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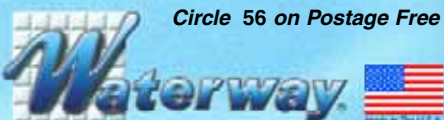
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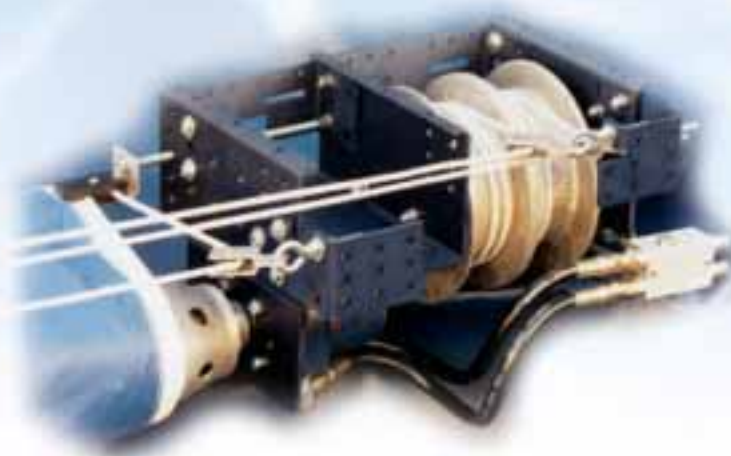
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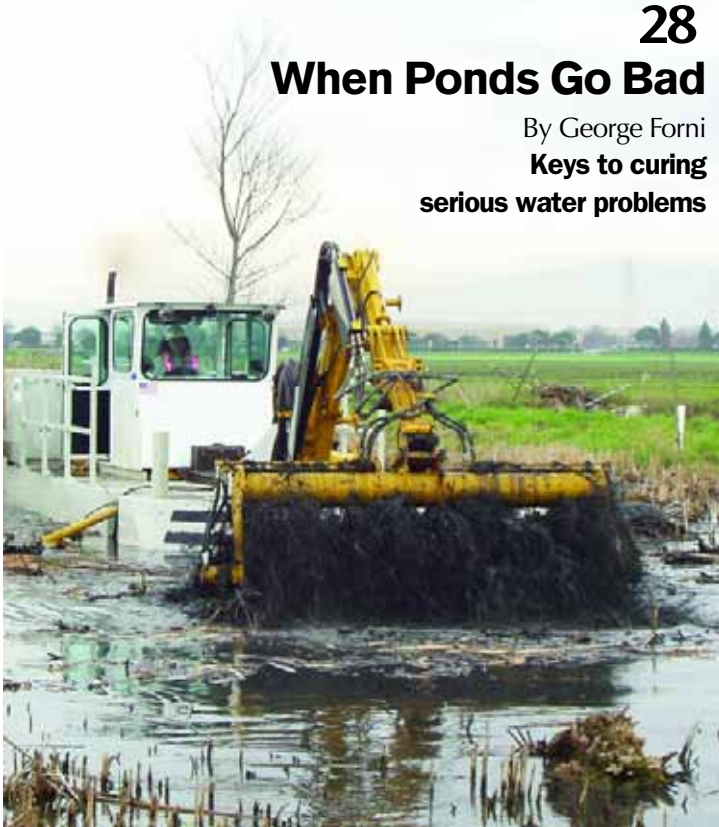
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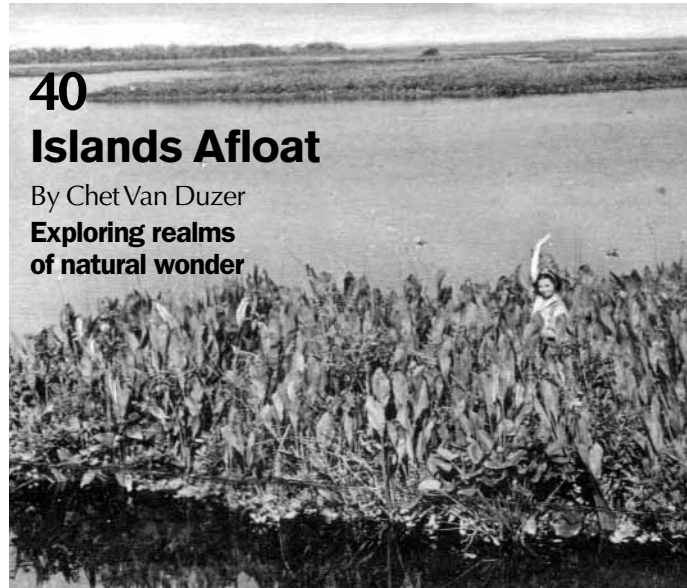
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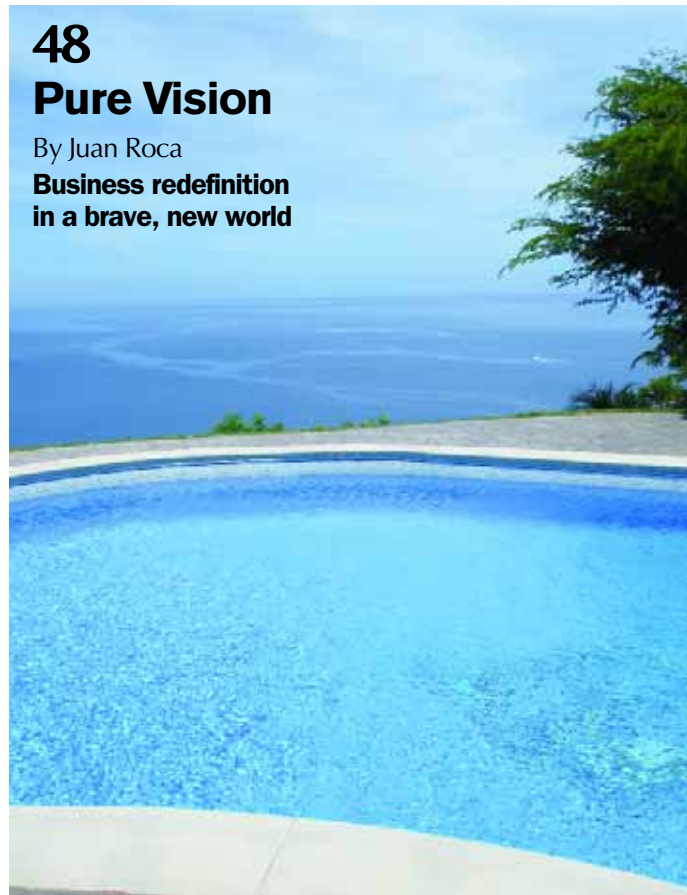
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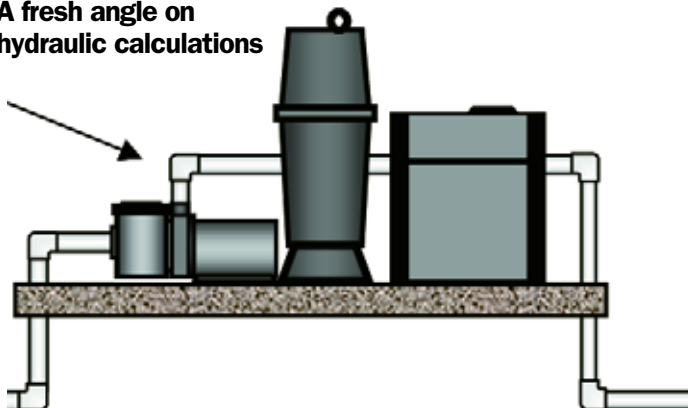
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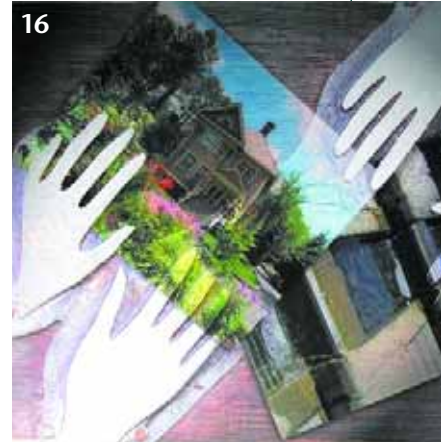
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Photo courtesy Aquart J. Roca Disseny, Guanacaste, Costa Rica.

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By Eric Herman

Pioneer Spirit

I recently enjoyed an experience a long, long way from my familiar surroundings in southern California that nonetheless had me feeling right at home.

A few weeks back, I had the distinct pleasure of flying to Central America to visit watershaper Juan Roca in his homeland of Costa Rica. It was a classic mixing of business with pleasure: I'd never been there and had no idea what to expect, but to say I was blown away is something of an understatement.

On the pleasure side of the journey, Costa Rica is among the most welcoming, soulful and beautiful places I've ever been. I'd heard for years, of course, that the country is "hot" for vacations, investments and emigration, and I now viscerally understand the appeal: From the beaches and the jungles to the small villages populated by friendly, open-hearted people, it's obvious that this place belongs (and will stay) on the world's "desirability" radar for years to come.

For all that, what impressed me most was the working side of my trip and the job my host is doing of blazing a bold trail in his homeland. Currently the only custom pool builder in the entire country after having retooled his mid-line business to aim at the country's growing upper class, Roca's creativity and persistence are winning him an increasing number of projects that enable him to display the sophistication needed to work with top architects in providing dramatic watershapes for affluent clients.

From my perspective, it was fascinating to spend time with someone who is literally defining his own market. Even more remarkable is the fact that Roca isn't ego-driven or bent on self-glorification. Rather, he's a distinctly modest guy who is genuinely motivated by a desire to create works of watershaping art.

His own words tell the story beginning on page 48 of this issue, and he hangs lots of detail on the outline I've provided here. What's most important to add to his account – basically because Roca himself would be too modest to make the point on his own behalf – is the overriding observation that his is a story of creative ambition fueled, nurtured, released and continuously inspired by professional education. The passion and heart he brings to his quest for knowledge stands, I believe, as an inspiring example for all who seek to elevate their own work.

When you place that energy and focus in a setting as glorious as Costa Rica, of course, the story becomes almost poetic. Time after time, he showed me vanishing edges flowing into views of jungle or seascapes and wonderful materials he's used to harmonize his work with the setting or surrounding structures.

He's quick to say that his best projects are still ahead of him, but in the meantime, his professional growth is apparent with every new project. As we again flip the calendar, gather wool and look to the future, it seems to me there's something profound to be gained from visiting with an idealist caught in the moment of pursuing a dream.

From all of us at *WaterShapes*, we wish you all the happiest of holidays and a most glorious New Year.

Eric Herman

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systems for pools, spas and other water-shapes. He teaches hydraulics at trade shows throughout the United States and is the featured hydraulics instructor for Genesis 3's Level 1 schools.

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Juan Roca is founder and principle of Aquart J. Roca Disseny in Gunacaste, Costa Rica. Born in Barcelona, Spain, Roca moved with his family to Costa Rica, where they started the country's first swimming pool company, Piscinas Acuarium, with which Roca began his career in swimming pool construction in 1975. In 1995, he started his own company, Piscinas Roca, and reconstituted it with its current name in 2003 with a complete focus on high-end custom work. Roca is a platinum member of Genesis 3.

