pevnick has an extensive background in technology and fine arts, including a bachelor's degree in design and fine arts from Southern Illinois University and a master's degree in multimedia, fine arts and sculpture from Washington University in St. Louis. An associate professor at the University of Wisconsin at Milwaukee since 1984, Pevnick has won a host of awards and grants for his work in developing Graphical Waterfalls. Among his many notable accomplishments was the time he spent in 1966 working for R. Buckminster Fuller, the legendary futurist and writer.

Bruce Zaretsky is the owner of Zaretsky & Associates, a landscape design/installation/consulting firm in Rochester, N.Y. Since starting in the landscape design industry in 1979, he and his firm have become nationally recognized for their creative and inspiring landscapes and waterfeatures in projects ranging from small residential spaces to innovative public projects. Zaretsky also works as the Landscape Consultant to the Town of Penfield, working with developers to ensure that the city's beauty is preserved. He teaches courses on landscape design and installation at the Chicago Botanic Garden and at national landscape conferences, and recently his firm has placed emphasis on conceiving and installing healing and meditation gardens for health-care facilities and on promoting sustainability and conservation in the landscape industry.

By Brian Van Bower

Life's Absurdities

If you've ever designed or installed commercial swimming pools in the United States, it's likely you're well acquainted with just how strange certain health department standards (and the officials who enforce them) can be.

I've discussed this topic before, of course, but it's come back to mind in powerful ways in light of a couple recent experiences I've had – incidents that illustrate the issue to near-comedic perfection.

Before I climb into these oddball scenarios, let me observe first of all that, in most cases, commercial codes are based on methods rather than results – and never the twain shall meet. Second, it's my observation that the restrictions we face in our country are, as a rule, far more cumbersome than what I encounter overseas.

Third, and the reason I'm bringing all this up yet again, is that I believe things have gone so far wrong that it's time for the industry to do something about it. Yes, it will require a concerted, long-term effort to get anything done, but some of these issues are so ridiculous that I can't help thinking if we were to get some form of a fair hearing of our grievances, there's a good chance reasonable minds would prevail.

The willingness to do whatever it takes to get a job done has led to development of commercial codes that are based on the concept that we must do everything in our collective power to protect people from themselves.

missing sense

Before we can get anything done, it's my added observation that we need to start offering determined resistance to the absurdity.

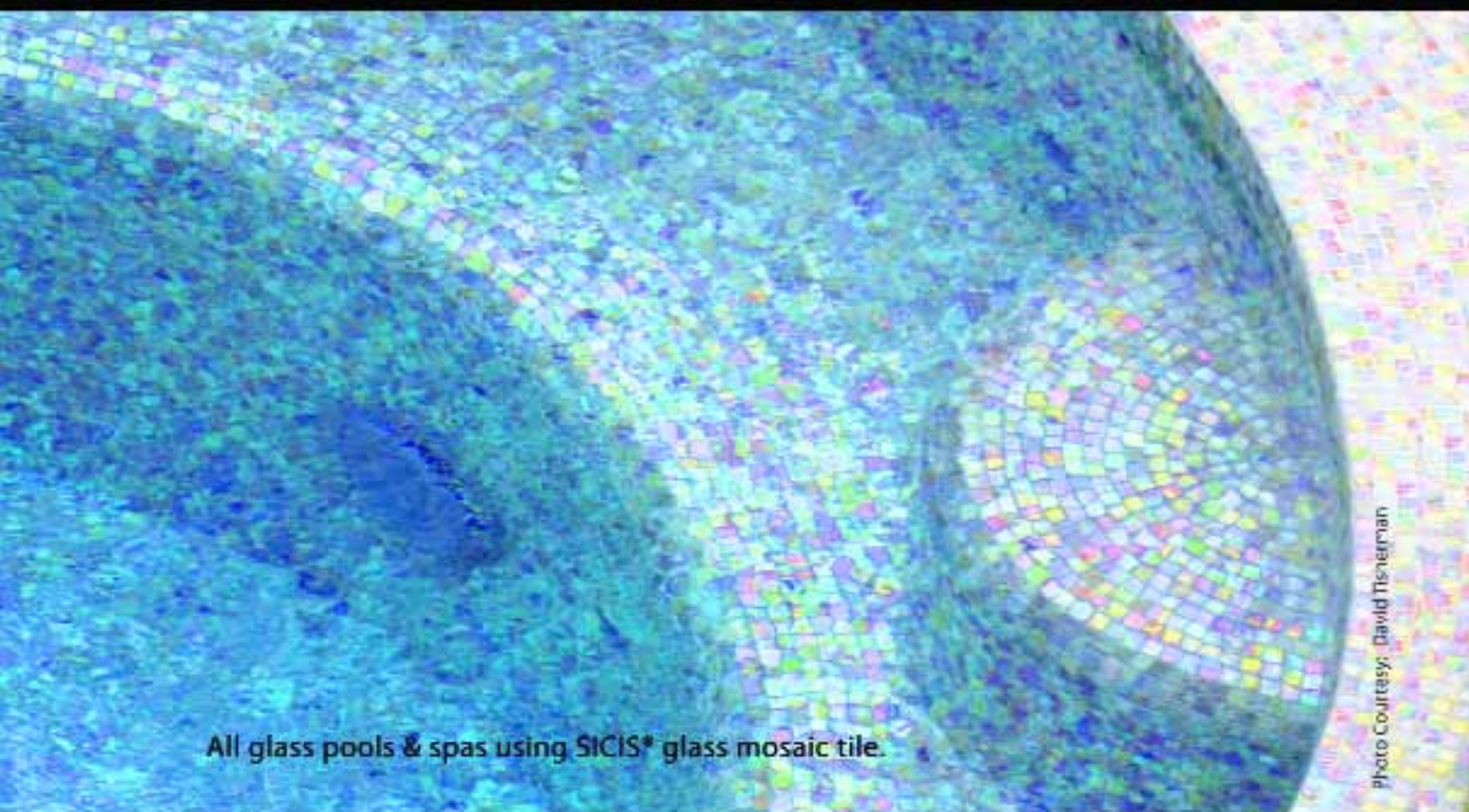
In my work as a designer, I've encountered a large population of commercial pool contractors who simply acquiesce to whatever any official might say. I understand the motivation to do so, but I think our general willingness to cave in and cooperate is part of the problem.

Yes, commercial projects are not as common as residential ones, and most who work in the former realm are forced to follow jobs wherever they are. This means these watershapers work in different geographical areas and must contend with different local requirements promulgated by various municipalities, counties and states. These are of necessity extremely adaptable people – and I would argue that they may be so to a fault.

Indeed, most I know are oddly complacent about compliance and simply accept the fact that they have to roll with idiotic proclamations that make very little sense. I've wondered why this is so for a long time, and the basic conclusion I've reached is that these operators simply accept and work within the rules to get the jobs and to avoid any potential for legal consequences.

This willingness to do whatever it takes to get a job done has led to development of commercial codes that are based on the concept that we must do everything in our collective power to

step into color



CACTUS
STONE & TILE

401 S. 50th Street ◆ Phoenix, AZ 85034 ◆ 602-275-6400 ◆ 800-528-9445

Circle **60** *on Postage Free Card*

protect people from themselves. In this country, that translates to a least-common-denominator phenomenon in which we apparently anticipate what the dimmest of all dim people might do and keep them from pursuing their inevitable tendency toward self-destruction.

If the same thought were applied to hotels, every room would be padded. Moreover, there would be signs posted all over the padding warning lodgers that rubbing their faces aggressively against the fabric might cause abrasions, just to free hotel management from concerns about liability.

That's an absurd analogy, because we as watershapers all acknowledge that water can be hazardous and that some standards are absolutely necessary. Yes, there should be standards for water quality and, yes, there should be standards for line velocities in circulation systems – but no, there shouldn't be a standard requiring *X* number of chlorine tablets in particular types of chemical feeders. That's nit-picking and is simply ridiculous.

'lawbreakers'

The problem with this sorry state of affairs is not only that it makes life difficult for us as watershapers, but also for property owners in the United States who are losing competitive ground to facilities in other countries where codes are more reasonably approached.

In fact, if you look at the best-known commercial pools in our country, it's safe to say that most of them are effectively getting away with something. In Orlando, for example, there's a wonderful swimming pool at the Hyatt Hotel that's been around for decades and includes grottos, waterfalls, a rope bridge and all sorts of artificial rock formations around the edge.

Visiting this facility while keeping today's codes in mind, I can't even begin to count the number of violations represented on site. Even given its age, I'd love to know how that design made it through approvals to the point where it was actually built – and just how it has managed to stay in operation.

Similarly, the pool at the Delano Hotel in Miami Beach sticks out of the ground some 12 inches and has a fascinating edge treatment in which water flows into a grated gutter covered by loose flagstones. The pool also has a large, shallow lounging area that I know for a fact is in direct violation of local codes. How did this one get by? And isn't it ironic that the pool has become a community icon featured over and over again in magazines, newspapers and television shows?

Naturally, if someone tried to mimic that exact design for another property, health department officials would stop the project in its tracks. And they would need no reason to do so beyond the fact that multiple violations have been observed.

Just a couple of blocks away from the Delano Hotel, there's the pool at the Raleigh Hotel I profiled in this magazine several years ago ("A Seaside Classic, January 2002, page 48). I helped develop a conceptual plan for remodeling the pool that involved creation of a shallow lounging area around the entire perimeter – a fabulous feature that accentuates the site's beautiful Art Deco sensibilities.

As it turned out, the owner moved ahead with the design without pulling any permits. When the work concluded, the health department had a fit, threatened to shut down the property and, on a more personal note, said they'd take away my construction license because my firm had done the drawings. (We hadn't done the physical work and had noted the plans "Conceptual, Not for Construction", so we were in the clear – but we endured several agonizing months before that decision was reached.)

After a long, expensive battle, the health department gave up and the pool with the illegal design is still beautifully operational. Indeed, it's another "violator" that's become a community icon – and as far as I know, no one's ever been hurt in experiencing the offending design.

here and there

Before those of you who work globally start composing letters, the problems I'm discussing here aren't exclusively confined to the United States. I'm currently working on a project in the Cayman Islands, for example, and have run up against some incredibly silly regulations.

What they have there is a combined res-

idential/commercial code that seems to have been compiled at random. That combination seems strange on its face, but when you dig into the details and try to get something done, you see in addition that lots of what they apparently want makes no sense at all.

They have, for example, a rule stating that there can be no shared circulation between a residential swimming pool and an *attached* spa. I formed a couple theories on my own before asking anyone about this: Perhaps it was a matter of officials being kind to suppliers by requiring purchase of two equipment sets instead of one, or maybe it was their desire to decrease spa use by making the water in the smaller vessel of perceptibly lesser quality than in the bigger one by denying them shared circulation.

When I finally *did* ask, I was told that this requirement was simply in the code – end of discussion.

This frustrated me until I started working through some of the other details and found similar howlers elsewhere. I came across, for instance, the statement that perimeter overflows must be at "3.75 gallons per minute per linear inch." Great: The design I was working on called for a 20-by-40 foot pool with a full-perimeter overflow: That translated to 5,400 gallons per minute going over the edge!

Now, I suppose it's possible *theoretically* to build a system that will accommodate that flow rate, but in my 35 years in the business, I've never seen a pool make that happen – and why on earth would anyone even try? In discussing this point, the official I dealt with allowed a specific variance on this one point but refused to revisit any of the other requirements, including the equally deranged spa-circulation requirement.

As a rule, however, what I see being done in other countries is vastly more creative than what we're able to execute here. Consider, for example, the amazing project at Jade Mountain in St. Lucia (covered in great detail in *WaterShapes*' April 2007 issue). That property represents one of the most fantastic uses of water to be found anywhere in the world, and there's absolutely no way that it could have been built in the Unites States without the unusual cooperation of approving agencies.

For starters, the two-dozen pools at Jade Mountain all have colorful tile interiors: As we know, health departments here require the interiors of all commercial pools to be white or very light colors *only*. I've never understood that particular rule, really, but its application is close to universal across the country.

imagination constrained

Sometimes the excesses when it comes to enforcing the regulations are truly breathtaking.

Not long ago, I worked with a landscape architecture firm on the design of a pool for a lovely resort property in North Carolina. The project included a large lounge area inside the pool as well as a

vanishing-edge detail. The landscape architect managed to get the design approved and moved forward with construction, and that should have been the end of the story.

During construction, however, the health department decided that the original approval was in error: Somehow, they'd become concerned that someone in the pool could climb over the vanishing edge's dam wall, fall past the trough and tumble down the slope.

The last-minute, logic-defying, design-destroying solution they demanded required installation of a walkway over the trough, thus making it possible for someone to walk around the entire perimeter of the pool. This walkway included a railing, so, while the vanishing edge is still there, the visual effect has been completely ruined – and just about anyone with a will to self-inflicted damage might still find a way to tumble down the exact same slope, now without the trough as an impediment!

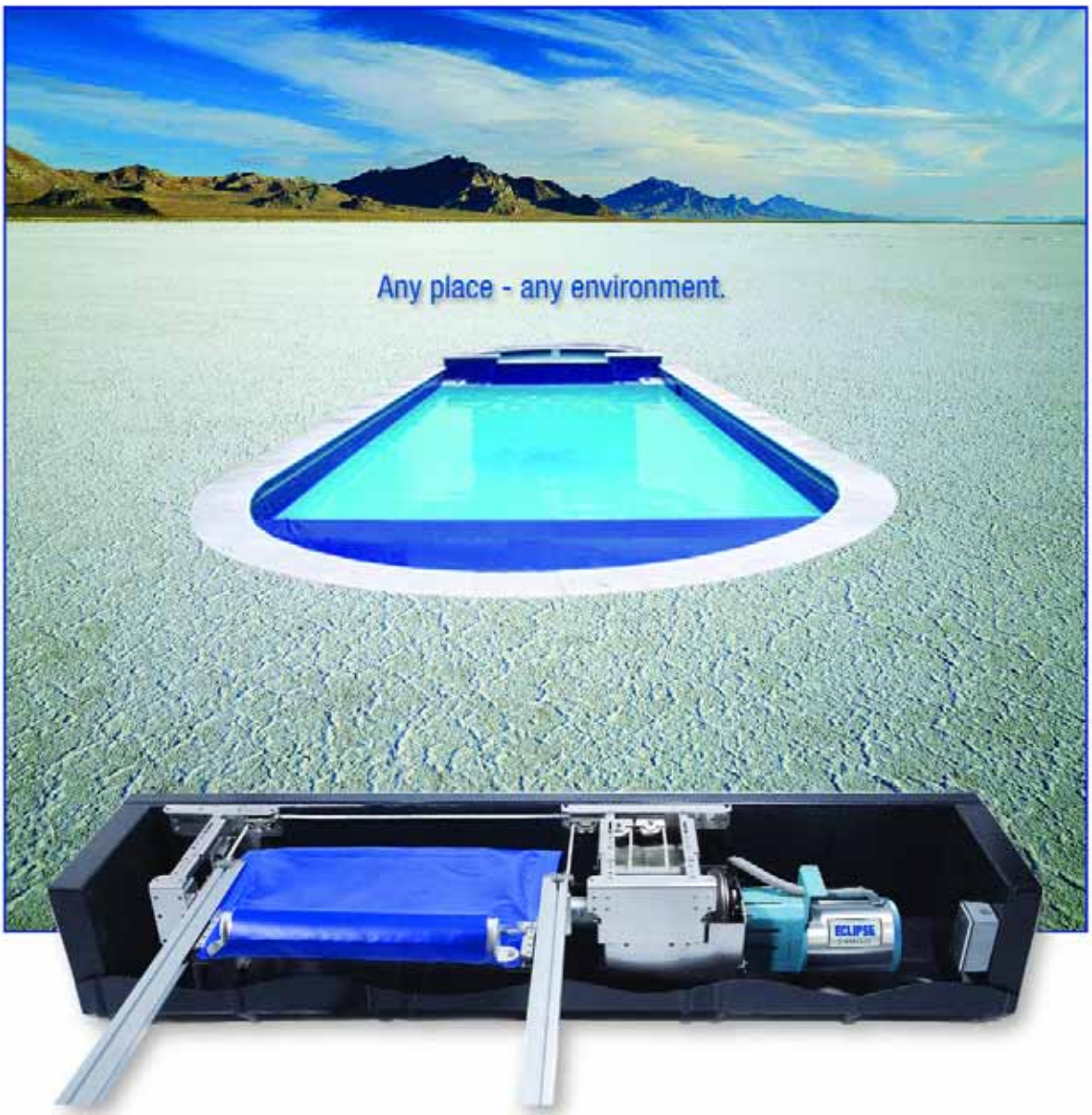
In other words, there was absolutely no improvement in safety on any level; the only effect was to screw up a glorious design.