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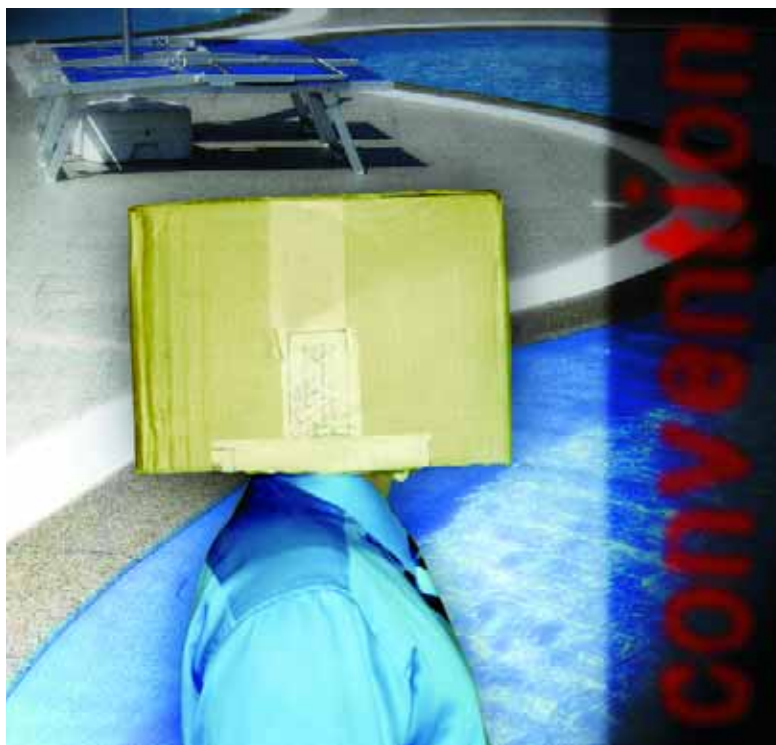


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By Brian Van Bower

Commercial Constraints



For years, conventional wisdom has held that many of the advances in watershape design incubate in the commercial realm and then slowly percolate over to the residential market as our clients ask for features they've seen on vacation and elsewhere.

That paradigm holds up to this day in many ways, but what's less acknowledged and, I believe, more prevalent in today's market is an *opposite* trend in which commercial clients are requesting details that are more closely associated with residential pools. In fact, it's my observation that the custom residential market has become so adventurous in recent years that it's now driving commercial watershape designers into areas that wouldn't have even been considered just a short while ago.

On the one hand is a residential market in which the only real impediments are budgets and the imaginations of designers and clients. On the other is the commercial realm, where designers, contractors and clients face the same limits of cost and creativity but are also hamstrung by the often-random dictates of local health departments.

The latter environment can be so oppressive that many designers – myself included – have become reluctant to tackle projects in anticipation of the frustration of having a hard time giving clients exactly what they want.

Some contractors are so adamant about limits that they don't seem at all interested in pushing the boundaries in any way.

code keepers

What we see over and over again in this environment are commercial projects that have been designed primarily to meet health department codes. This has led to what I view as an enormous design rut that channels these projects to a backward-facing banality at a time when the rest of the watershaping world is moving forward by leaps and bounds.

Does this apply across the boards? Not at all, as there are some commercial projects in some regions that bespeak wonderful creativity. In the main, however, commercial work is too largely defined by limitations – that is, health department rules – that drive the design process to a far greater extent than do the needs of the client or the requirements of the setting.

Making matters worse is that there are some commercial contractors out there who seem interested in preserving and protecting this situation. I've run into situations recently in which such contractors are so adamant about limits that they don't seem at all interested in pushing the boundaries in any way. It's as though there's a certain control this gives them over the work and a sense that health department standards empower them to stand pat in what they're willing to try and what they're not.

The upsetting thing from a design perspective is just how arbitrary some of those rules have become. Take signage requirements as a smallish example: In some jurisdictions, the warnings required at small intervals for every step, edge and flat surface in and around a pool have reached a level of absurdity. Or there's the resistance to shallow-water lounging areas, beach entries or seating areas located within the boundaries of a pool: None of these restrictions seem either necessary or sensible.

And I love the concept of setbacks for food service around bodies of water. It's as though selling hamburgers within 50 feet of the water is an open invitation to drop an over-priced sandwich in the pool. Maybe I'm missing the point here, but most people I know don't go swimming while eating. Despite that simple observation, in a great many



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jurisdictions you can forget any thought of including shallow lounging areas in commercial projects.

For all the annoyance of this overwrought concern for errant French fries, there are codes that create real problems. Traditional gutters, for example—still allowed and even required in some areas—collect debris that becomes saturated with water and sashes

back out into the pool where it sinks to the bottom. Personally, I'm much less worried about a spilled beer than I am about this sort of decomposing muck.

litigation phobia

To my mind, much of what we see in the commercial realm stems from our society's epidemic belief that people must

be protected from themselves. It doesn't take a genius to see the relationship between petty regulations and the litigious state of American culture.

And to be fair, there are many health department codes that are reasonable and make perfect sense. There's nothing objectionable in requiring slip-resistant surfaces, for example, or demanding circulation, filtration and water-treatment systems that produce reliably safe water conditions. I understand the disability-access issues, too, as well as the lighting requirements that go with pools.

But even where they do good, the codes sometimes do it in arbitrary or even contradictory ways. With chemical treatment, for instance, I understand why health departments might require certain levels of sanitizer residual or oxidation-reduction potential (ORP) within a body of water. Those things are necessary to ensure healthful bathing conditions and I can't argue with them.

Yet it seems as though health departments are more concerned with technique than they are with results. Why on earth, for example, does saltwater chlorination technology face such uphill battles in some areas? The technology has proved itself, but for years health departments in certain jurisdictions have resisted its application for no apparent reason.

Of course, I remember a time when ORP technology, now a mainstay in commercial systems, was on the outside looking in, and there are elements of filtration, heating and pump technologies that have all faced similarly gradual acceptance. On a hopeful note, this indicates that even though health departments are slow and arguably behind the times, they can and do change. But what is it that forces these changes?

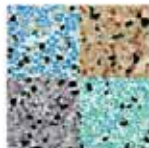
In my view, it's not likely that the contractors who work the commercial market are working as drivers of change. In fact, I know many who are quite content to keep building the same thing over and over again and have a remarkable ability to resist any voice that says there might be another way to get things done.

Some are distinctly determined to stick with the familiar and avoid the potential hassle and expense of battling with regulators over a novel design feature. That re-



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luctance results in a stagnant mindset that has, I fear, resulted in the commercial market's failure to realize its modern potential.

bounday busting

Those missed opportunities really come into focus when you see the wildly adventurous commercial projects that are being built in other countries.

This is where you see vanishing edges, imaginative waterfeatures, swim-up bars, shallow lounging areas (with, I might add, full food service nearby) and much, much more. I've seen pools in other countries that I know for a fact would *never* have been built in most jurisdictions in the United States.

For all of that, I draw encouragement

from specific situations that seem to indicate the possibility of pursuing more adventurous commercial designs and applications.

Some years back, for example, I redesigned the pool at the famous Raleigh Hotel in Miami Beach, Florida. At the time, there was real speculation that the design I developed – one that included a shallow shelf around the entire perimeter of the pool and a huge waterfeature fashioned from the existing diving tower – would never make it through health department review. As the designer, I wasn't directly involved in the battles with the health department, but to the amazement of many, myself among them, the pool was renovated entirely as planned.

More recently, I designed a pool for a planned community located outside of Cashiers, N.C. The property's well-regarded developers were working with a landscape architect who, at their request, had drawn up a general plan for an unusually elaborate public pool that was to feature a vanishing edge, large waterfalls and a large, shallow lounging area.

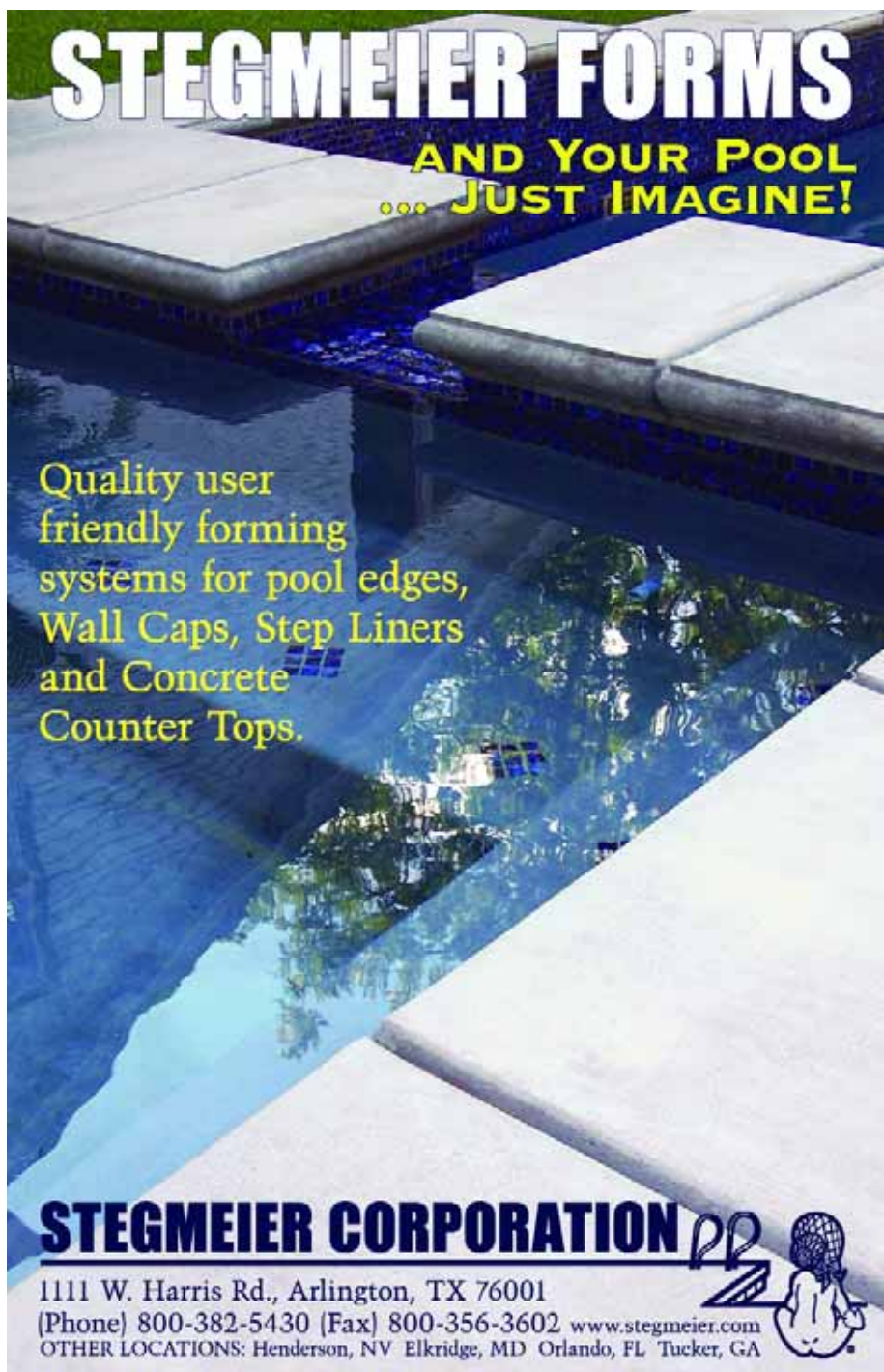
When I became involved, I told the clients that the only way they were going to have any fun was to step outside the envelope, push for the design they wanted and overcome what I call a "pocket protector" mentality among both contractors and health departments that calls for doing things plain, simple and the way they've always been done.

I told the design firm that if that mentality applied, I wasn't interested in participating. I further explained that my firm was all about exploring and stretching creative boundaries and that it wouldn't be in our shared interest to bring me into an environment that would be hung up on convention.

The clients knew what they wanted – a composition that would be a luxurious selling point for prospective buyers – and agreed to be adventurous with me, so I signed on.

big steps

Frankly, the resulting plan not only pushed the gray areas, but also ran around freely in an area well outside the box. The design team was in agreement and we moved everything out for bids.



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We knew what would happen and, sadly, weren't disappointed: The contractors predictably slammed the entire design based on their conviction that there was no way the plan would meet the local health department's requirements and restrictions. So we short-circuited the process and took the plans to the health department on our own rather than leaving them in the hands of contractors who didn't believe in what we were trying to accomplish.

It was difficult – a nip-and-tuck process for much of the way – and we did end up compromising on a couple of features, but for the most part the design held up and made it all the way through the approval process.

The client now has an approved set of plans in hand and has no reliance on a less-than-enthusiastic contractor to broker the health department's review process. Of course, we recognize that there will be snags along the way, but this gives us a starting point that is far more solid than it would have been otherwise. It also did our souls good to gain approval for a scheme so many contractors had told us would never fly.

To be sure, the phenomenon I've discussed here is distinctly regional. I can imagine that there are some of you in places like Las Vegas and Hawaii who can't believe your eyes (and should be thanking your lucky stars you live in a place with so much more design flexibility). It's clear to me even in casual observation of these markets that designers, contractors and health departments have been moving forward together toward more adventurous designs.

I wouldn't be at all surprised to learn that the scale, expense and eventual economic impact of these resort projects have given property owners and their design teams more clout of a sort that leads to greater regulatory flexibility. More than that, however, I believe there's a competitively fueled culture of innovation that takes hold in these areas and that innovation is an expected part of the process.

When that culture permeates the industry and its clients and brings momentum to negotiations with local officials, the possibilities open up and the potential for exciting and successful projects increases dramatically.

I look forward to a day when those

shackles of convention are set aside in more than an isolated few markets in favor of a more legitimate and expansive focus on luxury, creativity and innovation. When that happens, commercial watershaping will reclaim its proper place at the innovative forefront of the industry. Until then, we're left to live with the constraints – or to work hard at breaking them. **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.



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By Stephanie Rose

Landscaping's Place



Like most everything in life, “Natural Companions” has evolved through the years.

When I first started writing this column in 1999, I focused primarily on topics related to combining plants and watershapes and wrote a lot about surrounding hard structures with greenery in sensible and sustainable ways. As the New Year approaches, I’ve been thinking about how things have changed with the column and where it’s now heading.

I distinctly recall having the sense about four years ago that my pool of available topics was getting thin. At that point, *WaterShapes* editor Eric Herman and I brainstormed ideas and a whole new perspective emerged: I recognized that this column was about much more than just a marriage of disparate elements, and instead had the potential to explore the synergies that existed among various design elements, trades and schools of thought within the whole of the watershaping industry.

I’ve always believed – as do, I think, the vast majority of watershape designers and builders – that plants and water naturally go together.

It wasn’t that radical a proposition – there are, after all, very few settings in which one interacts with a watershape utterly devoid of any surrounding plant material – but it had the effect of redirecting my column in a number of distinct and, I think, interesting ways.

natural connection

I’ve always believed – as do, I think, the vast majority of watershape designers and builders – that plants and water naturally go together. That’s where the name of this column originated, and Eric saw from the magazine’s earliest stages that leaving regular discussion of plants and landscaping out of the magazine would be a critical error.

The magazine is designed to educate all watershapers about water, build awareness of its possibilities and celebrate water in all its forms. That’s a readership that unites a bunch of professions and a range of design and construction trades, and the ambition has always been to help everyone reach out to available resources and combine their efforts to create outstanding watershapes and overall watershape environments.

Let’s use a related profession to illustrate this point: An architect designing an office building can work in a vacuum and create an incredible structure that is visually stunning, unique and makes a magnificent contribution to the urban landscape and to other architects’ perceptions that what they do has value and merit.

Unless that same architect, however, has a clear, near-omniscient awareness of furniture, fenestration, interior finishes, exposures, spatial organization and much more, the structure may prove to be no more than a beautiful shell around a chaotic, non-functional interior space.

Rather than considering just street-level appearance, he or she must know how much space is needed for tables, desks, window treatments,

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#- 1

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tranversed by several
street car tracks.
The Bubble Spray
Effects with 1.250"
spray orifices are
sequenced 1.5 to 3 Feet
in height .



#- 2

22 x PEM 1721
Light Emitting
Bubble Spray Effect
In a public square in
Oslo, Norway
The sequenced Spray
Effects are 1.5 to 3 Feet
in height, reducing when
street cars tranverse the
fountain to 3.5" in height,
returning to normal
operating height after the
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#- 3

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Light Emitting
Bubble Spray Effects
illuminate at night a public
square in Oslo, Norway
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tranversed by several
street car tracks.
The sequenced Bubble
Spray Effects are normally
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Pictures #1 & #2 by T. Holth, Picture # 3 by Sven Granhaug. All Pictures courtesy of Fontene Teknisk, Oslo, Norway

storage spaces, movement between floors, mechanical necessities and so much more to be able to, on his or her own, create a design that serves its purpose (and its tenants) in a functional manner.

Without this omniscience, he or she must collaborate – which is what happens in almost every project of any size or scope.

To translate this to watershaping, the designer who lacks at least basic knowledge of plants and plantings (the sorts of things I've discussed nearly 70 times in the past seven years), cannot hope to deliver top-quality design programs to his or her clients. A watershaper needs to encompass planting spaces, root systems, types of plants appropriate for the site and

Even those with assumed expertise need to be thinking of their choices in light of the unique nature of watershapes and integrate this special perspective into their approaches.

any of a number of other considerations that might positively or adversely affect the final outcome.

a big net

It's in this context that we've examined such seemingly obscure topics as attractive or visually compelling types of tree bark, for instance, along with specimen plants, groundcovers and a range of subjects that may seem peripheral to the average watershaper.

I know from e-mails and letters I've received that plenty of you recognize my intentions and have told me time and again that these discussions have helped some of you participate in basic decisions about how your watershapes will be surrounded, how your work will be set off or subordinated within an overall setting and, basically, how your clients will perceive and appreciate your work for years to come.

Lots of you have been paying attention, and that's all the encouragement any of us who have written for WaterShapes through the years really needs. Ultimately, it's all about delivering excellence and finding ways to bring satisfaction to watershape owners on every market level.

I'm not suggesting that anyone should commit to memory everything I write; indeed, a huge portion of the landscape architects and designers who receive the magazine should already be well versed in the characteristics of locally available plants and techniques for encouraging them to thrive. My point is that even those with assumed expertise need to be thinking of their choices in light of the unique nature of watershapes and integrate this special perspective into their approaches.

The same holds true for the pool designers and builders who read the magazine: The ideas I present about spe-

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professionally and in turn
elevate our industry.

cific plants and planting concepts are highly relevant to all watershape designs, and familiarity with them can only help win the confidence of clients and help you step away from the stigma of being “just a pool guy.”

This is an elevation of watershaping that all of *WaterShapes*’ columnists have offered as a collective goal for everyone who reads the magazine. Our points of view are as diverse as can be, but Brian Van Bower, David Tisherman and I all seek to celebrate water and raise the profession to a higher, more integrated level of quality.

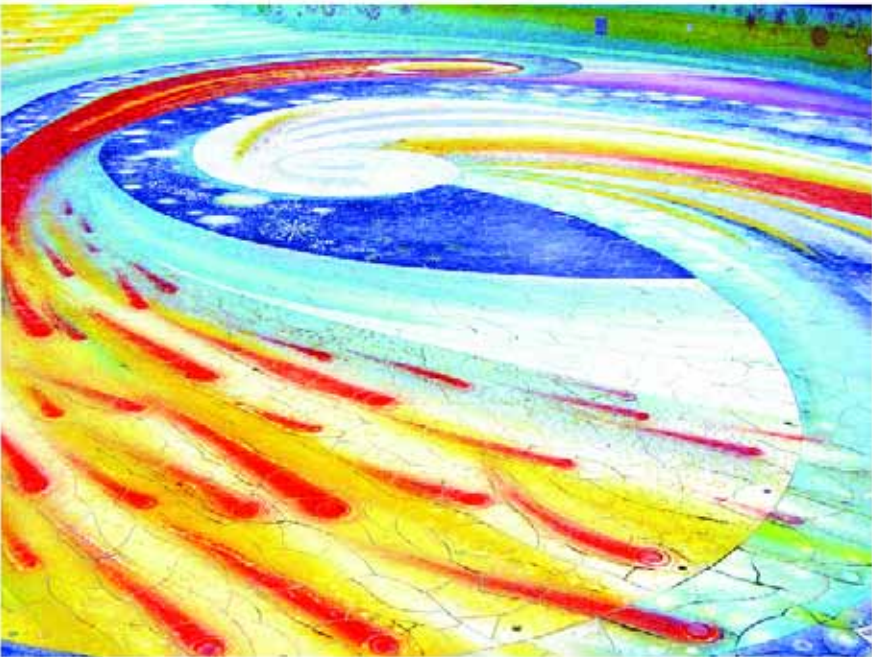
By contrast, if we as professionals decide collectively that everything we need to know is restricted to our narrow function within the watershaping industry, we end up selling ourselves, the industry and our clients short.

many roads

Just as I needed to understand more about watershaping, lighting, masonry and other trades when I started writing my column in 1999 and, more pointedly, as I embarked on the project with Randy Beard discussed in my last column and covered as a feature in the magazine’s November 2005 issue, those who come at watershaping from the concrete-construction side of the market need to educate themselves about the plant kingdom.


As a plant specialist working with watershapers, I’d like to make the assumption that you all know that you need, on average, a minimum of 18 inches of width for a planter to provide adequate space for a successful planting. I don’t know that this is the case.

I’d like to assume that most watershapers will suggest (despite the fact that



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there are some exceptions) using evergreens rather than deciduous trees around watershapes. Again, I don't know that this is the case. And I'd like to think that most watershapers have some knowledge of what plants do best in sun or in shade, but I know for a fact that most don't.

The point is, if your clients are relying on you to create incredible outdoor environments, you owe it to them to have a basic understanding of what is required in a good planting.

If that means acknowledging your limitations and hiring a qualified landscape designer or landscape architect to collaborate with you, that's fine – but you should *still* know enough about plants to recognize whether your hired gun really knows what's what around watershapes. And it certainly can't hurt if you have a few pertinent planting suggestions up your sleeve, just in case.

Recent times have seen much discussion in the landscape architecture com-

munity about landscape architects getting back to their "roots," the implication being that too few of them have enough knowledge of great and interesting plants and that they tend too often to stick to tried-and-true plants that have always worked for them. This isn't to say their plant designs aren't good, rather that they could probably be better.

standing out

If that sort of debate is raging among planting's supposed "experts," that leaves watershapers with an even greater responsibility to take charge of the creation of stunning, visually imaginative watershape environments for our clients. By assuming this burden of knowledge on our own, we elevate ourselves professionally and in turn elevate our industry.

In other words, knowing what plants will work and having ideas that go beyond the standard planting palette is one critical way for ambitious watershapers to distinguish themselves from the pack.

As the New Year approaches, it's the perfect time to examine where you are and where you need to be. I'm not suggesting you go and take plant identification classes and learn what has taken me 16 years to learn with daily focus on my specific field within the watershaping world. What I am suggesting is that the parcels of information I pass to you through these columns are things that, as a watershaper, you can easily apply to improve the caliber of your products and projects. **WS**

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

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By David Tisherman

Blended to Perfection



My last two “Details” should make it pretty clear that I’m more enthusiastic about tile than I am about any other surface material for watershapes. In October, we covered the use of color while focusing on tile, and in November there was a discussion of my favorite suppliers and their distinctions. This time, I’ll bring the sequence to a conclusion by looking at the process of selecting tile and at the ways I blend tile mosaics.