I'm having the same sort of trouble on the opposite side of the country as well. For a project in California's Napa Valley, we designed a complex in which separate

This is no way to treat a vanishing-edge detail, but that's just what local officials ordered after changing their minds about the permissibility of this commercial installation. I honestly don't see how the walkway is any 'safer' than the edge and trough, but if the rules say it's so, there's no good way to argue the point with most officials.

The result of the alteration to the vanishing-edge effect is a disaster no matter the time of year: The walkway and railing completely obliterate the water-on-water effect, and our best design intentions were utterly disrupted by what seems a clear case of regulatory silliness.

Engineered Reliable.



The Coverstar Eclipse™ stainless steel automatic safety cover system

Because of the harsh environments in which pool covers operate, the engineers at Coverstar have developed an automatic safety cover made to withstand the elements. With parts engineered of stainless steel, the Coverstar Eclipse is designed to stand up against the harshness of any pool environment. With larger stainless steel pulleys, a stainless steel bracket system and mechanical torque converter as well as 4,000 lb. ropes, the heavy-duty stainless steel components of the Eclipse are immune to the environmental factors and most of the problems that cause service calls with other automatic cover systems. You and your customers will appreciate the reliability, durability, safety, and savings that only the Coverstar Eclipse provides.

To arrange a demonstration of the Eclipse, call **1.800.617.SAVE (7283)** for you're nearest Coverstar distributor.

COVERSTAR™
The Highest Standard

Circle* 11 *on Postage Free Card

men's and women's spas have massaging cascades in which hot water falls down along a wall onto people sitting in either spa as a form of relaxing hydrotherapy.

The health department's objection? They don't want water falling from the cascades to originate in and be recirculated from the spas themselves. Rest assured, the water is filtered and chemically treated before reintroduction to the bathers, but these officials see it as "unsanitary" for some reason. They have no problem with bathers sitting directly in the spas, mind you, but water falling on those same bathers from overhead cannot, for some reason, originate in these spas.

In effect, they're saying that you can't have water pouring on people who are already immersed in that same water. Go figure.

And of course, it's beside the point that this exact same sort of feature is found at numerous other properties in California: It's a no-go in Napa so far in this case. And what's baffling to me is that they have no idea where the restriction came from, and they don't care: It's in writing, and that's all they need to head us off. (Arbitrary *and* dumb: my favorite combination!)

what to do

I bring all of this up with a certain sense of futility, because I have no specific idea what to do to get away from this silliness.

It would be great if an organization such as the National Swimming Pool Foundation would take up the cause and create some sort of task force to engage health departments in meaningful dialogue and negotiations rooted in good technical information. Of course, that might take years, even decades – and personally I don't have that long to wait.

As it stands, those of us who have to navigate through these shoals of nonsense simply have to take each situation on a case-by-case basis and pick our fights as well as we can. The result, however, is higher costs and greater difficulty in designing world-class facilities, which means that those who will suffer most are property owners and their patrons.

In the meantime, I'm waiting for some persistently dim person to notice that oceans, lakes, rivers and streams are filled with water and pose hazards similar to those found with pools and spas. I can see it now: Railings, nets, fences, warning signs, the works – all to protect the dimmest of our citizens from the hazards of natural bodies of water.

Then again, none of that's in the code as yet, so it's probably not a problem – at any rate, not yet! 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.

WHAT IS THIS?

That's the National Pool Industry Research Center and YOUR INVITATION to JOIN members of your industry in UNITING to solve problems and help YOUR INDUSTRY!

POOL SURFACE APPLICATORS
POOL BUILDERS • POOL SERVICE COMPANIES
MANUFACTURERS, DISTRIBUTORS AND SUPPLIERS

JOIN THE

NATIONAL PLASTERERS COUNCIL

WWW.NPCONLINE.ORG

FOR MORE INFORMATION CONTACT US AT:
PH: (941) 766-0634 OR TOLL FREE AT (866) 483-4672

Circle **109** *on Postage Free Card*

By Bruce Zaretsky

Straight Talk

As I've grown as a professional landscape designer and watershaper and have worked on projects across a range of sizes, styles and price tags, my thinking has evolved.

Does the size of a project or its budget correlate with its creativity or quality?

I know many of us have clients who think that way, believing the more money they spend, the better product they're going to get – and my best guess is that there are lots of watershapers and landscape professionals who buy into that model as well.

We all come to this view honestly; because all through our lives we're bombarded by cultural messages suggesting that bigger/grander/more is always better: From reality shows on television that embrace all things affluent to images in books and magazines where the most celebrated properties are always owned by the very rich, we have been told incessantly that art and beauty go naturally with wealth and power.

As we stare at the 30,000-square-foot homes, the collections of vintage cars, the extensive wine cellars, the exquisite finishes and the pools shaped like violins, as professionals we often think: "How can I land some of these people as clients?" We dream about that big job that will put us on the map, make our mark on the watershaping or landscaping world, bring us recognition and referrals to other projects that ultimately will attain for us our *own* big home, great car, nice wine – and, of course, a pool shaped like a dollar sign.

It's an extremely seductive vision, and my suspicion (despite the fact it's wrong-headed) is that it's a driving force behind much of what we do.

both sides now

I'll admit to the fact that, for a long time, I bought into that intoxicating but misguiding belief system. As I've grown as a professional landscape designer and watershaper, however, and have worked on projects across a range of sizes, styles and price tags, my thinking has evolved to a point where I see that all projects can be made, in their own ways, to deliver tremendous value to clients.

In other words, I can now honestly say that bigger is not *necessarily* better, not *necessarily* more creative, not *necessarily* more valuable (depending on how we define the word). A bigger budget gives you access to a wider variety of options, but the value of the project still boils down to quality design and installation, no matter the wherewithal of the client or the extent of the budget.

In fact, it's gotten to a point where, when I see a project of the sort celebrated in design-awards programs or featured in consumer magazines, I look things over and ask myself, "What could I have done had the budget for the project been half or even just a quarter of what it was? Could I still create something worthwhile?"

In a sense, that pair of questions stand at the heart of the conversation we're going to have in this column, which will, as clearly as it can, focus on what it is in watershaping and

landscape work that defines its value. Right off the top, I'd argue that it's more about creativity, artistry, reliable engineering and quality construction than it is about project scope and/or the wealth of a client.

In conversations with colleagues at conferences and trade shows and during visits to botanical gardens, museums and even social gatherings, I've observed that 90 percent of us – me definitely included – do *not* mix with the clientele whose properties we see on television and in magazines. While we may strive to that level – and certainly *should* – we're left in the real world with clients who are decidedly *not* spending the money that those highlighted projects entail. The simple fact is that most people lack that kind of disposable income. Or, if they do, they apparently have other priorities in mind.

So where does that leave us? Do we all migrate to areas where we see this work happening? Do we go to work for companies that are doing these projects? Those are possibilities, I guess, but that's not what I want – and this is where we come to the column you're now reading and the thought behind its heading: We're going to speak "On the Level" here, meaning, among other things, on the practical, functional level where most of us operate in the workaday world.

freeing minds

I'm excited by the opportunity to converse with you. It's profoundly liberating to recognize that, in working at a high level of creativity and quality, we are not constrained by the scale, complexity or budget of a project. Instead, what we do is governed by the values we ourselves bring to the work and the ingenuity we use to implement those values.

It's a practical matter, really, because any project, no matter how big or small, requires us to pay attention to the design, its details and our clients. We don't need a big budget to perform on that score and design creatively. In fact, I would say that it's more challenging (and hence more stimulating) to attack a design based on a smaller budget than it is to work with a big one. Indeed, I find myself much more engaged in designing tiny courtyards than I am by larger sites, simply because those confined settings force me to inject value in ways that go beyond dollar signs.

To be sure, big projects have their inherent challenges and virtues when it comes to design and implementation. But so do smaller ones, because everything is amplified, every inch counts and every plant or appearance of water is noticed. And you can't gloss over a problem area while focusing on a more favored view: When everything is so close at hand, the nuances of every view come into sharp (even relentless) focus.

None of this is to say that big, expensive projects aren't wonderful, but what makes them so is our capacity to elevate our game and pay the same degree of attention to details no matter the scope of work. To my way of thinking, those who think value is limited to and defined by the so-called "high-end" market are missing the boat. To me, the trick is to draw ideas, practices and procedures from the upper-level projects and apply them in more modest ones.

I'd also argue that when you work at a high level across the board, then you'll be prepared to apply that sort of elevated approach to the big-budget, grand-scale jobs when and if they come your way.

All of this may seem too philosophical, but I'd say it's actually quite down to earth and practical: How do we incorporate everything a client wants *and* stay within a budget? How do we keep the client focused? How do we keep control of the project and its subcontractors with respect to scheduling and work flow? How do we handle mid-project change orders or unexpected challenges? How do we make design visions become reality and do it consistently, project after project?

When you break it all down to the components of what quality watershaping and landscape work are all about, we can reliably conclude that none of this is easy!

on the ground

If you're reading this column, you've chosen a tough way to make your living. Odds are you didn't choose this profession because of the money, at least not at first. You chose it because you love the challenges and the satisfaction that flow from building something from nothing. Or you might love interacting with clients, the design process, digging in the dirt and/or the final cleanup of the site. You may simply be showing off your artistic prowess.

Beyond that sort of initial (and enduring) idealism, however, ours is a business defined by brutal practicality. To be successful, we must have both the left and right sides of our brains working full tilt and in complete harmony as we strive for a blend of creative and financial success. To hit the mark, the creative side of our work must be informed by the practical – and vice versa.

In future issues, much of what I have to write will be focused on these crossroads of idealism and ground-level reality. We'll converse about what it takes to do more than make a living in this crazy profession and how to live well as a result of our efforts; how to dictate the schedule based on your decisions rather than vice versa; how to charge for your time; and how to get back to the days when you truly enjoyed the work – that is, before it became a "business."

We'll also engage in dialogues about design, from process and presentation to implementation. We'll touch on ways to create really cool, human-scale projects without bankrupting our clients or ourselves. We'll talk about the people who work with and for us and how we keep them motivated and involved; we'll also discuss the people who hire us and define ways to make the good ones happy and the bad ones go away.

We'll get high-minded, too, looking at our responsibility to the environment, the need to recycle and reuse products and ways to use resources including fuel and energy more wisely. And we'll explore projects, taking some from start to finish, getting inside the heads of the clients as well as the designers. We'll talk about good times and bad, all of it with an eye to finding ways for all of us to enjoy and be proud of what we do.

Ultimately, we're going to talk about you and me and the ways we make our ways in the world – straight up, honest and always "On the Level." WS

For any pool style, shape, or design you create, Cover-Pools® covers the best.

The Professional Choice for Year-Round Pool Protection

For professionals who demand the highest quality automatic safety covers for their pools, Cover-Pools offers the most advanced technology and labor-saving installations in the industry.

The Save-T® 3 cover protects against unwanted entry into the pool, reduces drowning risk and saves up to 70% on water, heat and operating costs at the turn of a key or press of a button.

Freeform? Water feature? Rectangular? Vanishing edge? You'll find an option to complement whatever design you create.

Visit our website or call for details about customized pool cover options for concrete, vinyl and fiberglass pools.

THE **ORIGINAL** AUTOMATIC SAFETY POOL COVER

COVER POOLS®

Save-T® Pool Covers

1-800-447-2838 | www.coverpools.com

Circle* 8 *on Postage Free Card

By David Tisherman

Hillside Smarts

In last month's introduction to what it takes to prepare for, organize and complete the excavation stage of the watershape-construction process, basic common sense was the governing factor in how the process should proceed. What I was discussing last time, however, was simple, flat-site excavations – cases in which access is commonly not an issue, soils are often consistent across a site and the potential surprises are relatively few.

This time, my focus is an altogether different breed of excavations – that is, the task of preparing a sloping, hillside site for installation of a watershape. This process offers a set of challenges that is not for the faint of heart – something certainly to be avoided by beginners and even by many experienced builders.

Hillside projects are notorious for an elevated risk of structural failure, for the extensive substructures of piles and grade beams they often require and for sites often characterized as "difficult" with respect to equipment access. To make a long story short, working in these conditions is inherently harder (and potentially more dangerous) than is excavating on flat land.

At the same time, these projects tend to go smoothly – and for at least two good reasons. First, their complexity makes me perform at the absolute top of my game as I deal with hundreds of details rather than the dozens that might be encountered in a flat-site job. Second, the expert support I gain from soils and structural engineers as well as from inspectors, building departments and the top-flight subcontractors who get involved in these projects puts 50 pairs of eyes on the tasks at hand in addition to my own.

All of the piles had to be dug by hand in a process that put brave, strong, skilled laborers down into the holes with chipping hammers, shovels and buckets used to carry off the spoils.

steep inclines

The project seen in the first set of images accompanying this column is a classic example of what can be described as a "tough" excavation.

Set in the Hollywood Hills, the design called for a pool/spa/deck structure to be cantilevered off an extreme, fall-away slope into which we dug a set of piles that reach down to competent soil (as determined by the soils engineer). In all, this required us to remove about 30 cubic yards of material – not a huge volume compared to many standard excavations but in this case quite a lot.

The main complicating factor here was access, which was extremely limited for this site: There was absolutely no way we could bring in a drilling rig, so all of the piles had to be dug by hand in a process that put brave, strong, skilled laborers down into the holes with chipping hammers, shovels and buckets used to carry off the spoils. There's no way to pretty this up: It is brutally hard, terribly confining and potentially dangerous work.

In all, the pool's foundation required us to dig six of these holes to contain what are known as *friction piles*, which are like huge paper-towel rolls filled with structural steel and concrete. We might alternatively have gone with *bell caissons*, which, as the name suggests, have a widened, bell-like area at the bottom to increase surface area, but the choice here was friction piles: These have uniform diameters top to bottom and are far easier to dig despite the fact they require somewhat greater depth.

Hand-digging of this sort is an area in which OSHA requirements must be followed to the smallest detail. While some see dealing with this agency as a chain of endless hassles, in the case of hand-digging piles, OSHA's guidelines can literally spell the difference between life and death

Often imitated, never duplicated, Pebble Tec®, Pebble Sheen® and Pebble Fina® brand pool finishes help to create the kind of luxurious, durable pools and spas that provide a lifetime of inspiration and relaxation, whether you're building a new project or remodeling. A tradition of innovation in swimming pool surfacing creating a distinct, yet natural appearance - let your imagination soar with Pebble Tec. For more information visit www.pebbletec.com, or contact your preferred pool builder.

PebbleTec®
SUPERIOR QUALITY POOL FINISHES

Available exclusively through the world's finest pool and home builders. Hand-crafted by artisans who have been carefully selected, trained and licensed by Pebble Technology, Inc.

Circle* 107 *on Postage Free Card

for the intrepid souls who are willing and able to work in three-foot-diameter holes at up to 30 feet below grade.

One of the key safety issues, obviously, has to do with shoring up these pits to prevent cave-ins. We generally use corrugated-aluminum tubes that slide down into the holes as they get deeper, but you can also use thick-cardboard SonoTubes or even wooden shoring. As a rule, cave-ins happen at the upper levels of a hole where the vertical pressure of the soil isn't sufficient to lock the earth in place. OSHA, however, requires support all the way to the bottom, almost certainly because experience has shown the regulators that the risk is too great otherwise.

no room for error

Hand-digging these holes is definitely *not* a one-person operation. Typically, the one in the hole is supported by another at the top who is constantly raising or lowering a five-gallon bucket with a rope to remove the spoils and, of course, to insert or extract the person down in the hole. This ground-level person also serves an important safety function, communicating steadily with the worker below to make certain all is well and pulling the worker back to the surface if signs of fatigue or oxygen depletion become apparent.

That last point is quite important: Depending on the depth of the holes in question, we'll set up an oxygen line and will even drop exhaust fans into the hole because the air can get depleted pretty quickly in confined spaces at depths more than 20 feet below grade.

Hand-digging adds another factor to the mix: A worker in the bottom of a hole needs a diameter of at least 36 inches to complete the task effectively and efficiently. This requires early communication with structural engineers, who typically assume that a site offers adequate access and so will often specify 24-inch piles.

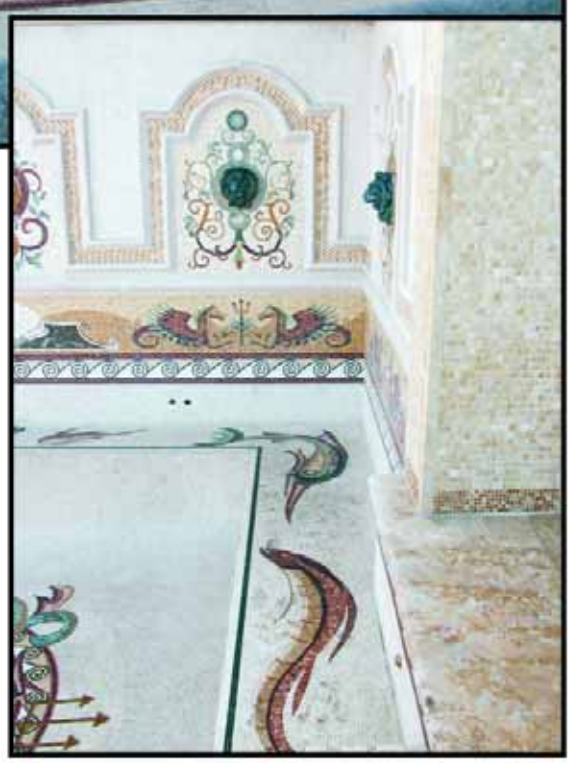
If a plan calls for these 24-inch piles and you bid the job that way but there's no access for a drilling rig, then you have a *huge* problem because of the extra expense involved in labor, time, materials, forming and everything else involved in this construction phase. It's a case where knowing all about access issues ahead of time not only determines the logistics of the operation, but the actual design itself.

This is not, in other words, an area in which corners can be cut or you can learn as you go: Knowing what you're doing when you need to dig 25 to 30 feet down into the earth on the side of a hill is absolutely crucial because, eventually, what you're doing below grade will determine the reliability and longevity of the structure that will appear at and above grade.

Even with a plan, however, you sometimes run up against the old axiom, "Sometimes you get the bear; sometimes the bear gets you." A skilled laborer with a chipping hammer can be amazingly efficient and delve into the

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.



VITA NOVA

The tradition continues...

Makers of fine mosaics in either classical or contemporary motifs in marble, glass, ceramics and combinations thereof. Full design services available. Simple to install.

Pool builders and landscape professionals can now become dealers.

Inquires to (818) 785-4484

Check out our web site for many more examples of our work.

www.vita-nova.com

earth with surprising speed, but there are limits: Some types of extremely hard material cannot be penetrated by hand, and sometimes a site calls for a hole that reaches too far down for a person to dig (our safe limit is right around 30 feet).

True, it rarely happens if you know what you're doing and the soils and structural engineers have done their jobs well, but every once in a while you end up with a design that simply won't work as planned – at which point the client has a big decision to make. Anything can be built if that client has the resources and the will to cover the increased cost of getting the job done, but there are times when the numbers become so large that the client will call things to a halt.

Whatever happens – stop or go – rest assured that, in the face of unexpected difficulty, fudging on either the design or the structure to get a project built is *never* a good notion.

This site offered both a steep slope on a fragile hillside as well as extremely limited access, so digging for the piles and grade beams that would be needed to support the watershapes and decks was done by hand. These are delicate operations requiring a knowledgeable, experienced crew and equally knowledgeable, experienced supervision.

the lay of the land

As suggested above, even the best planned of these hillside projects can run into the unexpected – such as a section of soil impenetrable by hand.

Hillsides also commonly encompass a variety of soil conditions within the same site. It's not unusual, for example, to encounter all sorts of odd bedding planes, layers of alluvium, various cut-fill transitions and a range of other conditions that might have an effect on the structural design that will send you back to the drawing board.

This is why, whenever I'm building a hillside structure, I make it clear to the homeowners that this is not an area where they can think in terms of saving money. I let them know we're going to design a reliable structure based on soils testing and proper engineering – no ifs, ands or buts – and that I'll walk away from the project without the slightest hesitation if they can't accept that fact.

I also let them know, as with the pos-

Fortunately, many sloping sites offer good access – as in this case, where we were able to bring a drilling rig onto a well-prepared, well-marked site and complete the excavation for a string of deep piles with relative ease.

sibility of running into an impenetrable obstacle, that their project might run into something unexpected – something that stands a chance of substantially increasing costs to the point where they might have no choice other than to back away and rethink everything based on the site's limitations.

Fortunately, not all hillside projects are as unforgiving as the one shown in the first group of photographs on these pages. In most cases (as in the second group of images), you can find a way to move a drilling rig into position and make much shorter work of the excavation.

Any drilling rig will do at a pinch, but as is the case with most tasks requiring equipment, bigger and more powerful is always better than any alternative.

Drilling rigs come in a helpful range of sizes and are *extremely* efficient. You can drill holes in a matter of hours that would take muscle and sinew days to complete. That's why, if there's any conceivable way to get a drilling rig where it needs to go,

There are lots of different drilling rigs and all sorts of attachments designed for penetrating certain types of material. In selecting a rig, going with the biggest, most powerful unit that can fit on the site is usually the best and most efficient approach, while choosing the right attachments is something to be determined by a soils engineer familiar with the site.

I'll always bring one in wherever possible: The expense is *always* worth it.

Once you have a rig in place, of course, you still need to know what you're digging into: There are a variety of bits and augers suited to delving through different types of material – something for the engineer to determine. Again, this is an area where absolute knowledge of the site and its soils is essential.

too sensitive

Allow me to make one enormous point about all this: Hillside excavations are so tricky and so individualized to the site and its characteristics that it would be irresponsible of me or anyone else to try to be prescriptive in a magazine article. This is not an aspect of watershaping you can learn that quickly or easily.

Where it's unfortunate when a firm works beyond its ability in excavating for a standard, flat-lot project, with a hillside project, "unfortunate" becomes "criminal." Not only will the homeowners end up with a project that will fail – sometimes spectacularly so when entire structures give way and fall down a hillside – but you as a watershaper can also literally kill people on these jobs if you don't know what you're doing.

Short of that, you can waste unimaginable sums of a homeowner's money, ruin your reputation and end up spending years in litigation, because failures in these cases have an ability to cause incredible amounts of property damage not only for your clients, but also for neighboring properties. And when you factor in the risk of serious personal injury to workers, it becomes clear that this is not work for the timid, the unskilled or the uninformed.

I would argue that *every* watershaping project calls for proper engineering and onsite management at every step of the way, but that's even more critical on hillsides, where everything from anchoring heavy equipment to removing the spoils from the site must be carefully orchestrated.

Simply put, hillside work is absolutely no place to practice or learn on the job. Every single person on your crew should be experienced, and if you yourself are not up to speed on the fine points of all project phases, you and your clients will be far better off if you step back and bring someone in who has the expertise and experience required to guide a project through this phase.

If you do so, pay attention to what happens: You might not be ready to tackle the next project solo, but you'll pick up valuable lessons you can apply the next time you need to organize a hillside excavation. WS

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 the Genesis 3 Design Group, which offers education aimed at top-of-the-line performance in aquatic design and construction. He can be reached via e-mail at david@tisherman.com.

Integrated View

By **Melanie Mackenzie**

A spectacular site is often the foundation for extraordinary watershapes and landscapes, observes Melanie Mackenzie – and that certainly proved to be the case with this project. As seen here, she built upon elements suggested by the site and its surroundings to develop a fully integrated approach that ties the front and rear yards together in ways that delight the eye, cheer the spirit and encourage the contemplation of distant horizons.

From my first visit, I knew I'd be spending a lot of time here developing the watershapes and landscapes on this amazing site.

Set on a bluff in Del Mar, Calif., the whole property slopes down from the street level to the back edge of the property. Beyond was an open space offering uninterrupted views of a river estuary, native coastal scrub studded with rare, indigenous, protected Torrey Pines and the Del Mar shoreline's pounding surf. There were also the spectacularly patterned cliffs at Torrey Pines State Park – a vista and set of colors that ultimately determined material choices for this project.

It helped that I was completely at ease with the homeowners right from the start as they shared the story of the 25 years their family had spent in this extraordinary place. Not surprisingly, they were protective of both home and property, and their questions to me were to the point and well considered.

Access to the home was substantially redefined in remodeling the landscape, starting with the Craftsman-style pilaster and lantern at the head of a sweeping stone stairway. The steps move down to a landing (now hidden from the street) that leads to a bridge and the home's carved front door.

I soon learned that they had already interviewed, hired and fired several designers before being referred to me, but that didn't seem to make a bit of difference, as we connected so strongly and so soon that I left our first meeting feeling honored and fully entrusted with bringing their dreams to reality.

Doing **Homework**

As a first step in the design process, we brought in a civil engineer to map the site; took samples for agricultural-suitability testing; and shot a barrage of photos for my use during the design process. Next, I visited with the local planning department and the homeowners' association to determine if there were any ordinances, restrictions, covenants, architectural guidelines or anything else that might affect my direction.

I don't undertake any design work without first performing these critical tasks: It keeps me from basing my work on supposition and wasting everyone's time.

As a landscape-oriented designer, I prefer having plant-suitability soil testing performed early in the process instead of waiting for a landscape contractor to make these determinations just before installation. My thought is that plant materials can and should be discussed early on and that this information carries a lot of weight in deciding what will be appropriate.

I also find it helpful, even at this preliminary stage, to start considering what I call "architectural plants" that I like to incorporate in selected places as key design elements. Knowing if the soil will help these trees and shrubs thrive is a major consideration.

While the engineer and I did our work, I asked my clients to do some "homework" on their own. I do so in the belief that full client participation is critical – so much so that if clients have not completed their assignment by the time I call to confirm our pre-design meeting (or if I learn that one spouse will not be able to attend), I will reschedule to allow them time to complete their assigned tasks and/or figure out a time when both will be home.

To me, any project is too important for my clients not to be fully involved – and when they are, I find they always get excited and become more aware of what they like

Off the left side of the bridge, those approaching the door hear and eventually see a small fountain/waterfall that features the same ledgerstone found in various other architectural details – but it's used here in a flowing, sinuous, organic pattern that mimics the water-pounded bluffs at Torrey Pines. This water source 'feeds' a dry streambed that leads under the bridge and around the side of the house (and is, by the way, a fully functional and much-needed drainage swale when the rains come).

and dislike. Using this approach, I nail 98 percent of my designs in the first concept drawings, usually with only minor revisions. Of the two percent I miss, it's with clients who've held back, done minimal homework and came to the pre-design meeting uninvolved, unexcited and unprepared to help me develop the design.

As for the "assignment," it's actually fun if the clients get into it. On this project, for example, I asked them to develop a wish list of all design elements they wanted me to incorporate. I also asked about entertainment needs, maintenance considerations, allergies and the budget. To complete the exercise, I requested that they mark pictures in magazines and books and let me know about any products that caught their eye in catalogs or on web sites.

They knew I would be bringing my own stack of design books and magazines, but I stressed that the more effort they put into the assignment, the better chance I would have in being successful in creating spaces they would love. All in all, the site research and their homework set us up for a most productive pre-design meeting.

The **Borrowed View**

Right away, it was clear that the owners' main desire was for me to focus on preserving their unobstructed views while visually blending any new details with the sandy bluffs on site. I suggested we take that visual connection one step further by selecting materials that not only worked on site, but would also visually connect them with the far vista – that is, with the bluffs at Torrey Pines State Park.

This "borrowed view" approach is one I never hesitate to apply in my designs whenever the opportunity arises. The concept allows me to integrate my clients' spaces into larger native surroundings seamlessly, without interruption and with a sublime sense of expansiveness. In this case, they immediately loved the idea.

Another critical consideration had to do with preserving and maintaining the stability of the bluff edge, which made the handling of stormwater and irrigation runoff even more of a priority than usual.

Beyond the functional issues, there were also aesthetic ones. My scope of work included upgrading the front yard, which

The new deck commands amazing views off into the distance, but it also offers access to and views of the lower yard as it falls away to the top of the bluff.

meant designing a new driveway, new retaining walls, new planters and a new entry walk to coordinate with a new entry footbridge the architect was designing. We also discussed a new fountain near the front door from which a dry streambed was to "flow" under the footbridge and perform double duty as a drainage swale during the rainy season.

The existing yard featured a dated mix of plants coupled with a narrow, salt-finish concrete entry step/walkway treatment and a rotting phone-pole retaining wall that almost completely hid the early-1980s-vintage, wood-sided home. As it was, it gave me the sense of walking down a narrow staircase into a bushy ravine – not a particularly welcoming approach to the front door.

But the existing space was not without points of interest: There was an outstanding, hand-carved front door with an Agave motif and the existing footbridge that led to the door. Happily, the house was to be remodeled in conjunction with the exterior makeover and the front door was to be preserved, although a new covered bridge was to replace the original open span. In addition, the old siding was to be replaced by tan stucco (to pick up the color and textures of the bluffs) and set off by ledger-stone details.

Upgrades in the rear yard included incorporating the architect-designed deck into the overall garden scheme while integrating and augmenting an existing homeowner-built waterfall and pond. A new bluff-top seating area was to be included along with new garden paths that would link areas within the garden and offer access to adjacent open spaces.

Preliminary **Plans**

During the pre-design meeting, we reviewed the remodeling plans and discussed the changes to the front, particularly the covered bridge and the finishes specified for the structural footbridge-support system and the home's exterior.

They showed me a sample of a cultured-stone veneer that had been recommended by the architect and the interior designer. I am not a fan of these products, so I asked if they were wedded to the choice and mentioned that I already had a natural stone in mind that would pick up the colors, textures and deep-plum shadow patterns seen in the bluffs at Torrey Pines State Park.

That material – Three Rivers stone – was something I saw being used for various applications throughout the project, including the fountain, the exterior-wall veneering and the pilasters flanking the footbridge. This would, I said, translate into visual cohesiveness and avoid the problems inherent in mixing natural and cultured stone.

To press the point, I brought the

Below deck level, you encounter a small bridge and a variety of pathways that lead to various viewpoints atop the bluffs. The sweeping paths pick up the curves of the entry walk and lead to special views, hidden sculptures and a range of visual treats up close and off in the distance.

clients samples of Three Rivers flagstone. They still struggled, however, basically because they were uncomfortable deviating from the architect's recommendations. This led me to schedule a meeting with the architect and interior designer: Although they told me they liked my ideas and fully understood what I was trying to accomplish with the stone and its connection to the borrowed view, they were still hesitant about switching.

This confused me until I recognized that I was dealing with a comfort level/familiarity issue, as neither had worked with natural stone in these types of exterior applications. Once I provided the architect with resources that would get him the construction details he'd need, he relaxed and left the decision up to the clients.

Although this is not a stone for every client or application because of its strong patterns and distinct purple overtones, it only took a visit to one of my completed projects to sell the clients on the Three Rivers option. Seeing it installed, they recognized it as the perfect choice for their home – so much so that it made the increased cost bearable.

To me, the lesson of this story is plain: As a designer, I can't hesitate to go the extra mile in educating my clients and showing them how good design can work in their favor. Just telling them this stone was the right choice was not enough, but seeing certainly was believing – and it really did work in everyone's favor once we were done.

At last, with all homework completed and hardscape materials selected, I was ready to start drawing.

In the Studio

Knowing which stone would be used was my guide as I visualized and laid out the conceptual plan for the driveway and a web of walkways using what I call the

The pathways flow around and through a variety of special destinations, including the small waterfall/pond system as well as interesting compositions in rockwork and greenery. Perhaps most welcoming of all, they lead to a small, bluff-top deck next to the pond.

"river of stone" approach.

I started by laying out the Three Rivers flagstone in an irregular pattern that flows through contrasting flatwork – in this case a colored concrete paving and a seeded river-pebble finish that offered a wonderful match to the flagstone. (I also used this material to fill voids in the hardscape and in places where there was no planting.)

The front entry's retaining wall, flatwork and steps are laid out in arcs that fall away from and out of view of the street, down along a series of sweeping stone steps that hug a stone-faced retaining wall. At the base of the steps is a circular stone landing that provides a transition to the composite-wood bridge, the leading edge of which is cut to conform to the irregular contours of the abutting flagstone.

Ledger-faced columns (designed by the architect) support the new bridge and its solid cover. The battered profile of these details lend the house a subtle Craftsman-style aura that we gently adopted in our treatment of the street-level entry pilaster that terminates the arcing wall. Its battered faces and Craftsman-style lantern (decorated with a Torrey Pine motif) pay homage to the region.

The new covered bridge passes a waterfall/fountain inspired by the splash zone of the nearby beach cliffs, where waves at high tide pound the bluffs and, between sets, the seawater trickles from the rugged stone cliffs into the tide pools below. Only here is the ledger stone laid in a sinuous fashion in emulation of the natural strata of the cliffs. Buried as it is and oriented to face the bridge and the house, it cannot be seen from the street and offers a wonderful surprise to those approaching the front door. (It can also be seen through the kitchen window.)

The fountain also seems to be the "source" of the dry streambed/drainage swale that runs under the footbridge before wrapping around the west side yard and heading toward the rear yard. This swale is fully functional when it's not being purely decorative, collecting stormwater runoff from both landscape drains and the home's downspouts for transfer to an unusual drainage system.

Set back from the bluff by about 15 feet and running across the property is

a large, gravel filled, subterranean trench that acts as a sort of leeching field to capture and percolate water into the soil before it reaches the bluff. A gentle swale set just above the bluff is the key, directing any rainfall away from the edge and into the hidden trench, which has been in place since the home was built.