My enthusiasm extends from the fact that tile in watershapes is incredibly dynamic – so visually flexible, so durable and, if done well, so elegant. It can be used either as a complementary material that recedes into the design to blend seamlessly with plaster, coping or other edge treatment – or, by contrast, as a distinctive design element that makes a strong statement.

The first step in defining and refining the options you’ll share with clients requires you first and foremost to understand which path you’re following and the basic intent of the overall design scheme. For this discussion, let’s assume that the choice of tile is based on a decision to develop a harmonious

My enthusiasm for tile extends from the fact that it is incredibly dynamic in watershapes – so visually flexible, so durable and, if done well, so elegant.

color scheme and a watershape that is a coordinated part of an overall environment.

match games

Let’s start the development process by considering tile accents that can be blended with other elements.

In such cases, my usual approach is to select tile that matches the plaster. This works beautifully when you succeed in matching tile and plaster so closely that you eliminate any variability in appearance at the waterline and all boils down to how good your plaster is and how custom you want to go.

Matching plaster to tile means first mixing plaster samples that will, when fully cured and then placed under water, match the color of a selected tile. This can be a painstaking process and involves working with oxides while accommodating the basic coloration of the cement (white in some cases or any one of a number of shades of gray, including reddish or greenish grays and many more). It’s not unlike mixing paint or plaster for the exterior of a house: You keep making samples until you get a nearly perfect match, which might mean just a few tries or *lots* of attempts.

One of my favorite plaster colors is green – something I’ve mentioned in this column many times. When I work with green, I typically select one of two one-by-one tiles offered by American Olean (Dallas). Through experience, my plasterers know exactly how to match the color of these tiles, and the look is terrific.

I have similar preferred combinations for other colors as well – and enough experience to reassure me that there’s never a need to hesitate with any sort of tile/plaster combination if the design and the client’s preferences lead me in that direction.

Continued on page 24

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To me, working to achieve a match of tile to plaster is the best way to go – unless, of course, you’re using tile to make a distinct artistic statement. I’m not a fan of trite bands of cutesy tile at the waterline – or of tile that looks like stone when it doesn’t blend with other design elements. And as I mentioned in my October column, I consider blue tile on gray or black plaster a fluorescent abomination that runs *exactly* counter to the concept of creating a body of water that blends seamlessly with its surrounding environment.

on the wall

In selecting a specific tile product, you must be familiar with the way its supplier mounts it. Some products, for example, come only in *stacked* form, which means trouble any time the tile needs to cover a curved surface (the top of a spa dam wall, for example). For curved surfaces, in other words, you are limited to products that come in an *offset* (or *jog-jointed* or *running-bond*) pattern that will help you avoid big, ugly, pie-slice grout joints.

This same consideration applies especially when tile is used to surface an entire vessel: If you have an interior shape that offers anything other than perfectly perpendicular surfaces, you’ll find yourself facing the same issue of covering radii, particularly in corners where walls meet floors.

What I’ve seen far too many times are tile surfaces that run a stacked pattern on the flat surfaces and then switch to offset patterning on the curves. This can really mar an otherwise beautiful surface by disrupting the continuity and flow of the tile pattern and basically indicates a lack of knowledge on the part of the installer or those directing the installer.

In one amazing case of installer ignorance, a self-styled tile expert who had been hired to fill a pool with gorgeous mosaic glass tile on the basis of lots of experience actually put the tile on *backwards*, with the mounting paper up against the wall rather than the other way around. That one was a total disaster of an immediate sort.

I’ve also seen cases where installers have tried to mix tile sizes – big ones high up on the walls with smaller ones to deal with the radiuses in the cove – with chaotic



Working up evocative blends for tile mosaics requires having lots of choices on hand to fuel the selection process. You can work with what suppliers offer or, as shown here with tiles from Sicis (Ravenna, Italy), you can cut up samples, free tiles from their backings and develop new blends on your own, as I typically do.

overall results with absolutely no visual continuity across the tiled surfaces. Then there are those who start out on the walls with stacked patterns but shift to offset patterns when the surfaces get tricky lower down in the pool.

I've also seen projects where the designer has apparently run into problems in selecting a grout color. Some have a tendency to select dark grouts with the idea that they will blend more smoothly with dark-colored tile – and I think that's almost always a mistake.

First of all, dark grout will noticeably change in appearance over time and will really show scale when it forms, which can completely distract from the appearance of the tile. More important in my view, dark grout makes even the most vivid tile recede into the grout lines and detracts from the overall appearance.

bigger pictures

As much as I may love tile in general, I *really* love tile mosaics. I'm not talking



The process of developing custom blends has been simplified by the people at Boyce & Bean (Oceanside, Calif.), who provided me with a grid that makes experimenting with tile combinations a relatively simple process. One neat thing about the grid is that it helps you visualize the grout joints as part of the composition.



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about figurative mosaics of sea creatures here: What I mean is broad fields of tile in different colors that blend together visually to create dancing seas of color, texture and visual energy.

To me, developing these blends of colored tile is among the strongest of all ways we have to create watershapes that are sculptural works of art. As I mentioned in November's column, there are many products out there that work in these applications, and the suppliers I mentioned there are just a handful I particularly like. Truth is, there are myriad products out there that cover a broad spectrum of possibilities that need to be considered.

To work in tile mosaic finishes, you really do need to familiarize yourself with these product options. You need to keep up with the available colors and the new ones that seem to emerge every day. You need to learn as much as you can about mounting options and the willingness of suppliers to provide custom as well as off-the-shelf blends.

Just as important (if not in fact, more important), working with these surfaces means you actually need to offer them to your clients! I know that this is difficult for many people in this business, but to work seriously in tile, you need to overcome any hesitation you might have about suggesting that your clients need to spend their money to make greater pleasure in their backyard environments a real possibility.

My experience is that clients become extremely passionate about tile surfaces when the option is presented. These products are so beautiful across such a wide visual spectrum that clients will often make getting it a top priority and allocate significant resources to getting just what they want. Naturally, we must be mindful that it is a significant purchase, so it is absolutely incumbent upon us to make certain you're giving them something they will love just as passionately when it is finally installed.

Often, that means taking the time to present these clients with a variety of options. For my part, I spend a great deal of time and effort creating custom blends and presenting them to the clients for their careful consideration.



For me, the key to developing custom tile blends is having representative sets of samples on hand, as with my collection, seen here, of specimens from Oceanside Glasstile (Carlsbad, Calif.). Amassing these samples takes a substantial investment – suppliers don't give this stuff away! – but the results are well worth it when you work up the right combinations of colors, finishes and reflective qualities.

in the studio

Developing these options for my clients takes time, because I prepare each of the samples by hand. In my studio, I maintain large supplies of mounted and individual tiles to use in making up blends. Yes, acquiring all of that tile has represented a significant investment, but I now have hundreds of tile pieces on hand in dozens of colors.

When I begin playing with these samples, I'm typically aiming to blend three or four colors in varying ratios to achieve different looks. When I light on something I like, I will mount it on light cres-

cent board, which has a nicer appearance and finish than standard poster board.

Two suppliers in particular have aided this mosaic-development process: My friend Walter Iberti at Boyce & Bean (Carlsbad, Calif.) providing me with a metal-grid template that makes it easy to move pieces around while letting me see consistent "grout" lines. The folks at Bisazza (New York) went well beyond that, giving me a table that reminds me of an old typesetter's bench complete with tile-storage areas, trays for individual tiles, film for binding selected tile patterns to-

gether and a generous work surface.

My initial approach in blending tile mosaics involves working with relatively tight color combinations. When I'm working in greens or blues, for example, I'll set up colors that range from light to dark over a very narrow bandwidth of shades. That's not to say I won't break out of the box and add in a dramatically color or shade from time to time; generally speaking, however, I'm aware that wide variations in color will draw attention to individual pieces rather than creating a smooth, harmonious field of color.

Bottom line: Mixing mosaic samples takes time, practice and considerable patience. It's also largely an intuitive process that requires randomly mixing tiles while keeping in mind the way the colors are being dispersed in the mix. I don't want some areas to appear darker or lighter than others, for instance, nor do I want to see anything that looks like a repeated pattern.

I'm definitely not a fan of uniform-appearing tile surfaces because, in too many

situations, those surfaces pretty much disappear or dissolve to become an uninteresting blob of color as opposed to a vivid blend of color.

When my samples are ready, I'll present two, three, four or more possible mixes to clients and give them the time they need to consider each one. If none of this first batch hits the mark, I go back to my studio and start over, adjusting color selection and ratios and sometimes coming up with completely fresh color schemes to provide contrasting examples.

the right mix

Yes, working with tile in this way is a major investment of time and money, and at this point I've put several thousand dollars into keeping my studio supplied with the best products I can find in the vast tile marketplace. But it's also a great pleasure to work with these wonderful materials, and I've come to see it as both a relaxing and entirely enjoyable process.

In approaching the work, I always make a point of blocking out enough uninterrupted time that I'm reasonably certain I'm not operating in any sort of distracted hurry. It's a process that requires a "feel"—and one that becomes more interesting and effective (and fun) the more you do it.

These efforts are almost always well worth the trouble when a client signs on and approves an all-tile surface—a sense of satisfaction topped only when the surface is installed and the watershape is filled with water. **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 Genesis 3, A Design Group, which offers education aimed at top-of-the-line performance in aquatic design and construction. He can be reached at tisherman@verizon.net