According to the homeowners, the bluff's edges have not receded during that time, so we didn't tamper with the system in any way or intrude into the dry zone between the drainage system and the bluff's edge.

Improved **Planting**

Our work in the rear yard *above* the swale was just as involved as our work out front. When we started, we encountered a haphazard array of Roses, succulents and turf, and the best features were a waterfall and pond that had essentially been swallowed by the plants. We began by redefining and reorganizing both the layout and the plantings.

Using the stream-suggesting flowing-pathway approach once again, the steps from the architect's deck now tumble down to a flagstone-paved landing that serves as the hub for all the yard's pathways. A small, arched, prefabricated footbridge was positioned where the dry swale/streambed crosses the yard and now conceals the true source of the waterfall. (This portion of the dry streambed is, by the way, just for looks: The actual drainage inlet is up the slope, where it collects runoff and routes it directly to the bluff-top drainage field.)

The natural-stone steps have ledger-stone risers and groundcover frames, providing easy access through the lush planting along the watercourse and down to the lower areas around the pond. Ferns and tropical plants flank the rocky banks of the waterway as it falls gently to the newly enlarged pond, which is lined with Arizona River Run cobbles.

Incorporating another arc, a curving, ledger-stone garden wall defines a small flagstone patio. Viewed from above, this space beckons one to come and enjoy the vista, both of the garden and its watershapes as well as the ocean. Perched just above the bluff, the seat wall projects slightly into the dry transition zone, where we planted drought-tolerant, deep-rooted Mediterranean and native species to stabilize the cliff top and blend with the native landscape beyond.

We also used rectangular, poured-in-place concrete steppers (colored and seeded with pebbles to match the front yard's paving) in addition to the flagstones to add a geometric element and some textural relief. This path flows through the garden and out into the transition zone between the gardens and the dry zone along the bluff.

We completed our work on site in 2005, and in April 2006 I received the call all designers love to get: My client was relaxing, glass of wine in hand in his new backyard, when he felt the urge to call, thank me and let me know just how much I'd exceeded expectations. It was a special ending to an extraordinarily satisfying project.

Everything on the back of the house is dedicated to the simple proposition that the views are what make the home so special. The fact that we borrowed colors and textures from bluffs seen in the distance only heightens the sense that this space is part of a far larger setting that everyone who visits is invited to enjoy.

Rough Edges

Although far more common than they once were, pools with vanishing edges are still among the watershaping industry's most distinctive designs. Their increased popularity, however, has been accompanied by a rash of expensive repairs and structural failures in the walls used to create the edge effects. To get to the bottom of this disturbing trend, engineer Ron Lacher has investigated the causes and, in this article, presents his recommendations for solutions.

By Ron L. Lacher

Through the past 20 years or so, the vanishing-edge look has become perhaps the most recognizable hallmark of custom swimming pools.

In that time, these vessels have gone from relatively rare to remarkably common. These days, in fact, it's a rare builder who doesn't have at least a handful of these projects in his or her portfolio.

Unfortunately, this growth in the popularity of vanishing edges has been attended by a dramatic increase in problems with these structures, particularly on the outside surface of the freestanding wall that creates the elegant edge detail. The problems manifest themselves as cracks, surface delaminations, efflorescence and, in severe cases, as leaks. These are issues that have led to scores of dissatisfied homeowners and numerous potential lawsuits.

The good news is, the problem is entirely solvable through implementation of a few basic measures that really should be the industry's standard practice. The bad news is, at this point too many watershapers are just not aware of those procedures, much to the detriment of the industry's collective public image.

Beneath the Surface

Vanishing-edge pools have been around in various forms for many years, but they really came to everyone's attention in the late 1980s – and then caught fire as *the* upscale look of the '90s.

As is true when any design type rapidly catches hold, the spread of knowledge about the construction techniques needed for proper installation of these features lagged well behind the demand. As a result, many of these structures were designed and built using a seat-of-the-pants approach in which workmanship standards were not what they should have been.

All seemed well at first, because the problems didn't become apparent immediately in most cases. Indeed, news about the increasing number of failures first reached my ears only five years ago. At that time, the vast majority of these weir walls had exposed aggregate surfaces on their outer sides, so many people assumed that the problem rested with the finishes because the failures were visually apparent on the surface.

The diagnosis was that these surfaces, because they were exposed to repeated wet/dry conditions, were breaking down over time. Given the fact that my firm provides structural plans for thousands of pools each year, we are always among the first to become aware of these sorts of problems, and I became involved early on in discussions aimed at determining exactly why this was happening.

Almost immediately, I recognized that it was likely *not* a problem with the surface finish alone. In fact, I could see that there were as many as four or five separate possible causes or combinations of causes that stood at the heart of the matter.

What knocked exposed-aggregate surfaces down as the primary source of the problem was my observation that most of the incidents were limited to weir-wall surfaces: There were far fewer problems with the wall of the collection trough just opposite the weir wall – a part of the vessel subject to exactly the same wet/dry conditions as its counterpart and one usually having the same surface finish.

Based on that point alone, it made no sense to lay the blame on the surface material. In addition, as time passed it was clear that exposed-aggregate surfaces weren't the only ones manifesting prob-

The growth in the popularity of vanishing edges has been attended by a dramatic increase in problems with these structures, particularly on the outside surface of the freestanding wall that creates the elegant edge detail. The good news is, the problem is entirely solvable.

lems. Now we were hearing about issues with walls finished in stone and tile – and the concern was always primarily about the weir walls.

It had to be something else, so we started digging deeper.

Material Insight

For the longest time, I was at a loss to explain these failures. I knew it wasn't the surface material, because by now we were seeing situations in which surfaces finished in combinations of tile and exposed aggregate – as in cases where the edge itself is covered in tile while the wall below is finished in some other material – were experiencing failures with *both* surfaces.

I began to notice that these problems were similar to those I'd seen in the dam walls of raised spas and in pools built into ascending slopes with overly irrigated landscaping above them. Moreover, we were now seeing projects where water was leaking all the way through the weir wall – clearly not a problem related to *any* surface finish.

All the evidence began pointing to a conclusion that the issue had to do with water *behind* a wall structure that had an exposed surface on the opposite side.

This problem wasn't happening in all vanishing-edge pools, however, so we soon recognized that the water was merely exacerbating some other problem (or perhaps a combination of problems). At its core, the challenge had to be coming from water penetrating through weir walls.

Backing up a bit, at this point it's important to note that the cementitious surface materials used in swimming pools are not completely waterproof. The Technical Manual of the National Plasterers Council, for example, describes plaster, the most familiar of all pool and spa surfacing materials, as a "semi-permeable membrane."

This is not new information. The simple fact is, without some other means of waterproofing or the use of admixtures, all cement-based materials will allow some water to penetrate their surfaces. They may be said to be "water-resistant," but they certainly are not waterproof.

With swimming pools or other wa-

In the years since vanishing-edge pools gained incandescent popularity in the 1990s, we've seen more and more failures of the sorts depicted here, with extensive, disastrous cracking and delamination of surface materials. It took a while, but eventually patterns emerged that helped us determine why these freestanding weir walls were failing – and what needed to be done to prevent it.

tershapes installed in the ground – that is, where the walls are backed by earth – this semi-permeability isn't an issue because no harm is done when small amounts of water penetrate the structure. Usually, this volume of water is so small that it pales in significance to losses due to evaporation, so nobody ever gives it a thought.

That all changes when we consider freestanding walls such as those we set up in vanishing-edge pools. Here, the level of permeability obviously can become a problem.

Going Deeper

To get to the bottom of the mystery, we began examining a range of issues that might be coming into play – everything from workmanship techniques and the porosity of the materials used in weir walls to the physical nature of the walls relative to temperature differentials and the presence of moisture moving through the wall. In all cases, we were looking for ways in which these issues might be driving the failure rate.

Efflorescence is one such issue and is thought to be one of the primary factors in the cycle of weir-wall deterioration. Efflorescence is the simple formation of salt crystals through the evaporation of salt-bearing water. As water passes through a semi-permeable weir wall, salts remaining from the cement's hydration process are dissolved and carried by water as it moves through the structure.

Upon reaching the surface, the water evaporates and leaves behind the minerals – and thereby the evidence of water's transmission through the semi-permeable weir wall. As this process continues, salt crystals can build up in the pores and voids in the material and can eventually fracture (or *spall*) the surface. We stop this damaging effect of efflorescence by keeping water from passing through the weir wall in the first place. (More on this solution later on.)

Moving beyond that issue, we knew that weir walls were different from other pool structures in that they are exposed to extremes with respect to moisture changes and temperature variations – factors known to cause problems in the broader concrete-construction industry.

One consequence of exposing concrete surfaces to environmental conditions is the phenomenon known as "curling." More commonly an issue with concrete flatwork, curling happens when there are differences in the moisture level between the top and bottom of a concrete slab.

We all know that concrete shrinks as it dries and expands when moist. If you have a four-inch-thick concrete slab, for example, and the top surface is exposed to the atmosphere while the bottom is exposed to a moist subgrade, the top will dry faster than the bottom and the difference in the rate of shrinkage will cause the structure's shape to distort with its ends "curling" upward.

This same phenomenon can cause problems with the surface material on vanishing-edge weir walls when the back of the surface material is exposed to moisture penetrating the weir wall as the wall's front surface is exposed to the air. The stresses from curling can be tremendous and will expose any weakness of the bond between the surface material and the gunite or shotcrete substrate.

Another phenomenon is known as "warping," which is similar to curling but relates to concrete's expansion in response to heat. Basically, when one side is exposed to heat – as in the case of the outside surface material on a weir wall – the outside part of the material expands relative to the inside of the material and bows upward in the center.

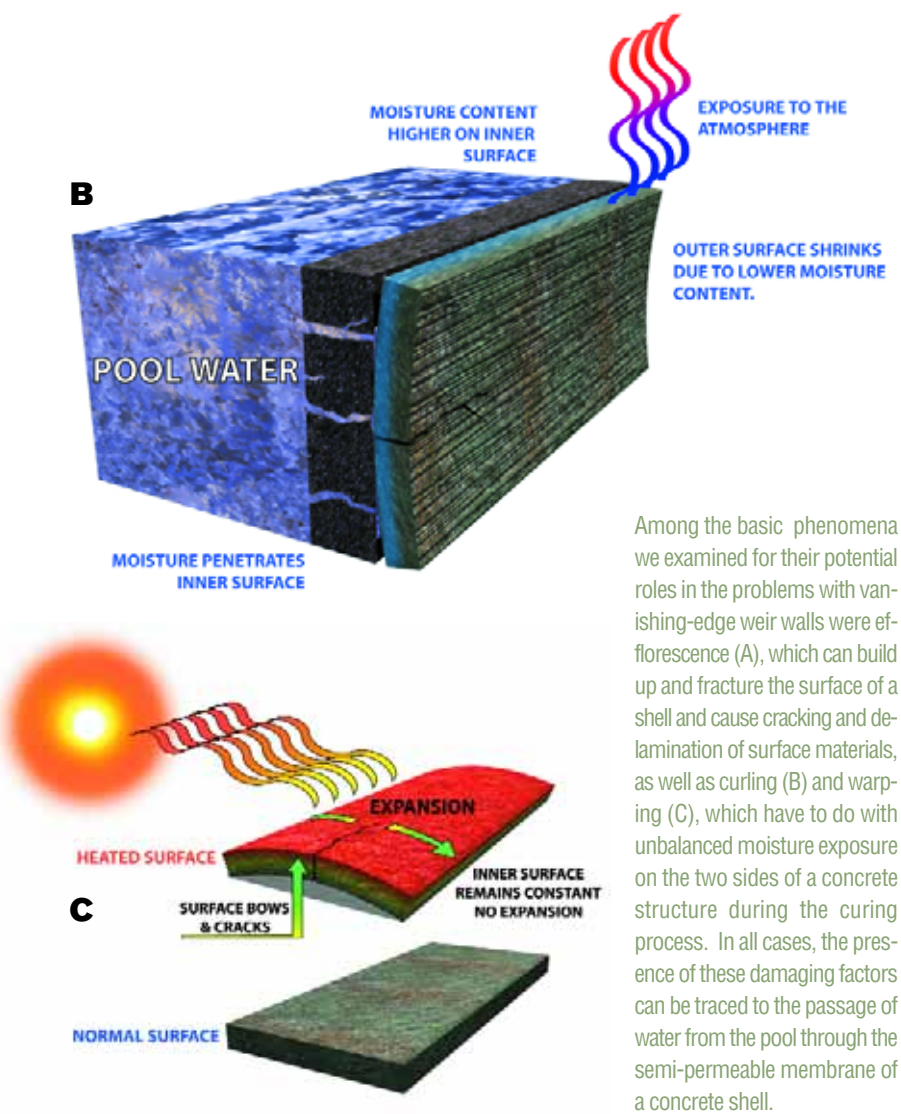
The possible result of curling or warping is delamination or cracking in the surface material. When even a single crack forms as a result, efflorescence can begin to build up and the cycle of wall deterioration accelerates. To minimize this potential for delamination, we must use the highest-quality materials and follow established procedures to ensure that bonding strengths of surface materials to their substrates far exceeds the stresses placed on them by curling or warping.

Keeping all these basic mechanisms in mind, we turned to the question of how water was managing to pass into these walls in the first place – and at such a rate that failures were occurring.

Key Concerns

The areas of inquiry now broke into two basic categories: First were questions about the structural integrity of the walls themselves, then we looked to see if there was a need for some form of additional waterproofing to provide a barrier to moisture migrating though the structural material and the surface finishes.

The structural integrity factor relates to a host of fundamental workmanship issues and standards. The workmanship component can be summed up by noting that weir walls must be built with techniques and practices that should be familiar to any watershaper. While these recommendations apply to



Among the basic phenomena we examined for their potential roles in the problems with vanishing-edge weir walls were efflorescence (A), which can build up and fracture the surface of a shell and cause cracking and delamination of surface materials, as well as curling (B) and warping (C), which have to do with unbalanced moisture exposure on the two sides of a concrete structure during the curing process. In all cases, the presence of these damaging factors can be traced to the passage of water from the pool through the semi-permeable membrane of a concrete shell.

every concrete pool ever made, they are of even greater importance on weir walls, where workmanship defects are more likely to reveal themselves – often in dramatic fashion.

The discussion of standards begins with a look at the pairing of concrete and rebar. As with all reinforced structures, the rebar must be completely encased in concrete, otherwise the structure is not effectively reinforced and the voids will allow moisture to travel through the structure and cause the rebar to rust.

Again, this is not new information, but in the case of a freestanding wall, it's absolutely critical that proper construction procedures be followed to ensure complete rebar encasement. First, the rebar must not vibrate or move as the concrete is being shot – and that the forms should be equally stable. Any movement might create voids around the rebar that will give water a place to gather and cause rust to form. Once rust begins to form, expansion pressure builds and can lead to reflective cracking, spalling and the buildup of efflorescence.

In the case of weir walls, I'm not exaggerating to say that violations of this standard are commonplace. All too often, I see crews install forms by tying them directly to the rebar with no spacers or dobies at all between the rebar and the form. What this means is that the rebar is, in effect, going to end up at or just below the surface of the concrete and will not be fully and completely encased.

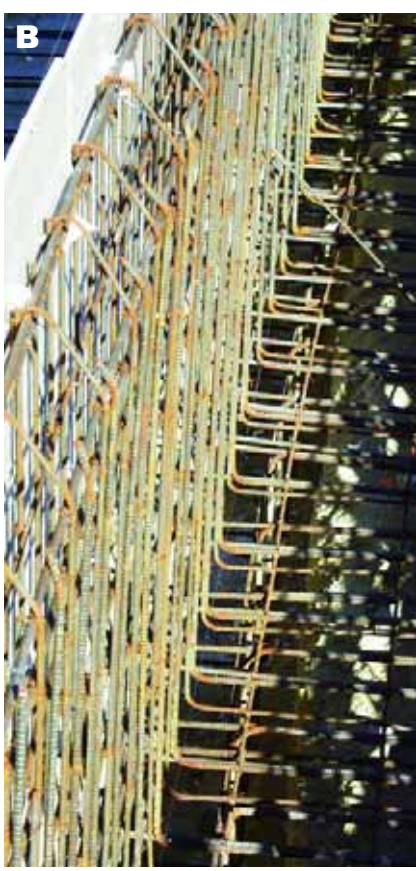
With failed surfaces, the removal of the surface material often reveals structures in which the rebar is right there, visible on the gunite or shotcrete surface and without the required coverage.

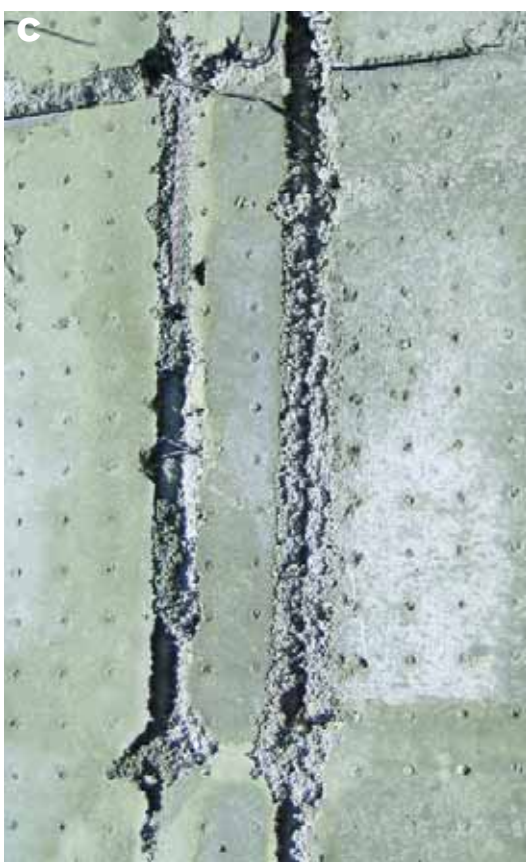
Given this practice, there's little wonder why so many walls are failing: The rebar simply isn't properly encased in concrete! The good news is, the fix is obvious: Build stable rebar cages, tie them together properly, construct stable forms properly braced at the top and bottom and, above all, use spacers or dobies that allow proper coverage of the reinforcing steel.

Sprayed On

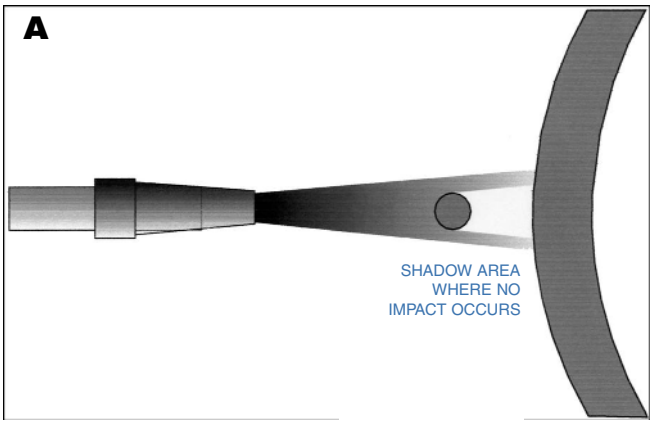
The issue, however, isn't all with rebar and forms: Of equal importance is a range of concerns having to do with proper gunite or shotcrete application. This is a huge topic and merits separate discussion; for our purposes here, a few key points will suffice.

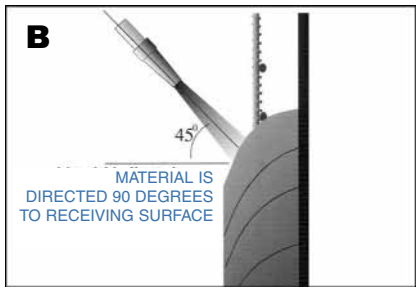
The first has to do with "shadowing." When concrete is shot into place, the nozzle operator must be certain that there's no shadow behind the rebar – that is, the sort of void that results when correct application techniques are not being followed. Just as is the case when rebar vibrates during shotcrete application, the voids formed by shadowing lead to familiar problems with water movement, rust, cracking and efflorescence.





Workmanship plays a definite role in these problems with weir walls. Situations in which cages are inadequately secured and are able to move during shotcrete application are trouble (A), for example, as are instances in which no spacers are used to make certain rebar can be fully and completely encapsulated in concrete (B). The consequences in the latter case show up as soon as the forms are stripped (C) – and the situation only gets worse when water is introduced.





Proper shotcrete-application techniques are important in avoiding problems with vanishing-edge weir walls. It's vital, for starters, for the operator to know to avoid 'shadowing' and creating voids on the back side of the rebar (A). It's also critical that the material be shot at the appropriate angle and in ways that minimize over-spray and the creation of rebound (B). Neither over-spray nor rebound are ever fully reliable material – and they are particularly troublesome in freestanding weir walls (C&D), where their presence can encourage water passage and speed a wall's deterioration.

Another issue is over-spray and rebound. Very often, I've seen applicators who are "stack shooting" a wall – that is, building the wall up with successive passes – allow over-spray and rebound to build up against the form, especially if the application surface isn't at a 45-degree angle. Maintaining the application surface at this 45-degree angle helps minimize the entrapment of over-spray and rebound. Proper workmanship dictates that after each pass, the crew needs to go back and clear away this over-spray and rebound; otherwise, the next pass simply locks loose material into the wall.

This is not an uncommon occurrence, of course, because clearing away the over-spray and rebound is laborious and time-consuming. But the outcome can be problematic, as in the walls of inground pools where you see over-spray and rebound lurking at the top of the wall or in the bond beam – and coping is subsequently mounted atop poor-quality material.

As has been discussed in a previous article ("Bad Benchmarks," August 2006, page 42), over-spray and rebound are also a huge problem in benches and steps, but they are equally problematic in weir walls, where the resulting imperfect structure is exposed to extremes of temperature and moisture differentials. Indeed, this single mistake of leaving over-spray and rebound in the weir wall structure can result in failures that might start slowly with minor cracking and efflorescence but can later develop into leaks and other serious problems.

Curing – that is, properly wetting the surface after it's been shot – is another basic step that's of extreme importance with weir walls. We all know that when concrete cures too quickly, it is subject to the formation of shrinkage cracks. When weir walls are exposed to direct sunlight, they can heat up quickly and, if not properly wetted after concrete application, will develop shrinkage cracks that aggravate the problems we've been discussing.

Waterproofing

In addition to basic practices that should be applied anyway, weir walls must also be given the added protection of some form of waterproofing – at least on the inside but preferably on both the inside and outside surfaces. If the above workmanship standards are observed, the added layer of protection afforded by

proper waterproofing should be enough to keep these exposed walls from failing.

I recently visited a project that had a vanishing-edge pool as well as a separate vanishing-edge spa. The spa had an all-tile interior, so it had been thoroughly waterproofed, but the owner hadn't wanted to go to the extra expense of waterproofing the weir wall as well. Here, where the same exact materials and installation techniques had been applied to both weir-wall surfaces, the wall that hadn't been waterproofed soon showed signs of water penetration and a buildup of efflorescence, while the waterproofed weir wall of the spa is still pristine.

I've also seen projects where waterproofing on weir walls appears to have failed. That puzzled me at first, but closer examination revealed an obvious problem that is easily remedied. Without getting into specific products and specifications, failures of waterproofing agents almost always have to do with improper use. The range of these products is considerable, and each comes with its own specific set of application instructions that must be followed explicitly.

For example, many waterproofing products applied to surfaces once the concrete has set are designed for use only on the "positive pressure" side of a structure. With a vanishing-edge wall, this means the pool's side of the weir wall. Others are suitable for both the positive and the negative sides, with the "negative" side being the outside of the weir wall. It all boils down to knowing which material is best used for what purpose – an exercise that requires thorough reading of the manufacturer's literature.

It's extremely important to note that, for all the good they can do when applied properly, waterproofing agents cannot compensate for improper workmanship. Most will only seal cracks or voids to a certain width, and they certainly won't do anything to shore up an unsound structure. By design, they are intended to perform optimally when applied to otherwise properly constructed walls.

Future Courses

They key in all of this is to realize that weir walls, because of their freestanding nature, will expose any flaws in a builder's fundamental construction practices. Based on the scores of projects I've seen both during construction and after the fact, vanishing-edge designs merely reveal inadequacies that might otherwise go unseen.

Certainly, there's room for additional research, testing and analysis – especially of the bonding ability of the various available surface materials used on the back sides of weir walls. The long-term performance of various waterproofing products must also be scrutinized with the goal in mind of establishing application guidelines for use of waterproofing agents in weir-wall applications with particular types of surface materials.

Perhaps someday this kind of information will be broadly available, but that day has not yet come. In the meantime, if you're one of the countless builders involved in the construction of vanishing-edge pools, you must be mindful of the basics of construction and should always take the extra step of properly applying an appropriate waterproofing agent.

If you don't, there's a chance the lovely pool you turn over to your clients won't be functional five or ten years down the line. If you do, chances are better than good that you can go back five or ten years later and find a pool that looks as good as it did the day the water first spilled over the edge.

Waterproofing is a good idea on both sides of a vanishing-edge weir wall, simply because, when properly applied according to manufacturer instructions, these coatings minimize the transfer of water from the pool to the outside of the wall and thereby act as welcome layers of protection.

Healing Waters

By Belinda Stillwell

Located on a university campus in southern California, the Brown Center is a state-of-the-art facility providing students and area residents with a venue for addressing a range of physical disabilities through both water- and land-based activities. Here, aquatic-program director Belinda Stillwell describes how this unique facility meets user needs and how water's healing powers improve the lives of those who take advantage of it.

In our business, when we talk about people with disabilities, we always put *people* first: We speak of "people with brain injuries," for instance, or "people with arthritis" or "people with spinal injuries." That's an important distinction, because the language informs the entire mindset needed to help them improve their situations in the most effective ways.

For starters, this "people-first" approach helps us avoid misleading generalizations: Often, we find that two people with nominally similar conditions or disabilities will have significantly different needs and that the methods used to treat each may prove to be significantly different as well. Everything we do at the Brown Center, in other words, must be based on the individual's own profile.

Situated at the heart of the campus of California State University, Northridge (CSUN), the center is able to provide precisely that sort of individualized attention and care, largely because we offer facilities for both land-based exercise programs and activities that take place in water. By providing both therapeutic mediums, we're able to provide an unusually full set of opportunities to address and, we hope, improve a broad range of physical conditions.

Work on our newly expanded aquatic center was completed in the Spring of 2003, and the facility now includes four separate bodies of water in which a spectrum of activities take place to address everything from obesity and arthritis to severe brain injury and more. It's a place where people can follow paths that suit their individual needs via an extraordinary array of exercise options.

Working Space

We at CSUN are proud of the university's commitment to helping people with disabilities. The Brown Center (named for a local family that funded a large portion of the construction) is one significant component of a larger program known as the Center for Achievement Through Adapted Physical Activity. I currently serve as the director of aquatic programs and in that role have seen at first hand just how important adapted water exercise can be in improving a broad range of conditions.

Our programs provide both individual exercise as well as opportunities for work in groups. What we do here is not "physical therapy." It is *adapted exercise*, which is part of a greater category known as *adaptive physical activity*, which can be defined as any activity that has been modified for people with disabilities, whether it's horseback riding, swimming or walking. Our program and facility are unique in the range of activities we provide – all of them outside the mainstream medical community.

Indeed, most people in our program have already worked their way through the medical community to the greatest extent possible and have found in the Brown Center a means of continuing their pursuit of better health. The program currently serves about 300 people, many of whom would not otherwise have access to such a facility. And we work with people of all ages: There's a program for children we offer twice a week.

The foremost issue for people with disabilities is simply having a place to go. The unfortunate fact is, there just aren't many facilities like ours where such a wide variety of programs can be offered. Having both land-based programs and aquatic facilities under one roof (as in our

case) is extremely unusual: For the most part, land-based clinics go no further than offering a warm-water tank of some kind – and that's about it.

Given our facility's flexibility and scope, we've been able to establish programs in which university students in fields such as kinesiology, physical therapy or pre-medicine can volunteer to work with our users. So not only does this facility provide an opportunity for those with disabilities, it also provides a unique hands-on, highly personalized educational opportunity.

These students participate in "lab time" in which they're paired with individuals who come from the surrounding community or from within our student population. This gives these young people the opportunity to gain real-world experience in the profound benefits of adapted therapeutic exercise. It also gives the Brown Center a role in building a cadre of future practitioners who have direct experience in caring for those with physical disabilities.

Open Concept

In most adapted-physical-activity curricula, there's unfortunately not much time spent on aquatic exercise – perhaps a lecture or two. Here, students can get up to a year of working directly with people in the water and as a result come away from the program with a far greater appreciation and understanding of how the theoretical ideas behind therapeutic exercise apply to real people. In essence, they gain practical ex-

perience that they might not otherwise have gathered until much later in their careers.

That's important to us as part of a teaching institution, but we never lose sight of the fact that the presence of our extensive aquatic programs gives a large number of people a safe and enjoyable place to follow a path toward greater physical strength, endurance, flexibility and, most important, confidence in what they can do with their bodies.

It's common for program participants to start out with individual exercise, working in the water with an assigned helper before moving on to group sessions in shallow water and, in some cases, into deep-water workouts as they become better able to move independently in the water.

Flexible access by a variety of means is a key to the utility of the pools at the Brown Center. From mechanisms and ramps for those who need complete support to railed stairways and transfer wells for those able to maneuver themselves into the water, the design intent was to make it possible for those with a full range of capabilities to get into and enjoy the water.

Ultimately, we want to place participants in a combination of land and aquatic exercises, but it's common to see participants start out in the water because that's the best place for them – especially in the early stages of exercise. Often, they will stick to water as the primary focus of their exercise regimens.

In entering the program, each participant is evaluated to determine levels of strength, endurance and flexibility. We then design their routines with all the components of a workout that someone without any disability would pursue, including a warm up, cardiovascular exercise, strength training, flexibility work, relaxation and a cool down.

For people with disabilities, the levels of fitness they attain in these workouts can make a huge difference in their abilities to move through daily routines – things as simple as brushing hair, going to the grocery store or getting in and out of a car. Thus empowered, they might be able to do more with greater ease and speed and with less pain. It's a realm in which the importance of fitness simply cannot be overstated.

What's so fantastic about water exercise is the range of conditions it can benefit. We see people who are extremely limited in what their bodies allow them to do, but because of the safety and comfort of water and the buoyancy it provides, they can pursue a variety of activities, find their limits and continue to reach new goals – even if they started out with extreme limitations. By the same token, more independent users can challenge themselves and make progress toward even greater physical freedom, all in a very secure environment.

Freedom of Movement

There's an emotional component to these activities that can be extremely important, especially when it comes to aquatic exercise. As an example, we're working with a woman who incurred severe injuries in an automobile accident some 16 years ago: She's been in a wheelchair ever since and, until she came to the Brown Center, had never tried working in water.

When we did the aquatic evaluation, she was able to rise out of the wheelchair and move with relative freedom in the water. It wasn't long before tears of joy began flowing, and I'll never forget how she explained that her wheelchair had become a "cage." Only in the water did she make much initial progress, and, no matter how difficult it was, she was encouraged to keep going because of the incredible sense of freedom she experienced in our pools.

As is often the case with people who haven't been in water for long periods of time, she had to go through a period of adjustment in which the water went from feeling like a foreign environment to becoming a place in which relative ease of motion and comfort were possible.

Once our clients are in the water, we offer them a full range of available activities, including a pair of underwater treadmills and swim jets in the main pool as well as comfortable lounges in the spa. Along with access to activities and various forms of individual and group exercise, we also offer them the personal attention of the center's experts as well as the support of talented students.

She's not alone. In fact, getting participants to develop a comfort level in water can be a big part of the early stages of our work with them. Often, these initial activities amount to baby steps, and we're always alert to the fact that sometimes just moving beyond an initial fear of water is a significant and extremely important accomplishment.

In the case of the woman who was in a wheelchair, she now wears a mask and snorkel and moves around our pools with tremendous confidence and mobility. She doesn't have use of her lower extremities, so it's unlikely she'll achieve anywhere close to that mobility on land. From the standpoint of someone who doesn't face that kind of challenge, it's hard to fathom just how important the opportunity to move freely must be to her and others in similar situations.

When looking at water exercise as a therapeutic activity, you can never underestimate the importance of the psychological effects it can have. Certainly, that's true about all forms of therapy, but with water we find that we're able to work with many people who have no other options: In many cases, the first, best and *only* real progress they can make is when their bodies are freed from gravity.

Then, of course, there's the inescapable fact that being in water is pleasant for almost all of us and that it's human nature that anyone who enjoys an activity is far more likely to stick with it over a longer period of time.

Water Bodies

As I mentioned above, this level of program flexibility is possible because of the variety of aquatic environments we have under one roof here. As designed by the team at Rowley International (Palos Verdes Estates, Calif.), each of our four bodies of water serves a different set of purposes, all of which are critical in designing regimens for a wide range of issues.