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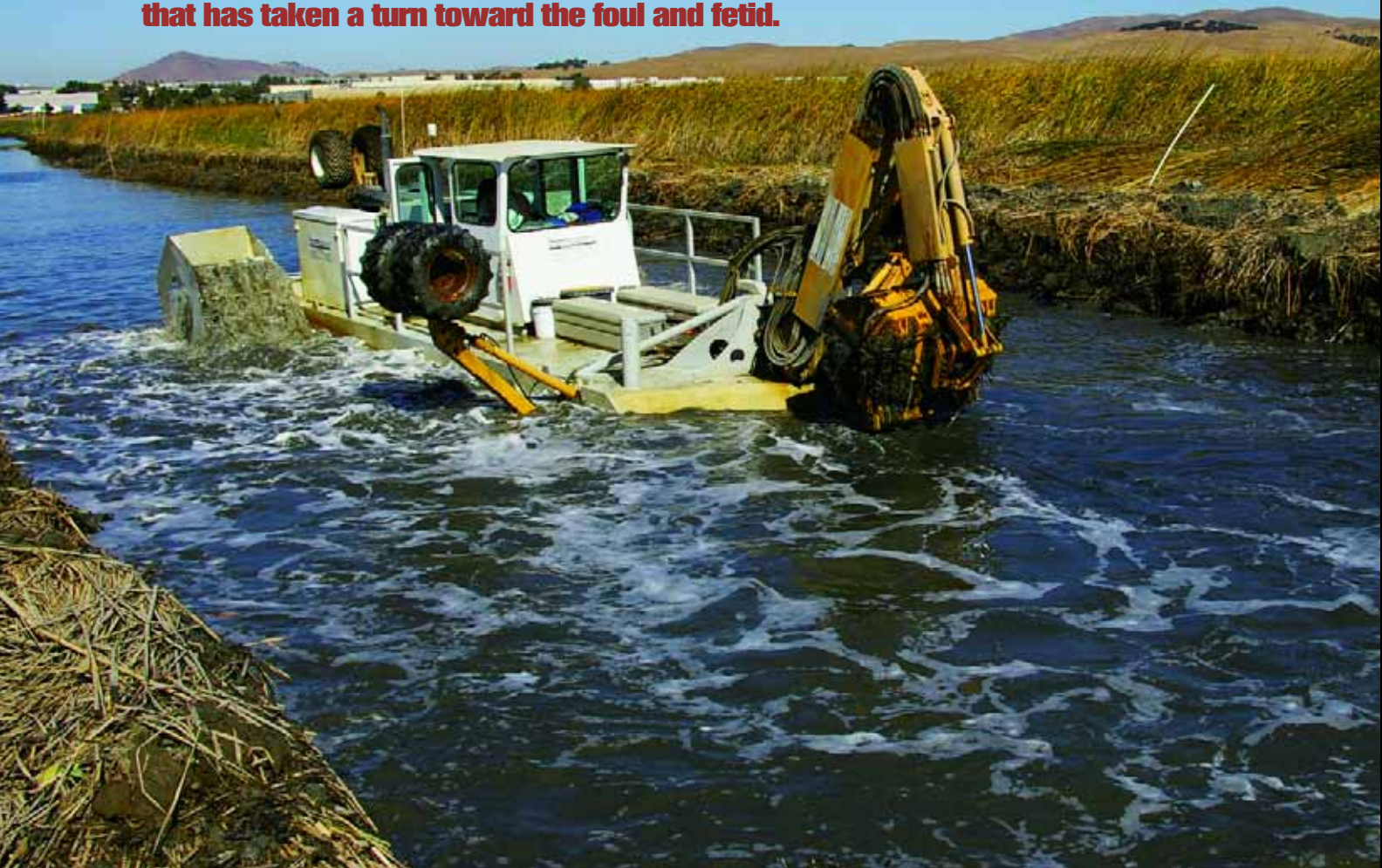
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A range of issues can conspire to make any good, man-made pond or lake head in the wrong direction. Addressing those factors and remediating poor water quality is a real specialty, says pond/lake expert George Forni – one that calls for an understanding of biology and chemistry as well as hydraulics. Here, he details the variety of techniques his firm employs when faced with a body of water that has taken a turn toward the foul and fetid.



When Ponds



By George Forni

It's a fact: A great many of the ponds and lakes in the western United States are simply not part of nature's scheme.

Whether used for water retention, landscape beautification, fishing or swimming, these artificial, man-made bodies of water are inclined (and in some cases doomed) to be troubled, usually because of fertilizer- and pesticide-laced runoff from surrounding developed areas. Indeed, some of these problem watershapes are filled with just about the worst water the environment has to offer.

As our business has developed, a large portion of what we do has focused on setting things right in these troubled watershapes and returning the water to a state of aesthetic grace. It keeps us hopping: Few residential or commercial developments thrive when the water designed to attract business and tenants goes bad, so when we get the call, things are *urgent*.

We refer to what we do as "aquatic remediation," which encompasses everything from redesign and reconstruction to start-ups and long-term maintenance.

Sizing Up

Of course, every body of water has its own character and idiosyncrasies, so a

big part of what we do involves analyzing situations and tailoring our approaches to offer the most feasible, effective and appropriate combination of helpful measures.

That may call for removing infestations of plant material, dredging the bottom, re-engineering the hydraulics or even turning to chemical treatments to solve the problem. Whatever it takes, our job is to confront an unpleasant body of water and make it beautiful once again.

The first thing we do in assessing a troubled body of water is to find out what the client really wants. Water quality in ponds and lakes is a relative, subjective issue—quite a different matter from, say, a commercial swimming pool, where the parameters are clearly defined and mandated.

We start by asking them about what they see as the pond or lake's primary purpose, its reason for being there in the first place. This will yield a variety of responses, from pure aesthetics or flood control to support of wildlife habitat, fishing or even swimming. What they say helps us plan a remediation program with a desired outcome firmly in mind.

If what they're after is an oversized swimming pool, for example, we'll im-

mediately think in terms of removing all vegetation and consider upgrading the circulation and/or filtration systems. If, by contrast, the body of water is seen as a way station for migrating waterfowl, then our approach would be entirely different.

The majority of these watershapes exist primarily for aesthetic purposes, but within the mission of restoring beauty is a host of significant variables. One of the big issues these days, for instance, is whether or not the clients or visitors who approach the water need to fear outbreaks of West Nile virus—a consideration that lends a tremendous sense of urgency to our efforts.

It's the Water

We take a look at algae and the degree to which the watershape has been infested by submerged emergent or surface plants. Then we assess factors that contribute to such problems and begin thinking about the removal of excess plant material, increasing the water depth and dredging muck (that is, accumulated sediment and/or organic matter) off the bottom. Further thought is given to the installation of aeration systems and turning over the water column more rapidly by

GO BAD



installing new pumps and plumbing runs.

In many cases, our recommendations have to do with solving problems with source water – both the fill water as well as any surface water that might flow into the lake or pond. Very often, these measures take the form of changing the fertilizers used around the watershed as well as the methods with which they are applied. It might also entail some re-engineering or re-routing of the water source, the establishment of desilting basins that will allow sediments to settle out of solution or filtration of contaminants before the water feeds into the pond or lake.

Sometimes the water issues are hard to crack. A problem we're encountering more and more, for example, has to do with water contaminated by the presence of large populations of waterfowl.

Some migrating birds (such as Canada geese) tend to choose a body of water and basically use it as a semi-permanent residence. Bird droppings are a rich nutrient source for algae and other unwanted plants. Furthermore, the availability of these vessels – combined with human interactions (that is, artificial food sources)



The combination of high nutrient loads with inadequate circulation systems can lead to unholy messes in lakes and ponds of all sizes and descriptions. Our approaches to restoring these watersheds to acceptable conditions can take many forms, depending on the specific desires of the clients, local regulations and the system's basic needs.

– disrupts migration patterns, which in turn creates all sorts of broader environmental problems.

In many cases where the waterfowl population exceeds watershed capacity, fecal/total coliform counts create public-interaction health concerns, while improper feeding by park patrons can contribute to outbreaks of avian botulism. The results in either case are extremely unpleasant.

In these cases, we need to work with local fish-and-game or fish-and-wildlife agencies' regulations to find ways to reduce populations or, in extreme cases, remove the birds from the property. The environmental rules and regulations can be quite limiting and range from using specially trained dogs to chase the birds away to adding eggs (that is, physically disrupting nesting sites) or trapping the birds and relocating them.

And everything gets more complicated if the presence of the birds creates a public health hazard: If a lake becomes contaminated (that is, if there are elevated total or fecal coliform counts), regulators tend to be much more accommodating in what steps they're willing to let us take.

Changing Situations

In our examinations of these bodies of water, we often find that basic engineering – combined with tightening regulations – is the underlying issue.

In many of these cases, the troubled lakes were built 50 or 60 years ago or more at a point before the areas around them saw any significant development. As conditions changed in and (more so) *around* the water, the original biosystems became unable to sustain and support good water quality. And where the original installers may have seen draining and dredging as simple corrective strategies, in many cases that's no longer an option.

Regulatory changes are also a factor. Not long ago, for example, you could buy bluestone (which is the old term for Copper Sulfate), tie it up in a burlap bag, attach a line to it, throw it off the back of a boat and pull it around a lake – a process that controls algae and vegetation quite effectively. This is no longer permitted in most states, and the same is true of using a broad range of chemical treatments commonly used in the days before we were as concerned about endangered

species or habitat degradation.

These days, it's almost always the case that when we set out to help a troubled pond or lake, we have to do so with small "footprints," whether from a mechanical, chemical or physical perspective. This can make it tough, of course, when we're confronted by a body of water that obviously requires massive intervention. So often, the most direct and cost-effective solution would be to drain the water, extract all plant material, clear away muck and revise the circulation system – but again, that's not always an option.

Unfortunately, in fact, there are many circumstances that take truly drastic approaches off the chart, including the size of the body of water, high water tables, the lack of a place to discharge the water, excessive lake depth, drought restrictions on refilling or the existence of environmental regulations aimed at protecting certain species of birds, insects, amphibians or fish. In such cases, we have to develop alternative approaches, which sometimes involves implementing a regular maintenance schedule for that specific body of water.

All of these conditions, possibilities,





Harvesting a lake or pond with big machines is a common approach to relieving the chokehold plant material can develop in some situations. In some settings, however, we need to moderate our efforts so that, as seen from home sites for example, basic lake aesthetics will not be disrupted for too long a time.



When we're working in the shallows or, indeed, up on shore, a device called an Aquamog is our plant-remover of choice. It's shallow draught gives it superb maneuverability, and it's a real workhorse when it comes to clearing away unwanted plant material.

regulations, options and approaches are weighed, considered, accepted or rejected as part of an assessment process that takes place before we implement any direct measures on site.

Mowing the Pond

One of the most common solutions we implement involves removing some or all of the plant material present in the pond or lake.

Harvesting these plants falls into two specific categories: removing floating plants (such as hyacinths, mosquitofern or Duckweed) or extracting vegetation that is rooted to the bottom (such as Egeria, pond weed, naiads or other aquatic grasses). None of these is a problem until it reaches the infestation level, which can be loosely defined as a condition where plant material covers the majority of the surface of the water or effectively impedes water circulation. (Note that tules – that is, Bulrush or Cattails – are emergent plants that require other specialized equipment, to be discussed later.)

Some instances of infestation can be fairly dramatic: We had a project not long ago in which the presence of the plants actually raised the water level and caused a breach in a levee! The consequences of these infestations just make matters worse: poor circulation, rising nutrient levels, insect infestation and/or turbid water are all common outcomes when plant material takes over.

And when we get the call to deal with these problems, the water has pretty well been overwhelmed by the challenge and the watershape is in truly desperate need of intervention in the form of plant abatement. Our preference is to use mechanical means, but chemical approaches are also a possibility depending upon the circumstances.

The tools of our trade for plant removal include floating aquatic plant harvesters. These are not unlike the traditional harvesters you might see working in a wheat or cornfield: They have big belts with sets of cutting teeth on three sides and will cut and collect vegetation as they blaze paths across the water's surface. Depending upon what's needed, these units can cut the plant material to various levels down to about seven feet deep.



At times, there's no alternative to draining away the pond or lake water and clearing away all the muck that accumulates in the bottom. This work is spectacularly messy and basically quite disgusting – definitely *not* for those with sensitive senses of smell.

BY-PRODUCTS



Harvesting plant material from ponds and lakes can create a tremendous amount of plant debris.

We typically collect this material in one spot and let it dry out or dewater for a time (weather permitting) before running it through a machine known as a horizontal processor — basically a giant wood chipper.

We'll often mix the resulting material with dried debris from surrounding landscaping to create a rich mulch. Whenever possible, we'll move it along to local farms as fertilizer or to nearby landscaped environments or nurseries where it serves as a terrific mulch. If those options aren't available, this valuable material is shuffled off to a landfill as top cover.

Dredged material is a much more complex (and *expensive*) story: Environmental regulations require that we dry and submit the material for a range of tests to assess its chemical makeup and water content before it can be distributed in a landfill.

— G.E.



The harvesters work very well with submerged plants, which typically have very soft tissues, but when we work with emergent plants such as cattails or bulrushes, which can be very tough by comparison, we'll use another type of machine known as an Aquamog.

These are low-draft, self-propelled, multi-purpose barges that have an arm on the front that accommodates a variety of cutting and material-handling attachments. These units enable us to do quite a bit of work on the surface of the water – particularly in shallow areas along the shoreline where the toughest plant material so often takes hold.