- **Main pool:** The main pool is our largest body of water and is where a majority of group activities take place – not to mention the broadest overall *range* of activities. In almost constant use by individuals and groups, it offers access in various ways, including several lifts, a wheelchair ramp and steps with broad treads. There's also a bench that runs the length of the pool – easily accessible by anyone who needs to sit and take a break – as well as handrails around the full perimeter. In addition, this vessel is equipped with two underwater treadmills and swim jets.
- **Cool Pool:** This vessel is kept at a moderate 82 to 84 degrees F. and is used primarily by people who cannot tolerate warmer water. (That includes a large percentage of those who have multiple sclerosis and are therefore extremely sensitive to temperature.) This small pool is equipped with a swim jet and a "flume" system for more vigorous workouts.
- **Spa:** This large, inground spa is similar to vessels found at health clubs or resorts and is a primary location for our work with people who have arthritis and a range of other motion-limiting conditions. In addition, many people enjoy relaxing in the spa after working out in our other vessels or in our land-based programs.
- **Deep-water pool:** This pool has remarkable features, including a moveable floor that can be raised until it is flush with the deck. This allows people in wheelchairs to roll onto the floor and be lowered into the water, which can be set at any depth we choose down to seven feet. All of our deep-water classes take place in this pool.

The deep-water pool has proved to be particularly useful for program participants. In some cases, people use it simply to be suspended in water: When they're lowered into the pool, they experience a decompression of the spine that gives them a sense of physical articulation and relief of pressure they can't

experience on land. This pool is also very helpful in acclimating those who might be apprehensive or even fearful of the water at first due to its ability to be set at any depth.

Easy Access

It's very important to us that we keep our program both affordable and readily available. These days, there's much controversy about costs of health care, and we're more than aware that medically based physical therapy can be expensive.

As mentioned above, we have the advantage that we're outside the mainstream medical community, and that certainly is a factor in our fee structures. Students participating in the program, for example, pay nominal fees through their tuition, while members outside the university pay the program directly – but not much. While those with helpers pay a bit more, the typical cost is just $200 per school semester – any way you look at it, just a fraction of the cost of traditional, medical-system programs.

We can do things this way because of our affiliation with the university and the fact that students in kinesiology and related health and wellness fields use the Brown Center as part of their learning experience. Moreover, this facility is proving to be a fantastic place for academic research: We're currently engaged in studies looking at underwater walking gaits compared to land-based gaits as well as studies of various psychological techniques for reducing fear of water-based work.

But again, all the attention eventually flows back to those who use the facility as part of their therapeutic routines. We're proud of the fact that our center is large and flexible enough that we can serve a diverse range of needs and different disabilities. We're also humbled by the opportunity we have to make a difference in our members' lives. It's an important mission, and the four pools of the Brown Center make it all possible.

The deep-water pool is the most specialized of our four pools. Before sessions begin, its floor stands at deck level to provide easy access, then gradually lowers until everyone is immersed, buoyant and ready to exercise. We have a portable treadmill and various other equipment we can move onto the floor as well, giving our clients the full range of opportunities to benefit from the healing power of water.

Graphic Appeal

By Stephen Pevnick

For more than three decades, industrial designer, educator and inventor Stephen Pevnick has quietly been producing the mind-bending systems he calls 'Graphical Waterfalls' – highly specialized watershapes in which letters, words and images are formed with remarkable clarity within fine sheets of falling water. He discusses this mesmerizing effect here and its role in capturing attention and conveying messages in unique and surprising ways.

It comes as no shock that we remember things that surprise and fascinate us. Back in my days as a graduate student in fine arts, I was determined to exploit that very human tendency in creating nature-inspired artworks meant to evoke deep-seated memories and a personalized sense of *déjà vu*.

My first work along those lines involved creating a rail of ice with a central channel that carried heated air: The idea was to create a situation that reminded people of hot/cold experiences, such as the heat of a campfire on a cold night or the warmth of the sun atop a snow-capped mountain.

That project started me down a long path that eventually led me to create waterfall systems that use large quantities of precisely controlled droplets of water to "paint" kinetic graphics, logos and text – a concept I've continued to perfect through the past 30 years.

So far, these systems have mostly been used to display commercial messages at trade shows. It all makes sense: As deployed by exhibitors looking to amaze attendees (and by a handful of other high-profile commercial and public clients as well), the effect is meant to dominate a setting and attract maximum attention. To date, I've designed, programmed and installed more than 100 of these exhibits worldwide.

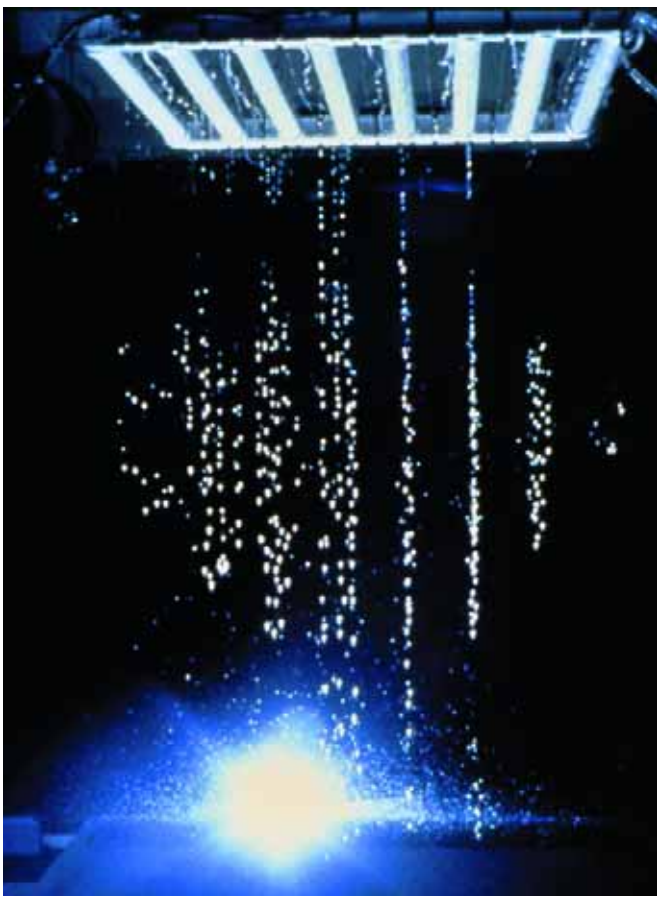
We've done some special events as well, including an installation seen by 24 million people who visited Atlanta's Centennial Park during the 1996 Olympics and, ten years later, another display celebrating the 60th anniversary of the coronation of the King of Thailand – a Graphical Waterfall (as I call them) seen by five million people in the first ten days of the event.

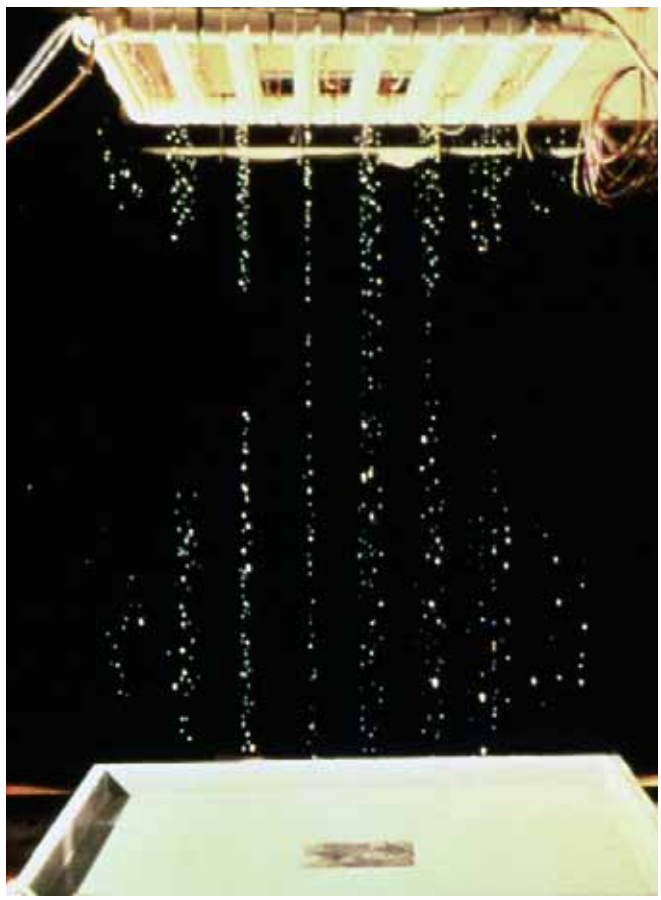
Painting in Water

Even with all that exposure, these systems are still enigmatic – mostly, perhaps, because of the low profile kept by Pevnick Designs, my Milwaukee-based firm. Rather than promote what we do directly, we generally work through trade-show exhibit companies that are typically reluctant to tell anyone where or how they found us. Still, our level of activity has kept research-and-development money flowing and drawn enough attention to our Graphical Waterfalls to keep everything going.

From the start, these systems have always been about combining art and technology to create something unusual and visually arresting.

The basic idea emerged from a series of incremental creative steps that actually began with the ice/hot-air project mentioned above. Upon completing my Masters of





The technology had a modest beginning with this 64-nozzle system, which produced my first three-dimensional, computer-controlled waterfall images. Completed in 1977, it depicted a diamond moving vertically through space.

Fine Arts' degree at Washington University in St. Louis, I began teaching in 1973 at the University of South Florida in Tampa. Soon after arriving, I heard that the chairperson of the music department had obtained an early mini-computer (the kind run by a paper-tape operating system) that had been designed for composing and performing electronic music.

This caught my attention because, in one of my other student projects, I'd worked out a system in which droplets of water fell on five heated cubes. It was an interesting project (if I do say so myself), but I was never satisfied with it because I lacked a good way to control the droplets and create something other than a random pattern. (As I'll discuss later on, even at this early point it occurred to me that it might be possible to create recognizable visual patterns in the streams of droplets.)

I asked the music professor if I might use the computer for the purpose of controlling falling water. He wasn't big on the idea, but he said that if I used it for a musical purpose or at least to create a sound effect, he'd let me give it a try. I followed up with an idea inspired by the sound of falling rain – a project in which I would define a space by using the rhythm and percussion of water droplets falling on plants to create a sonic illusion of rotation in space. He loved the idea and let me schedule some computer time.

In 1974, I received a grant from the university that enabled me to take off a semester to develop the concept. In trying to create the sound effect I wanted, however, I ended up coding an algorithm that was too fast and produced a diagonal line of water droplets. My original idea of creating a water display now came back to me, and from that moment on I knew I could produce complete images in falling water.

At that point I changed directions and, with the help of a graduate student in the music department, developed the first software for the system. I then enlisted the help of a mechanical-engineering professor to design what would be the first three-dimensional, computer-controlled waterfall. Next, with help from a technician in the music department, I tackled development of the electrical interface between the computer and the valves. That first system ultimately featured a horizontal, four-foot-square array of 64 nozzles.

Learning to Spell

I continued working with this original system for about three years and, by 1977, had produced a vertical sine wave, a spiral

and, finally, three-dimensional diamonds falling in space. I used a strobe light (also connected to the computer) to take photos of the early water graphics and discovered that I could animate the water-droplet-defined shapes and make them hover in space. I could also take a helix and make it hover – and then rotate the spiral clockwise or counterclockwise by adjusting the speed of the strobe.

After moving over to the University of Wisconsin in Milwaukee (where I still teach to this day), I installed one of the strobe-lit waterfalls at the Milwaukee Art Museum as part of a Wisconsin Directions show for Wisconsin sculptors, placing the waterfall in an inflatable black polyethylene structure so I could control the light.

After that show, I decided that I wanted to pursue the tradition of Western fountains and not use strobe lights: Their brilliance seemed to take the waterfalls into the realm of performance art, and I wanted to avoid the sense people might have that I'd shown them all I could. At that point, in fact, I was just getting started: I wanted my Graphical Waterfalls to be suitable for urban public venues as permanent installations.

Soon I was given a Project Design Fellowship by the National Endowment for the Arts and used it to develop a square, 576-nozzle system that operated off a single modular valve. By 1982, I was on my way, finally able to spell out *words*.

A second round of funding from the National Endowment enabled me to expand the concept to a 2,304-nozzle waterfall. First put on display through the Klein Gallery of Chicago during the 1998 International Art Exhibition on Navy Pier, that waterfall was able to say "hello" in different languages and create series of helixes and several other graphical images.

This trail-blazing display led to our securing a private grant from the Kohler Company that I used to develop a 12-foot-wide, 6,912-nozzle waterfall made up of a dozen of my one-foot-square units.

Kohler gave the grant to the University in exchange for my agreeing to exhibit my wares at two of their national trade shows each year. Once that relationship started, exhibit companies came calling and our waterfalls began appearing at trade shows both to display marketing messages as well as to draw attention to booths.

Focused Attention

I hadn't ever considered trade shows as being the defining outlet or venue for these effects, but it proved a ready (and

Continued on page 60

In the following years, I continued my research in valve design, always aimed at producing denser, more visible water droplets. By 1983, I had developed my first 576-nozzle module, which was capable of producing helical structures that appeared to turn as they fell.

PRODUCT INFORMATION CARD

For more information on advertisers and/or products featured in this issue's Of Interest *section, circle the corresponding Product Information Number on the postage-free card opposite this page.*

ADVERTISER INDEX:

Let your suppliers know where you found out about them: Mention code WS0807 to identify this issue when contacting them by phone or the Internet

Reader Service Number

44	A & B Aluminum and Brass Foundry (pg. 26) (800) 733-4995	www.abfoundryonline.com
	Advanced Aquaculture Systems (pg. 64) (800) 994-7599	www.perma-bead.com
88	Aqua Creek Products (pg. 41) (888) 687-3552	www.aquacreek..com
3	Aquamatic Cover Systems (pg. 3) (800) 262-4044	www.aquamatic.com
6	Aquatic Access (pg. 48) (800) 325-5438	www.aquaticaccess.com
118	Automated Fire & Water Effects (pg. 27) (702) 655-4074	www.automatedfireandwater.com
60	Cactus Stone & Tile (pg. 11) (800) 528-9445	www.cactustile.com
8	Cover-Pools (pg. 21) (800) 447-2838	www.coverpoolscom
11	Coverstar (pg. 15) (800) 617-7283	www.coverstar.com
10	Ebac Industrial Products (pg. 29) (800) 433-9011	www.ebacusa.com
46	Emperor Aquatics (pg. 9) (610) 970-0440	www.emperoraquatics.com
132	Fetch-A-Sketch (pg. 26) (800) 813-8422	www.fetch-a-sketch.com
64	Fountains Unique (pg. 16) (949) 305-7372	www.fountainsunique.com
16	Genesis 3 Schools (pg. 59) (877) 513-5800	www.genesis3.com
	Gilderfluke & Co. (pg. 64) (800) 776-5972	www.gilderfluke.com
67	Grand Effects (pg. 8) (949) 697-5270	www.grandeffectsinc.com
74	Great American Waterfall Co. (pg. 49) (888) 683-0042	www.gawcinc.com
28	Haddonstone (pg. 12) (856) 931-7011	www.haddonstone.com
130	IlluminFX (pg. 28) (877) 958-1200	www.illuminfx.com
96	Jandy Pool Products (pg. 68) (707) 776-8200	www.jandy.com
58	Lightstreams Glass Tile (pg. 67) (650) 966-8375	www.lightstreamsglasstile.com
63	Macalite Equipment (pg. 13) (877) 622-2548	www.macaliteequipment.com
14	Master Supply (pg. 64) (626) 967-5544	www.master-supply.com
84	Multicoat (pg. 41) (877) 685-8426	www.multicoat.com
1	Natare (pg. 49) (800) 336-8828	www.natare.com
109	National Plasterers Council (pg. 17) (866) 483-4672	www.npconline.org
4	National Pool Tile (pg. 7) (888) 411-8453	www.nptgonline.com
56	OLC Aquatics (pg. 48) (800) 203-1491	www.olcdesigns.com
107	Pebble Technology (pg. 23) (800) 937-5058	www.pebbletec.com
49	Pentair Water Pool & Spa (pg. 2) (800) 374-4300	www.pentairpool.com
76	RenoSys (pg. 27) (800) 783-7005	www.renosys.com
35	Spray Force Mfg. (pg. 19) (800) 824-8490	www.sprayforce.com
61	Speck Pumps - Pool Products (pg. 51) (800) 223-8538	www.usa.speck-pumps.com
42	Standard Bronze (pg. 28) (201) 339-1351	www.standardbronzeco.com
95	Texas Pool and Spa Show (pg. 24) (972) 978-9322	www.texaspoolandspashow.com
39	Vita Nova Enterprises (pg. 25) (818) 785-4484	www.vita-nova.com
	Wall Whale-GABco Products (pg. 49) (866) 888-8778	www.wallwhale.com

OF INTEREST INDEX:

135 Grand Effects (pg. 64)
136 O'Ryan Industries (pg. 64)
137 Laticrete (pg. 64)
138 CCSI Int'l (pg. 64)
139 Allen Concepts (pg. 65)
140 Cal Pump (pg. 65)
141 Whitewater West (pg. 65)
142 TimberGrid (pg. 65)
143 Pentair Water Pool & Spa (pg. 65)
144 Stow (pg. 65)
145 Modern Pool Systems (pg. 65)
146 Monarch Stone Int'l (pg. 65)

GENESIS 3 DESIGN GROUP

How Good Do You Want to Be?

Landscape Lighting School
Sept. 30-Oct. 4, 2007

Troy, New York

Come spend five days and nights with world-renowned lighting designer Janet Lennox Moyer and associates to learn all about the art of lighting exterior spaces.

Structured to familiarize participants with what's needed to develop and achieve a number of lighting effects in their own projects, the intensive program will include technical information and an introduction to lighting-design concepts as well as design workshops and five nights of hands-on exploration of lighting techniques.

The school will be held at Janet Lennox Moyer's all-new studio in Troy — with convenient access via the airport in Albany, New York. Program cost: $4,200 with hotel, $3,500 without; meals and course materials included.

NEW & EXPANDED!

Pool & Watershape Construction School
October 17-20, 2007

Boston, Massachusetts

In keeping with our mission of advancing education on a global level, we are pleased to offer our newly expanded, three-day Genesis 3 Pool & Watershape Construction School as the latest component in our design-certification program.

The school's curriculum covers plan review, excavation, layout, soil and drainage, steel placement, plumbing, utilities, gunite, tile and coping, decks and drainage, plaster and start-up and includes the Genesis 3 Edge Program as well as a key roundtable discussion. All sessions are taught by top-flight tradespeople, designers and engineers from the watershaping industry and beyond.

Program cost (four nights at the Hyatt Harborside, meals and course materials included): $3,400 with hotel, 2,280 without. (Spouses will be welcome for an additional fee of $1,250.)

AQUA Show/Genesis 3 Design Studio
November 12-16, 2007

Las Vegas, Nevada

Since 2004, Genesis 3 has participated in an alliance with organizers of the AQUA Show, held annually in Las Vegas. For 2007, we will be expanding our educational role at the show — now owned by Hanley Wood — offering accredited, 20-hour programs in the elements of design, measured perspective, fountains and waterfeatures, the history of architecture and color theory as well as two new 20-hour courses being offered for the first time on architectural plan and section drawing and on using markers as drawing tools.

In addition, shorter seminars and presentations will be offered by top instructors including Anthony Archer Wills, David Duensing and Greg Andrews on topics ranging from hydraulics and pond construction to garden styles, landscape design and fire and water effects.

New short courses this year will cover the art of creating world-class hardscape for water environments and engineering related to the proper use of steel. There will also be a new and expanded seminar on water-in-transit systems. Visit the show website at *www.aquashow.com*.

Visit our web site: www.genesis3.com

Founded by: David Tisherman, Skip Phillips and Brian Van Bower

(615) 907-1274 / Toll Free: (877) 513-5800 / FAX: (615) 907-7338 / www.genesis3.com / lisa@genesis3.com

Genesis 3 is proudly sponsored by Aqua Show/Hanley Wood, Jandy, Pentair, Aquamatic, Pebbletec, Sta-Rite, SonarGuard, Aqua Magazine, AutoPilot/AquaCal, Cactus Stone & Tile and WaterShapes.

GENESIS 3 - THE INTERNATIONAL FORUM FOR CONTINUING EDUCATION FOR WATERSHAPE DESIGNERS

Circle **16** *on Postage Free Card*

steady) market. As it turned out, the companies had no hesitation about funding the transport, set-up and dismantling of the systems while covering my other expenses.

To me, this was far more feasible than the prospect of participating in art exhibitions and hoping someone would notice. In addition, it soon occurred to me that some of the trade shows in which I was participating put my ideas on display in front of upwards of 100,000 people.

From the start and wherever we've installed these waterfalls, the response has always been strong. I often describe what happens as being similar to people sitting around a campfire: Once they lock the fire in view, they tend to spend a surprising amount of time just staring at it. Indeed, even when people are having active, animated conversations in front of my waterfalls, they don't look at each other for fear of missing something – the next image, the next change.

It's also like the proverbial hole in the fence at a construction site: Once one person has stopped to take a look, others tend to gather. I'll often see the same person come back after witnessing the waterfall for the first time – but now with others in tow so they can have a look, too.

There's no question these Graphical Waterfalls do as they're intended: They draw attention and are appreciated because they do so much to increase booth traffic.

While most of the displays I've done will focus on commercial messages, I always insert what I call "kinetic graphics" (including various dancing ribbons, diagonal lines and waves) to hold the attention of passersby and create a "show" in which the company logo or message plays the major part.

As an artist and designer, I appreciate the value of mystery, so rarely do we give away the commercial message right at first. The more varied and complex the accompanying graphics, the longer people will spend looking at the display and absorbing its message – a fact that convinces booth sponsors to give me lots of creative leeway in programming their displays.

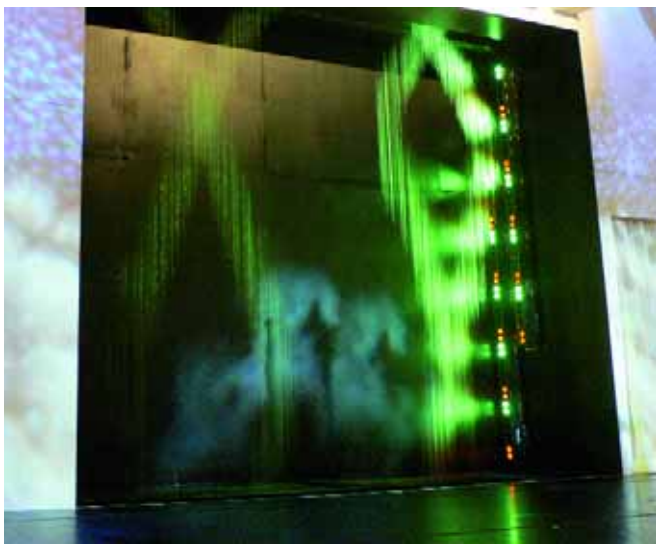
As my experience with the technology grew, I was able to produce increasingly complex imagery – rain effects, letters moving sideways, random ribbon patterns and much more – all in my attempt to capture nature at very rare and beautiful moments.

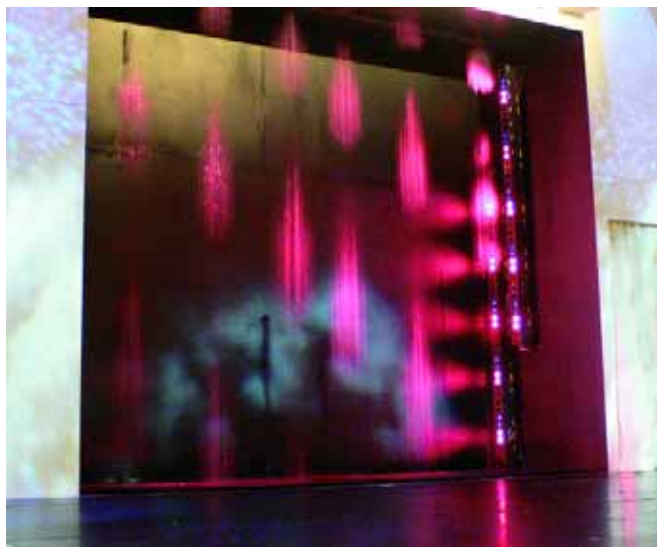
In these displays, my kinetic graphics are the art: They demonstrate the timing and grace that programmed falling water can have and form a link to traditional fountains. If one were to let marketing people run the show, I suspect the content would be like one continuous advertisement. My thought is that this would just make people feel as though they're being exploited, so the way I do it, the kinetic graphics are the show and the marketing words and logos indicate the sponsorship that make the artistry possible.

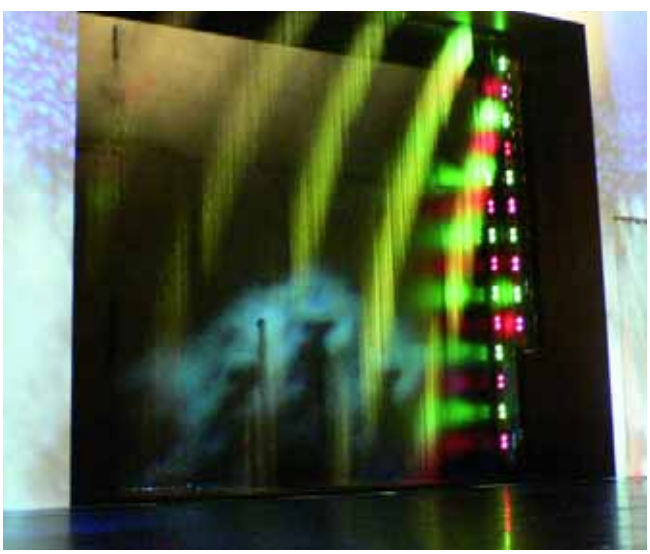
A Look Inside

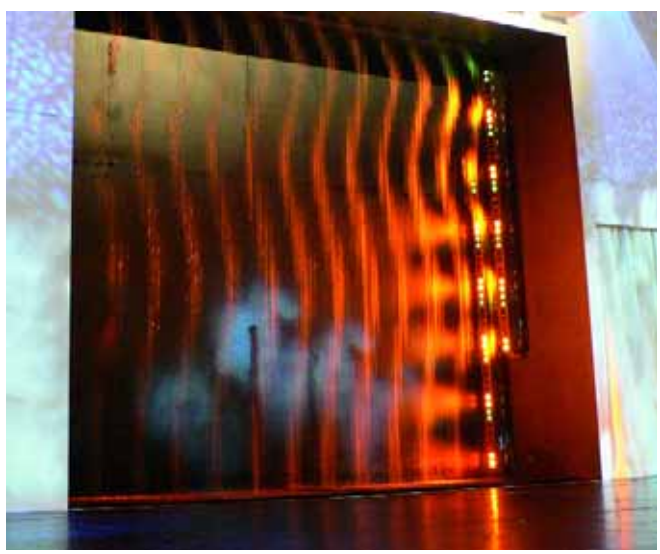
The element that attracts viewers to these displays is how "clean" the images are – a clarity that is the accomplishment of our exceptional computer programmer, Richard Bartlein, who has been with the company nearly from the start.

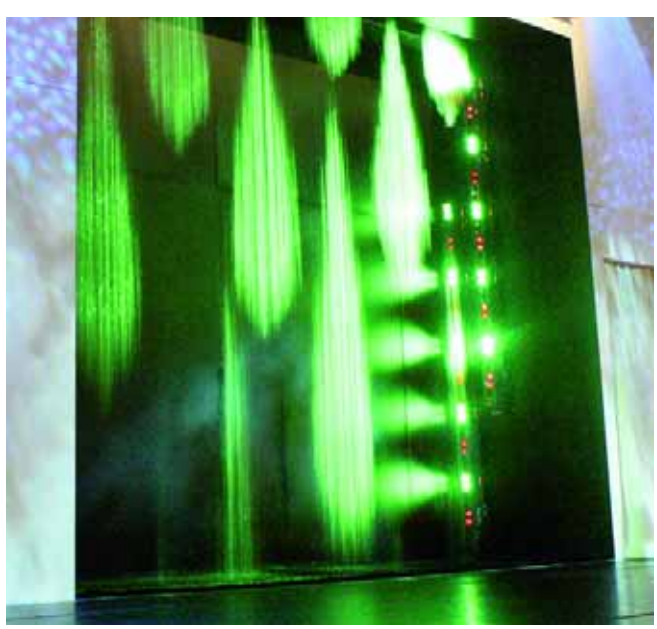
As letters and images fall from the nozzles into the catch basin, viewers perceive very little by way of degradation – and we've been able to achieve that degree of coherence with waterfalls as tall as 50 feet. In fact, taller is actually better with these systems, because height makes the











While many of the displays I develop for use in tradeshows include company logos and brand names, the displays are typically varied and feature graphics, geometric patterns, ribbons and various other shapes to capture eyes and entertain passersby as they absorb the corporate messages. In the display shown here, the aim was to create a colorful, elegant backdrop for in-booth entertainment.

water appear to fall more slowly – almost to the point where the droplets seem to be momentarily suspended in air.

Another point that surprises people is the optical depth these waterfalls have: We currently make systems with three, six, 12 or 24 rows of jets spanning the width of the waterfall, which gives us an ability to create amazing sensations of dimensionality.

There are, of course, limitations to what we can achieve with these systems. After all, we're working with falling water!

In systems installed outdoors, for instance – including the one we set up for the Atlanta Olympics – wind can and does affect the image, moving it from side to side but leaving it both contiguous and legible. Actually, our largest challenge in the Atlanta case was making certain we could replace the water

blown out of the system so the pump wouldn't run dry.

This sensitivity means that, as a rule, letters and distinct parts of images need to be at least two feet wide, meaning we can't be too delicate in our presentations. Also and perhaps more significant, there are settings in which the effect doesn't show up as well – particularly in places where there's a light or bright background. (You can't see images well, for example, against blue sky.)

And ironically, given the fact that the original system was developed using a machine designed to make music, we haven't ever been able to synchronize my waterfalls to a musical score and have it turn out to be aesthetically interesting, even with the aid of specialized software. As a result, I've never set out to integrate a show to music.

Those constraints aside, however, the basic technology behind these waterfalls has thus far stood the test of time.

Making Things Work

Units operate in a way that's similar in some respects to inkjet printers, although there are no moving heads. I like that connection, however, because I've always found it useful to consider the droplets as being analogous to pixels and the clarity of the image as being a function of the size of the droplets and water's surface tension. (The exact size of the nozzles and the droplets is proprietary information, but I do make them as large as possible.)

The water emerges from the nozzles under low pressure, so the rate at which it falls is attributable mostly to gravity. Thus, it is the speed of the valves' operation that is the critical factor. Mine are actuated with needles that open and close the orifice at a *very* rapid rate; this is another case in which the way things happen is a closely guarded secret.

Lighting is another key to the success of these displays. Although it can be introduced from the top or sides, I've always preferred handling it from the bottom. Whatever the angle, I've worked with white lights and with colored lights in various configurations of fixtures, and I must say I'm very impressed with today's LED lights.

Exhibiting indoors allows for better

The display we developed to celebrate the 60th anniversary of the reign of Thailand's king show the technology at its most elaborate – in this case a 24-foot-wide, six-nozzle deep array that presented a variety of effects, including, as seen here, the royal crest and a saxophone (appropriate as the king plays the sax). It also conveyed best wishes for long life in Thai and English as well as dragons and musical notations.

Self -Direction

Through the years, I've run into the possibility of expanding Pevnick Designs and the reach of our Graphical Waterfalls by accepting investment capital or merging our operation with another company, but I've always chosen to maintain control of our research and aesthetic directions.

As I see it, pursuing these opportunities might have the effect of diluting my control or would end up with me being relegated to a role as research-and-development manager for a larger company.

This self-directed approach has probably led to slower growth than we might have achieved otherwise, and indeed, when we started out, nobody seemed to know just how much he or she needed one of our Graphical Waterfalls. Through persistence and steady progress, however, we've grown through the years and have really hit our stride in recent years, with lots of displays here and in Europe and generation of more media exposure.

At each show or event, we run into other designers and get fresh feedback – occasionally of the crazy variety: Lots of people think, for example, that the images are projected onto streams of water, and at one show, someone even asked how I froze the water at the top and managed to melt it before it reached the bottom!

– S.P.

control of lights and lighting. Indeed, exterior placements are a challenge because of the sun and how ambient light changes during a typical day in ways that make consistency of the visuals an issue. Graphical Waterfalls are rich in "information," so contrast is important and people want to see more detail in them than they do in traditional fountains. With proper staging, these displays can be viable outdoors, but it's *not* easy to do.

As a rule, the units run with local tap water, and the water is replenished at a rate of about a third of a tank each day as a result of evaporation. (Depending on where we are and local requirements, I'll use a chemical oxidizer to kill bacteria.) At trade shows, these units run for just a few days and are thoroughly cleaned between uses, so scale buildup isn't an issue. In permanent installations, however, there's a need to monitor (and treat) water for mineral content to avoid problems with nozzle clogging.

The units are always hard-mounted to a support structure above an exhibit, which, depending on the structure, requires different types of rigging. No matter the setting, the units create a significant amount of vibration, so the mountings have to be designed to support dynamic loads with minimized vibration.

For simplicity (and given the fact that show displays are not permanent), water flow from basin to valves is handled using flexible vinyl hose with quick-release couplings. That's important at trade shows and special events: If the connections are of the quick-release type, there's no need to hire a plumber to set things up.

As specialized as these waterfalls may be, they do share issues with other effects that use moving water. Because they're installed most often in show booths with carpeting and in tight spaces, for example, managing splash-out is a factor: Exhibitors don't want their carpets or their shoes to get wet. I've tinkered with various catch-basin designs, but I've basically settled on using a fine nylon mesh to cover the basin: This can create a bit of mist at the base of the waterfall, but no water escapes once it flows through the mesh.