Harvest Dynamics

Harvesting ponds and lakes is much like maintaining and mowing a lawn: You plant the lawn, fertilize it and then mow it. Without fertilizer, the need to mow comes around less frequently.

With ponds and lakes, however, it's hard to withhold nutrients, and there's also the fact that a healthy biosystem will generate nutrients on its own and create conditions that tend to foster robust plant growth. In other words, plants in ponds and lakes naturally take up nutrients and clear the water, which allows greater penetration of sunlight that encourages plant growth – a helpful but difficult-to-control cycle.

This is why we so often see bodies of water that one year have only small amounts of plant material, but the next year will experience burgeoning, overwhelming growth spurts. The cause is simple: The plant population has reached a point of coverage at which it tips the scales from balance to infestation. Harvesting a pond or lake maintains or stabilizes this balance by removing the biomass (and accumulated nutrients) that would otherwise be an additional food source for the rapidly expanding plant population.

What this means in many cases is that the water must be “mowed” on a regu-

FROM THE DEPTHS

One of the most frequent questions I'm asked about our work in aquatic remediation is a matter of simple curiosity: “What's the weirdest thing you've ever found in the water?”

I would love to have great answer, but the truth is we've yet to find any hidden treasures, historical artifacts or evidence of nefarious deeds – although we once found a dog's skull. Then there was a project in San Francisco where we found a number of parking meters, cash registers, shopping carts, bicycles and motorcycle frames in a lake. (Public parks in particular tend to become dumping grounds for such things.)

We also come across lots of common items including bottles and various containers that sometimes date back quite a while. We found a wallet once, vintage 1975, still stuffed with cash, credit cards and a driver's license.

For the most part, however, we find nothing at all, partly because the nature of the goop we collect from the bottom of a lake doesn't incline anyone to sift through the smelly mess. It's possible we've missed some treasures through the years, but it's not something we think about too much.

–G.F.





We're called onto properties for a simple reason – that is, to intervene when ponds or lakes have lost their battles with plant materials and drastic measures must be taken. As these sets of before-and-after shots indicate, the results can be quite dramatic and remarkably satisfying to everyone involved.

lar basis. Immediately thereafter, there is typically a drop in water quality in the form of nutrient-related turbidity. As plants reassert themselves, they take up the nutrients and water quality improves dramatically – and the cycle begins anew. That's not a bad thing: The presence of the growing plants can be essential to maintaining relatively clear water in large systems.

If you ignore the plants, they'll top out, eventually retreat into the water and before long will fall to the bottom and contribute to the biomass. When you let this happen, you increase the chances of the water falling into anaerobic conditions in which there's little or no dissolved oxygen. When this occurs the fish and other species begin dying, which will fast become a major problem. This is where the worst water quality problems occur: complete turbidity, rampant algae blooms and terrible odors.

In our region, which extends from Washington State through to southern California, we might need to harvest bodies of water twice or even up to four times annually. It is rarely the *only* measure we employ, but it is an extremely important tool in the vast majority of cases.

Lately, another factor has led some of our clients to stay well ahead of plant-related problems: Fear of the West Nile virus has made property owners particularly aware of excessive growth of specific plants generally known as *tules*, which include all species of cattails and bulrushes, because their presence has been

associated with mosquito development and outbreaks of the illness.

Combined Measures

As a rule, we don't approach aquatic remediation with chemicals as a primary tool, but there are cases where we're forced to turn to algaecides and herbicides as a last resort.

In some cases, we use these materials because the client has a limited budget and chemical treatment is typically much less expensive than mechanical measures. It may be cheaper, but in the long run it can be less effective if it is used as the only remedial measure.

Most states require that you have a pesticide license to apply these products. In addition, in the western states, you must also have a National Pollution Discharge Elimination System (NPDES) permit, which is both expensive and difficult to obtain. There are also federal regulations to consider; these mostly have had the effect of setting up strict usage guidelines or of banning substances that were once widely used in the control of aquatic plants and algae.

In our work, we use mainly chelated copper products for algae control as well as endothalols or salt-based herbicides. Each comes with specific label concerns and warnings, and it's critical to know how to handle and apply every single product. This includes instructions related to mixing and dilution rates, which means you need to know the approximate volume of the given body of water – eas-

ier said than done in a large lake you didn't install in the first place.

Wet dredging is another approach we use in certain circumstances. This is a costly proposition that involves the removal of large quantities of saturated material or sediments. This means you need to find a way to dewater the mud and muck on site – unless cost is no object and you can afford to haul it away wet.

In most of our projects, we end up taking a multi-pronged approach that includes harvesting, dredging and chemical treatment as well as a number of site-specific measures of the sort described above. As a rule, we accept the fact that one-technique approaches simply do not get the job done. Beyond this, developing and implementing maintenance programs will ensure that the cost of returning a site to its former grace is not seen as a short-term expense.

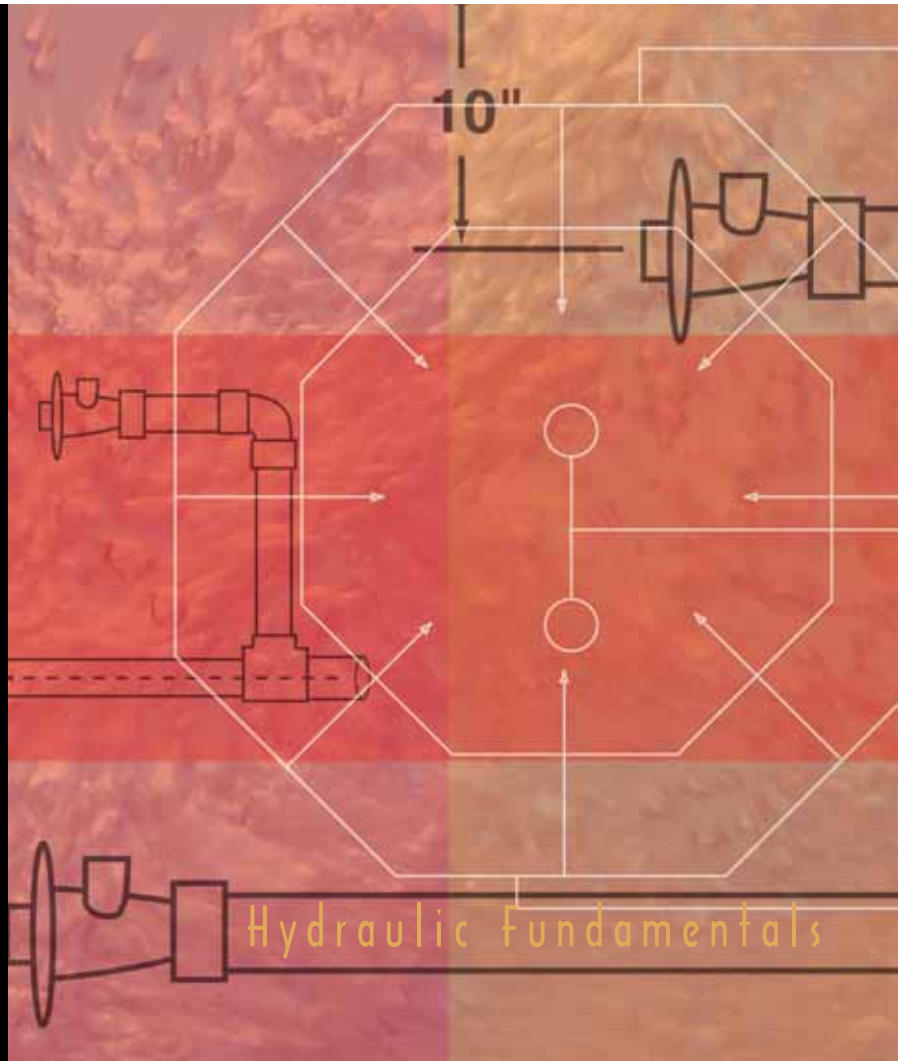
And make no mistake: Aquatic remediation is dirty, labor-intensive work that requires diligence and skill. We travel far and wide within our region to lakes and ponds large and small, and it's not unusual with big ones for a harvester or Aquamog to be on site for several days or even weeks at a time.

It's also deeply satisfying to pull troubled waters back from the brink: If we do our job and come up with the best set of solutions, we'll be satisfied by the thought that we've transformed a dank, dying body of water into one that is attractive, safe and an asset to the surrounding area and community.

Equating Continuity

By Steve Gutai

As watershapes have become increasingly complex, the need for reliable hydraulic designs that maximize efficiency and reliability is now more pressing than it's ever been, says hydraulics expert Steve Gutai. With this installment of his ongoing series on hydraulics, he launches a sequence of articles that will explore principles behind the fluid mechanics and hydraulics of custom pools while defining what's known as the 'continuity equation.'



Proper hydraulic design is all about asking yourself the right questions.

First are the basic ones: Do you know the flow rate of water moving through the system? Do you know the pressure requirements of each of the components in that system? Can you calculate the system's flow and pressure drop? Then comes a tough one: Do you know, for the system at hand, how flow and pressure relate to each other?

Knowing the answers to these questions (and weighing the relative importance of each) resides at the heart of a real understanding of hydraulic design. That's why I've broken them out for discussion here, and that's why we'll be exploring these issues in great detail in issues to come as we look into a range of interrelated concepts I refer to as the "properties of water."

What we'll be building toward is a clearer recognition of the fact that every individual element in a hydraulic design affects the *entire* design and that success in keeping things in balance in our water-

shapes requires both a conceptual and a working understanding of what's behind these key questions.

FLUID MATTERS

The questions encompass concepts that must be understood and applied in a broad and complicated context. To simplify matters for this discussion, we'll break things down into six distinct topics (the first of which will be covered in this article):

- ❑ the basics of flow and velocity
- ❑ the basics of pressure and head
- ❑ a five-step system for sound hydraulic design
- ❑ pump characteristics
- ❑ gravity-feed systems
- ❑ water flow over weirs.

People in the pool and spa industry have generally seen little value in understanding hydraulics in this detailed way, largely because the relative simplicity of off-the-shelf designs from days gone by created an environment in

which precision was not typically required. In other words, even systems that weren't designed properly worked well enough to avoid much scrutiny for debatable performance.

Today, however, watershape design and construction are much more complicated pursuits. Swimming pools and spas are increasing in complexity because consumers are now asking for much more than they once did. These clients are also more sophisticated, understand their options and place a high value on the contributions pools and spas make to their lifestyles.

They want custom spas, amazing waterfeatures, vanishing edges, slot overflows and interactive waterfeatures – each one of them an outcome that requires both designer and builder to have a firm grip on the basics of fluid mechanics.

In what follows, the focus will be on pools and spas, but the concepts apply just as well to fountains, ponds and streams. Whatever your specialty might

be, the goal here is to equip you with information you need to specify and install hydraulic systems that reflect an understanding of what's really happening.

This isn't about developing an abstract understanding of scientific principles; rather, it's about building a practical understanding of design factors that apply specifically to watershapes of the sort we design and build every day.

To understand and communicate effectively on the topic of hydraulic design as it relates to pools and spas, we need to become familiar with key concepts and, as important, get comfortable with a basic vocabulary.

GOING WITH THE FLOW

In all my years of teaching hydraulics at industry events and in schools, it's clear to me that even though some of these terms – including *flow*, *velocity* and *pressure* as well as related words such as *vacuum*, *head*, *elevation* and *friction* – are quite familiar, they are not necessarily well understood.

This time out, we'll focus on the most basic (and crucial) of these elements, that is, flow and velocity, specifically as they relate to pools and spas.

For its part, *flow* is a term that commonly refers to the capacity of water (in gallons) that a system or component of some sort has the ability to accept within a specified time frame, usually *minutes* in the case of pools and spas. This value is expressed as *gallons per minute* (gpm), and common examples of how it is used include main drains rated at 85 gpm, filters rated at 120 gpm, decorative waterfeatures rated at 30 gpm or spa jets rated at 15 gpm.

This flow rate or gpm level is considered to be the *maximum* flow rate for the component, as specified by the manufacturer. It also refers to the capacity of water that the plumbing network will be able to accept, meaning the pipes, fittings and valves all fall into this set of considerations and must *all* be considered from the standpoint of gpm relative to the flow through the entire system.

This set of details is about ensuring the compatibility of basic system components: No single component, whether a jet or a filter, should either be over-

whelmed or starved or in any other way have its performance negatively influenced by the flow through the system as a whole.

As important, gpm also refers to the capacity or flow being generated by a pump – for example, you'll see references to a two-horsepower pump with a specified output of "120 gpm at 60 feet of head."

Understanding the flow rates of all components used in a watershape system is the first step in designing a swimming pool's hydraulic system. (It is also useful to note that "gallons per minute" is not the only possible description of flow or capacity: Some systems are denoted in gallons per hour or day, and some are rated in liters per minute, hour or day.)

WATER IN MOTION

The next key term we need to consider is *velocity*, which is all about the rate at which displaced water moves through a given system.

Commonly measured in *feet per second* (ft/sec), this velocity figure and the flow rate of the system to which it applies are conceptually attached at the hip. If a two-inch-diameter segment of schedule 40 PVC has water moving through it at 70 gpm, the average velocity of that water is 6.7 feet per second, meaning the system would have a *line velocity* of "6.7 ft/sec."

In reality, the term *average velocity* is more accurate but less widely used. Sticklers for terminology prefer it because it more completely describes the velocity of the water within a pipe of a specific size: The actual velocity is higher the further away the flow is from the pipe wall, so an "average" is what is truly being described.

This more-accurate term will become important as we move further into this discussion: The drag on flow created by the pipe wall reduces the velocity of the water, which is why it is conceptually valuable to wrap our minds around "average velocity" as we approach calculations of a system's loss of velocity as a result of *friction*.

I emphasize all of this because there's a critical relationship between the flow in gpm, the velocity in ft/sec and the inside area (or *flow section*) of a pipe. This relationship can be described by using the *continuity equation*.

The continuity equation states that the flow is equal to the inside area of a pipe multiplied by the velocity. Another way of saying the same thing is that the velocity is equal to the flow divided by the flow section of a pipe. However you look at it, if you shrink down the pipe size or flow area, the flow in gallons per minute stays the same but the velocity in feet per second increases.

To understand this in more direct terms, let's return to our two-inch piece of schedule 40 PVC pipe and assume a flow source (in this case a pump) is generating 70 gpm. What happens to the line velocity and the flow if a smaller size pipe, such as 1-1/2-inch schedule 40 PVC, is used downstream?

INSIDE THE SYSTEM

To find out, let's say we have a long pipe run of 100 feet: The first 50 feet of the run is 2-inch schedule 40 PVC that transitions to 1-1/2-inch schedule 40 PVC pipe for the second 50 feet.

Figure 1 illustrates this situation: When

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slot overflows and interactive waterfeatures – each one of them
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firm grip on the basics of fluid mechanics.

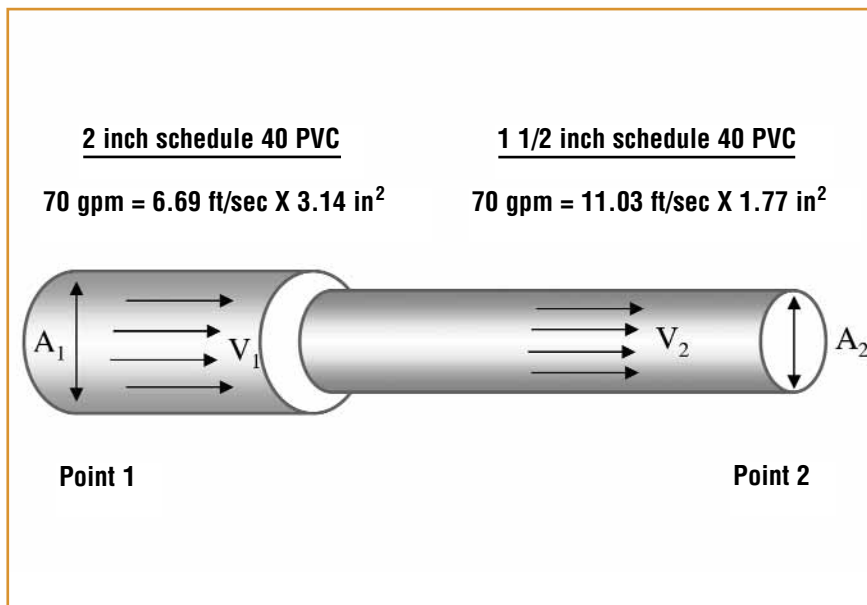


Figure 1: This schematic illustrates the key point that in a line where the flow remains constant, the line velocity increases if the pipe size is reduced. In this system the flow is equal to the line velocity multiplied by the inside area of the pipe – that is, flow (gpm) = $A_1 \times V_1 = A_2 \times V_2$.

the water travels from point A1 to point A2, the flow remains the same. At A1, the flow section of the pipe is 3.14 square inches with a line velocity (V_1) of 6.69 feet per second. At A2, the flow section shrinks to 1.77 square inches while the line velocity (V_2) increases to 11.03 feet per second.

This change perfectly illustrates the significance of the continuity equation as it applies to hydraulic design for watershapes: It indicates that the area times the velocity is the same. In other words, because the flow remains constant, when the pipe size or flow section is reduced, the line velocity is increased.

It's important to note that the rate of flow in all sections of the piping is the same in a single inlet/outlet system of the sort seen in Figure 2 – but that this will change when the system expands and we start considering plumbing networks, loops and manifolds.

It's also important to recognize that the continuity equation is also a foundation for understanding component compati-

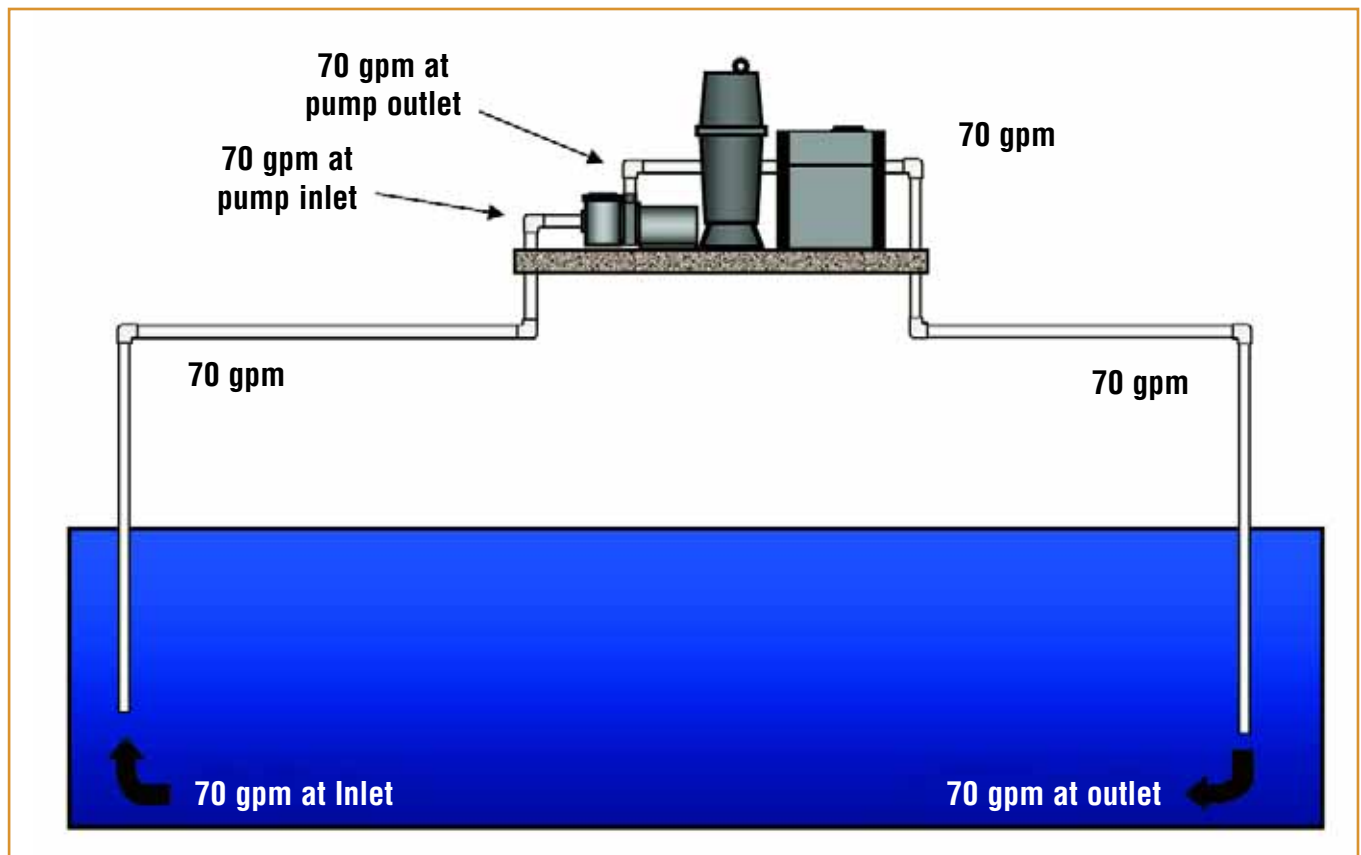


Figure 2: This schematic shows a simple system in which the flow is constant at 70 gpm at all points – a consistency that disappears and a system that becomes much more complicated once it expands to accommodate various plumbing manifolds, loops and networks.

bility. All components used in a pool's hydraulic system – main drain grates, spa jets, filters, waterfeatures and more – have their assigned flow rates. It is important for system performance that all equipment be sized properly and that their flow rates correspond. (Conversely, the continuity equation helps us understand component failure in situations where mismatched flow rates occur.)

Understanding the relationships defined by the continuity equation is extremely important because it gives us direct insights into pressure drops within a watershed's hydraulic system. Simply put, this is the all-important key that unlocks the door to more effective system design and installation.

PRACTICAL APPLICATION

Figure 2 shows flow in a system in its simplest form, assuming, first, that all readers of this article understand that a suction-side line for a watershed would include skimmers, drains or gravity-feed

Understanding the relationships defined by the continuity equation is extremely important because it gives us direct insights into pressure drops within a watershed's hydraulic system.

outlets that provide flow to the influent side of the pump; and that the discharge side of the pumping system might include various inlets – return fittings, spa jets, in-floor returns, fountains and more.

The continuity equation should be considered while looking at the *entire* branch of plumbing, the *totality* of active inlets and outlets on *both* the suction and discharge sides of the pumping system. This gives you the ability to design a hydraulic system using line velocity as a main criterion – something that has not historically been the case (at least in the pool and spa industry).

Keep in mind that hydraulics is one of

those subjects that may seem simple in the explaining, but becomes far more challenging when applied in the field. So that's all for now: My intention is to keep these articles brief so their concepts can be internalized more easily. In articles to come, we'll build on this foundation as we work toward clearing away the mysteries of hydraulic-system development, step by step.