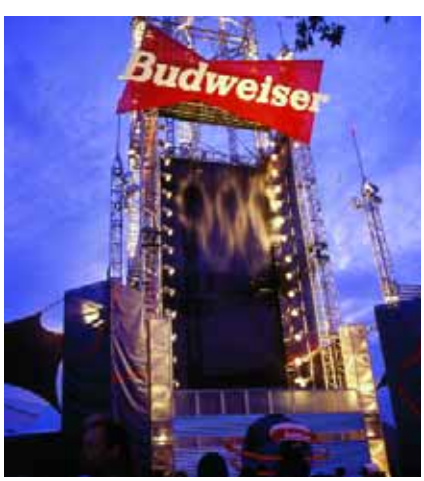
Forward Motion

My studio these days is a 21,000-square-foot building just west of downtown Milwaukee. There, our waterfalls are researched, built, staged and programmed; sent out to shows; and received, cleaned and maintained after each show. In all, Pevnick Design employs ten and works with two consultants.

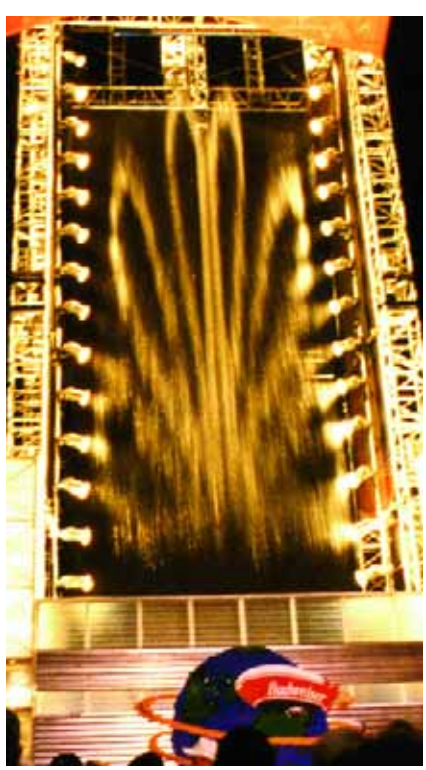
As I mentioned at the outset, I never intended for these systems to make their greatest impression in the world of trade shows, but that's how it has worked out so far. I've always been hopeful that interest would expand and that these systems would find their way into permanent architectural settings – makes sense to me, and these systems would, I think, be great additions to shopping malls, corporate campuses and more. And I would be particularly gratified to see them used as public works of art.

Through every developmental stage, I have always been amazed by the potential of my Graphical Waterfalls. As I see it, surprise and wonder are at the very core of satisfying human experiences, and I see no limits to the creative ways in which this surprising and wondrous technology can be applied.

For me, fashioning these systems has been all about making art from kinetic shapes and forms. Given my experience so far, it's more than likely the next path we take will be something I'm not even anticipating. And that potential, I think, will be more than enough to keep me going for years to come.



The most 'visible' of all the graphical fountains we've done to date was this one, set up in Centennial Park in Atlanta for the 1996 Olympic Games. The 110-foot theme tower contained a 50-foot-tall waterfall 12 feet wide and 24 nozzles deep. Millions attended the event, and millions more saw the display on television (that's NBC's peacock, as you may have noticed).



Of Interest

The following information has been provided to WaterShapes by product suppliers. To find out how to contact these companies, look for the Product Information Card located on page 58.

Fire-Feature Bowls

Circle 135 on Reader Service Card

GRAND EFFECTS offers bowls for use in automated or manually ignited fire features. The looks range from the classic to the sleek and modern – including the Essex, a 48-inch diameter, 15-inch high bowl that's available in five finishes: burnt terracotta, Greek, khaki, dark walnut and limestone. Each model interfaces with remote-control systems and features flame-monitoring technology. **Grand Effects**, Mission Viejo, CA.

LED Pool Lights

Circle 136 on Reader Service Card

O'RYAN INDUSTRIES offers the PoolStar line of LED lighting packages for pools. This includes PoolStar 1000, a small, 2-1/2-inch dry-niche system that comes complete and ready to install. Designed to illuminate areas up to 100 feet away, this model features a Starburst 28S LED bulb that is capable of being synchronized with any other S-series LED models in the company's line. **O'Ryan Industries**, Vancouver, WA.

Tile Grout

Circle 137 on Reader Service Card

LATICRETE has introduced SpectraLock Pro Grout. The material offers the high performance, color uniformity, rugged durability and maximum stain resistance of an epoxy grout with extraordinary ease of use. It also includes a mold/mildew inhibitor, never needs sealing, has an 80-minute working time and is available in 40 lifestyle colors that are always cleanable back to their original color. **Laticrete**, Bethany, CT.

Pool Enclosures

Circle 138 on Reader Service Card

CCSI INT'L offers Garden Prairie Rigid Frame Pool Enclosures. Made with quality, color-coated components, the structures significantly extend the swimming season, keep pests at bay and are designed to work well and blend in with the architecture of the home. The enclosures also feature opening, insulated, light-transmitting roof panels that allow for natural ventilation with minimal maintenance. **CCSI Int'l**, Garden Prairie, IL.

Pump Controller

Circle 139 on Reader Service Card

ALLEN CONCEPTS offers TightWatt 2, a dual-pump-operating, digital pool controller for use with 2-speed pumps. Designed to adjust throughout the year to run less in the winter and more in the summer for more economical operation, the device also installs easily in existing control boxes and has a lock-out feature to keep a booster pump from running when the main pump isn't on. **Allen Concepts**, Chandler, AZ.

Miniature LEDs

Circle 140 on Reader Service Card

CAL PUMP has extended its EggLite line with the introduction of Mini-EggLites. These LED lights are the size of a quarter, but they are powerful enough to light ponds, garden statues, potted plants or landscaping. Available in four colors (white, red, blue or green), they come with a low-voltage transformer that will run up to 12 lights. They also have pliable cords for flexible positioning. **Cal Pump**, Valencia, CA.

Play Features

Circle 141 on Reader Service Card

WHITEWATER WEST offers AquaSpray activity elements for use in park settings, including the AS-3500 Power Cannon – a waterfeature designed for use by older children that has quick-opening valves actuated by an easy-to-use trigger. All elements in the line have bright colors, attractive forms and an emphasis on fun while serving as individual fountains or in total waterplay systems. **Whitewater West**, Richmond, British Columbia, Canada.

Crib-Wall Systems

Circle 142 on Reader Service Card

TIMBERGRID offers environmentally friendly retaining walls and sound barriers. Produced from wood originating in sustainable forests, the timbers feature a preservative treatment that meets rigid health standards and can be used in structures ranging from simple landscape walls to major, engineered retaining structures. The walls also assemble quickly and can be planted – no geogrid required. **TimberGrid**, Weston, MO.

Automatic Cleaner

Circle 143 on Reader Service Card

PENTAIR WATER POOL & SPA has introduced the Kreepy Kruiser automatic pool cleaner, a suction-side device that features a seal design with slits and curved fingers to navigate over and around pool obstacles and keep the unit from getting stuck on or thrown off course by main drains, tight corners and other obstacles. It also has strong vacuum power and an extra-wide mouth. **Pentair Water Pool & Spa**, Sanford, NC.

Portable Mixers

Circle 144 on Reader Service Card

STOW has introduced the Collomix line of material mixers for use with grout, concrete and mortar. The products include six hand-held mixers and four mixing stations – all ruggedly designed with ergonomics in mind to take advantage of natural positions of hands and arms and keep operators in upright postures. All of the units have 220/120-volt, 50/60 Hz capacities with single and dual speeds. **Stow**, Carson, CA.

Scaffold Brackets

Circle 145 on Reader Service Card

MODERN POOL SYSTEMS has introduced scaffold brackets designed for use with the company's aluminum forming system for concrete and vinyl-liner pools. The device pins securely to the wall after forms are stripped and allows for easy insertion of walk boards around the inside of the pool wall, thereby allowing for easier installation of coping systems and decking. **Modern Pool Systems**, Columbus, MS.

Old Cobblestones

Circle 146 on Reader Service Card

MONARCH STONE INT'L offers historic cobblestone extracted from the streets of Europe. Anywhere from 100 to 400 years old, the material lends old-world charm, a patina produced by long-term wear and a sense of history to all types of projects. It's available in nine sizes and it comes in two types: granite (in browns, greens and grays) and sandstone (in grays and earth tones). **Monarch Stone Int'l**, San Clemente, CA.

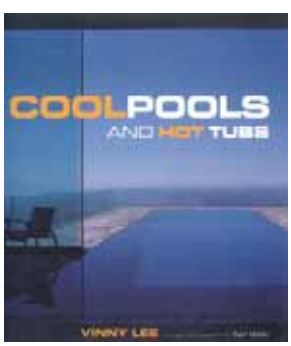
By Mike Farley

Pools International

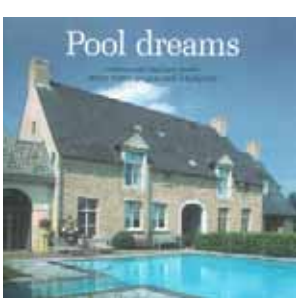
As I've reported previously, the past few years have seen a proliferation of consumer-oriented books on custom swimming pools. Most put the emphasis on images rather than written information, but I don't object: They're generally loaded with beautiful, inspirational projects and terrific photography.

In fact, I use many such publications as sources of ideas and frequently share them with clients as we move into the design phase. But I've found that I need to pick and choose within some of them: While the projects are often executed at a very high level, some aren't all that interesting.

With that one occasional caveat, I've recently been through four of these books – and this time around, they all focus mainly on pools in Europe and other locations around the world. Taken together, they offer a convenient global tour, almost entirely by way of photographs.



◗ *Cool Pools & Hot Tubs* by Vinny Lee (Watson-Guptill 2006): The London-based author of this book focuses mainly on European pools, salting things with a handful of (mostly) familiar, well-documented California projects. This is the exception in this group in that some substantial text accompanies photographs of the pools, which include a variety of indoor, outdoor and indoor/outdoor designs that are genuinely interesting. The author also shares insights on surface materials, deck designs, associated garden features and some truly artistic uses of patio furniture.



◗ *Pool Dreams* (EPN International, 2005): This book is unusual in that it is dedicated entirely to the work of a single German company, Antheunis Zwembaden, which has been building luxurious custom pools in Europe since 1959. This 240-page volume is very much a study in a single style of design: Almost all depicted projects feature gutters and perimeter overflows as well as unusual stainless steel handrails that appear on the vast majority of entries.

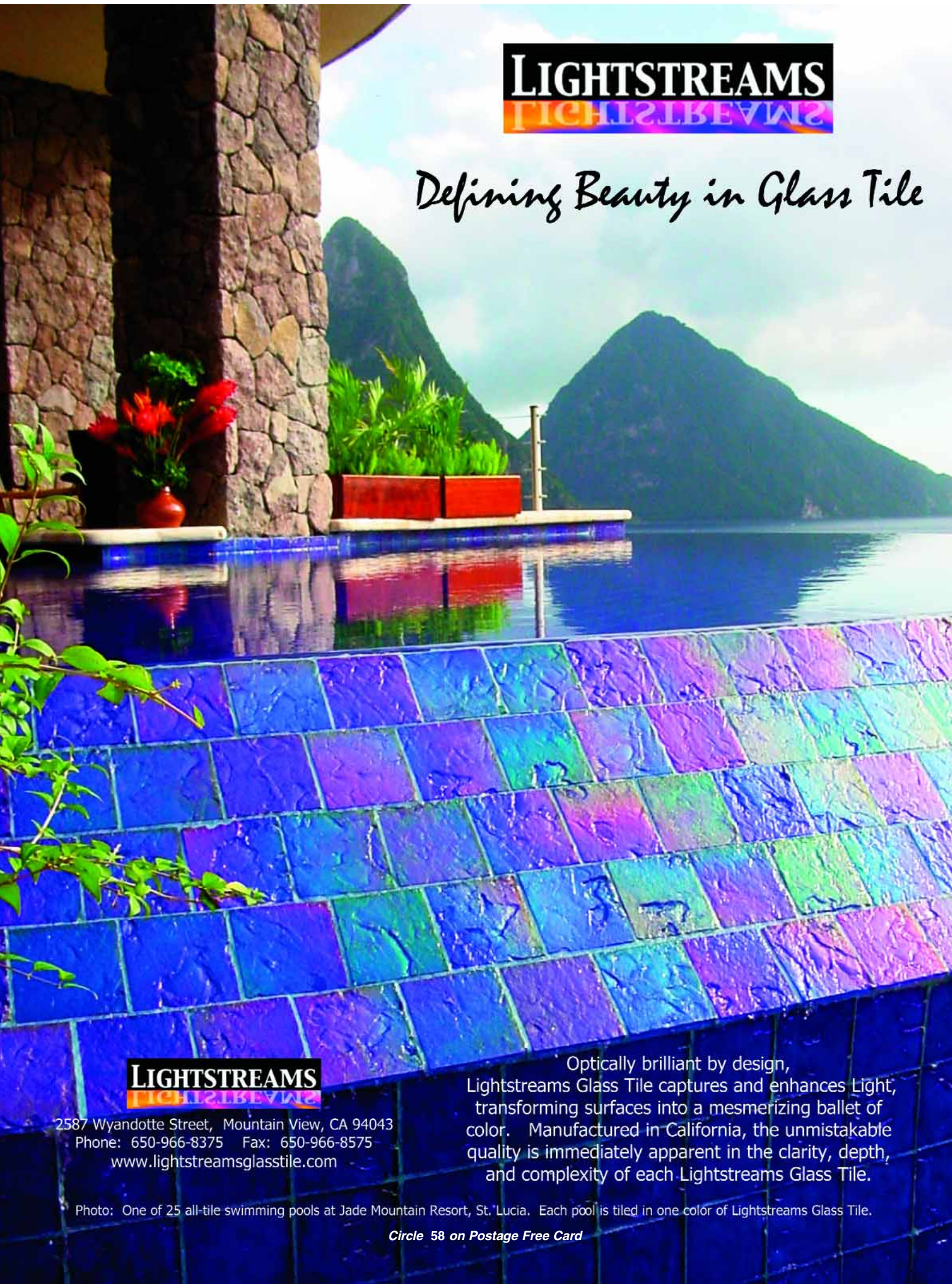
◗ *Pools & Gardens* (Paschen, 2006): This 380-page book offers 70 case studies that encompass not only European but also a small number of U.S. projects

along with a smattering of work done in tropical outposts from Singapore to Costa Rica. About half of the studies here feature swimming pools; the rest cover public and private gardens, most of which (but not all) contain fountains, reflecting ponds and other decorative watershapes. A nice variety of styles is represented, and the compilers did a good job of showing water used in a range of garden settings.

◗ *Pool Design* (Loft Publications, 2003): This 400-page volume offers dozens of case studies of pools found throughout Europe. I found it interesting to note that almost every depicted project has a simple shape – mostly rectangular – and that the European "look" as presented here is completely dominated by glass tile. I was also intrigued by frequent use of banks of tiny steps with extremely narrow treads – something we don't see too often in the United States.

Although each has limitations in terms of scope, when examined as a group these four books provide a good, basic survey of design ideas we can borrow or adapt from our colleagues overseas in setting our clients' imaginations ablaze. 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.


LIGHTSTREAMS
Defining Beauty in Glass Tile
LIGHTSTREAMS
2587 Wyandotte Street, Mountain View, CA 94043
Phone: 650-966-8375 Fax: 650-966-8575
www.lightstreamsglasstile.com
Optically brilliant by design,
Lightstreams Glass Tile captures and enhances Light,
transforming surfaces into a mesmerizing ballet of
color. Manufactured in California, the unmistakable
quality is immediately apparent in the clarity, depth,
and complexity of each Lightstreams Glass Tile.
Photo: One of 25 all-tile swimming pools at Jade Mountain Resort, St. Lucia. Each pool is tiled in one color of Lightstreams Glass Tile.
Circle 58 on Postage Free Card

Jandy®

- Pumps
- Filters
- **Heaters**
- Heat Pumps
- Control Systems
- Lights
- Water Purification Systems
- Valves
- Water Features
- Cleaners
- Accessories

Convenience and Control...

The New LXi Heater

ALL JANDY PRODUCTS WORK SEAMLESSLY TOGETHER

The Jandy AquaLink® RS Control System manages our complete line of technologically advanced products. The Jandy system is designed to create a carefree backyard paradise — enhancing the overall pool and spa experience by delivering performance and reliability through technology.

Performance
Reliability
Technology

Experience the next generation in advanced heating products by Jandy.

Integrating the most advanced features in every aspect—a technologically innovative control and automation system, lightest and strongest composite material construction—and superior hydraulic design, the LXi brings the future of heating comfort to your pool today.

Take Control Today!

Circle 96 on Postage Free Card

1.707.776.8200 • www.jandy.com • info@jandy.com