Next: The continuity equation will be even more critical when we explore a new set of conceptual building blocks – head and pressure.



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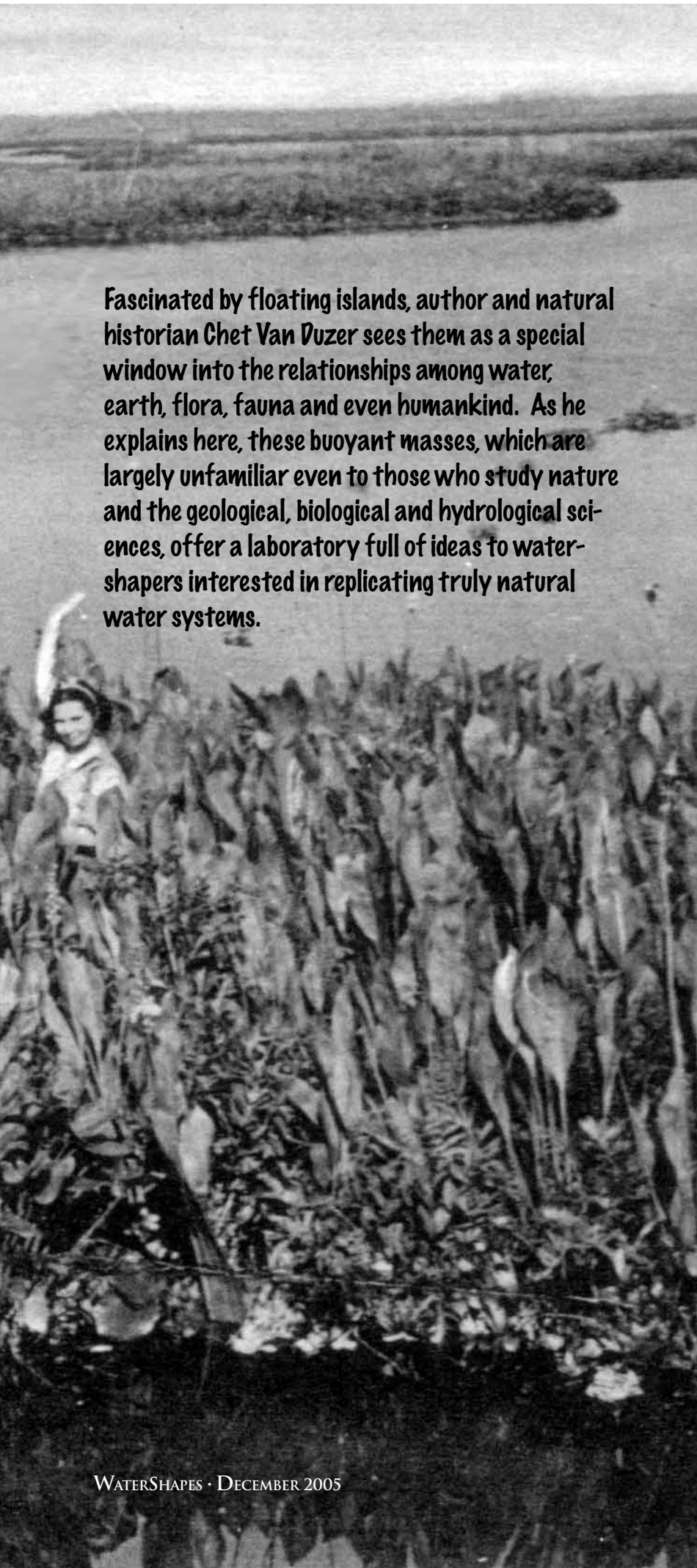
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A black and white photograph of a body of water. In the foreground, there is a dense patch of aquatic plants with large, rounded leaves. The water is calm, reflecting the sky and the distant land. In the middle ground, there is a small, low-lying island or peninsula covered in vegetation. The background shows a flat landscape with a line of trees under a cloudy sky.

Islands Afloat



Fascinated by floating islands, author and natural historian Chet Van Duzer sees them as a special window into the relationships among water, earth, flora, fauna and even humankind. As he explains here, these buoyant masses, which are largely unfamiliar even to those who study nature and the geological, biological and hydrological sciences, offer a laboratory full of ideas to water-shapers interested in replicating truly natural water systems.

By Chet Van Duzer

The very existence of floating islands seems counterintuitive. Are there really chunks of earth solid enough to support our weight while drifting over the surface of a body of water? Can these floating masses support the weight of trees, animals or even human dwellings?

The fact is that floating islands *do* exist on six of the seven continents and sometimes on the oceans between. Some *do* have trees growing on them and *do* support the weight of humans (and even grazing cattle). Some are, in fact, hundreds of feet across and are called “home” by their inhabitants.

These naturally occurring, waterborne vessels embody a fascinating subset of natural observation and are generally unknown — even though they play important ecological roles and have intersected human history in sometimes surprising ways.

From the Ancients

Made up of light, buoyant, spongy tissues of certain species of aquatic plants or, alternatively, suspended in place by gases released into their soil by decomposing vegetation (or by both factors), floating islands have attracted the attention of writers and philosophers since antiquity.

In one early instance, 1st Century Roman writer Pliny the Younger (in his *Epistles*, 8.20) provides an evocative description of the floating islands in Lacus Vadimonis, now a marshy pond known as Lago di Bassano on the bank of the Tiber about 40 miles north of Rome.

He writes: “No boats are allowed on the lake, as its waters are sacred; but several floating islands swim about it, covered with reeds, rushes, and whatever other plants the fertile marshy ground nearby and the edge of the lake produce. Each island has its peculiar

shape and size, but the edges of all of them are worn away by their frequent collisions with the shore and one another.”

Pliny’s observation about the edges of the islands being worn away by collision accurately describes a common characteristic of floating islands found in lakes to this day. Included among this battered legion are the floating islands in the lakes of the Upemba Basin on the Lualaba River system in Zaire; in Orange Lake in Florida; in the Iberá Wetlands near Corrientes, Argentina; in the Lago di Posta Fibreno southeast of Rome (Figure 1); and on the surface of the Zacatón sinkhole in Tamaulipas, Mexico (Figure 2).

It wasn’t until the 17th Century, however, that serious inquiry into the nature, formation, and buoyancy of floating islands began. Claude Dausque, who was familiar with the floating islands that once existed near St. Omer in France, started the ball rolling in his obscure but compelling book, *Terra, et aqua seu, Terrae flutantes* (published in Tournai in 1633 and again in Paris in 1677).

In Italy, the Jesuit polymath Athanasius Kircher studied floating islands as well, finding his in the Lago della Regina (then called Lacus Albuneus or “la Solfatara”) near Tivoli. He concluded in his *Mundus Subterraneus* (Amsterdam, 1665) that floating islands form from conglomerations of bituminous, sulfurous and nitrous particles. (An interesting concept, but incorrect.)

On Target

Several generations later, a particular floating island in England helped scientists recognize the importance of the gases released by decomposing vegetation to the buoyancy of floating islands. Derwentwater, a lake in England’s Lake District, was famed for an intermittent floating island that appeared only following hot summers, always in the same spot (Figure 3). Some had argued that upwellings of water from a stream that flowed into the lake were what buoyed this island.



Figure 1: The floating island in the Lago di Posta Fibreno southeast of Rome (photo by Antonio Lecce).

Jesuit polymath Athanasius Kircher studied floating islands and concluded in his *Mundus Subterraneus* (Amsterdam, 1665) that floating islands form from conglomerations of bituminous, sulfurous and nitrous particles. (An interesting concept, but incorrect.)



Figure 2: Floating islands on the surface of the Zacatón sinkhole in Tamaulipas, Mexico (photo by Marcus Gary).



Figure 3: The author atop the intermittent floating island in Derwentwater, Cumbria, England (photo by Sandra Sáenz-López Pérez).

Victorian scientists took a studied interest in the problem, and Jonathan Otley, author of a famous guidebook to the Lake District, took samples and determined that gases from the decomposition of vegetation were responsible for the island's rising. A hot summer, he observed, would increase the rate of decomposition, thus generating more gas that would make the "island" (actually a section of the lake bottom) buoyant enough to rise to the surface.

Toward the end of the 19th Century, the gases in a similar floating island in Lake Ralång, Sweden, were also analyzed, and quite similar conclusions were reached.

Through history, floating islands have been known commonly to rise in newly flooded reservoirs. If the flooded area has peaty soil (meaning it has lots of decomposing vegetation), the filling of the reser-

voir will make certain types of peat buoyant. If the water is deep, its weight will hold the peat in place; if it's shallow (less than six or seven feet), the buoyancy will allow sections of peat to tear away from the bottom and rise as floating islands – many of enough substance that they can be colonized by various plants, including trees.

In reservoirs raised to feed hydroelectric generators, these islands can cause serious problems if they are drawn into the intake systems. Removal is difficult and expensive, but awareness of the phenomenon has made it practical in some cases to prevent or mitigate this problem before flooding by burying suspect areas with gravel.

Sometimes these islands emerge with a rise in water level. If there is an area of peaty soil at the edge of a lake (which has gases suspended in it from decomposing vegetation) or a stand of cattails or pa-

pyrus (which have buoyant roots), the rising water breaks sections of these edges free of their former positions – processes assisted by wind and wave action.

Global Effect

Given the multiple forces at work in creating these islands, it comes as no surprise that floating islands are truly a global phenomenon.

In tropical lakes, for instance, floating islands can form from masses of floating vegetation such as water hyacinths (*Eichhornia crassipes*) or *Salvinia molesta*. These plants have special tissues that cause them to float, and in the right conditions they grow quickly to form large floating mats. Through time, plant detritus and dust will collect on these mats and alter them into quite solid form.

Floating islands also emerge during floods of the great tropical rivers of the

Ancient Perspective

Pliny the Younger's observation of floating islands near the Tiber river north of Rome led him to great eloquence. Continuing on with the passage following the one quoted on pages 41 and 42, he writes:

"They are all of the same thickness and buoyancy, for their shallow bases are shaped like the hull of a boat. This may be clearly observed from all sides: The islands lie half above and half below the water's surface. Sometimes they cluster together and seem to form a little continent; sometimes they are dispersed by the shifting winds; at other times, when the wind falls dead, they float in isolation.

"Often a large island sails along with a small island joined to it, like a ship with its tender, or as if one were striving to out-sail the other; then again they are all driven to one spot on the shore, whose limits they thus advance; and now here, and now there, they diminish or restore the area of the lake, until at last they occupy the center again and so restore it to its usual size.

"Sheep, seeking grass, proceed not only to the shores of the lake, but also upon these islands, nor do they perceive that the ground is mobile, until, far from the shore, they are alarmed to find themselves surrounded by water, as though they had been suddenly conveyed and placed there. Afterwards, when the wind drives them back again, they as little perceive their return as their departure."

– C.V.D.

A 1905 flood on the Río de la Plata filled the waterway at Buenos Aires with floating islands as far as the eye could see – some a half-mile long and 100 feet wide, others just a few feet in diameter. As they came down the river, these islands had enough mass and momentum to rip ships from their moorings.

world, when large masses of aquatic vegetation or chunks of bank are torn away and carried downriver. This often happens on the Congo River in Africa (Figure 4); in some cases, floating islands that navigated their way to the ocean were sighted 150 miles out to sea beyond the river's mouth.

Similar landmasses are also common within and beyond the Sepik River in Papua New Guinea following monsoon rains. These islands are called "lik lik aislands" in Pidgin English, and can be up to 330 feet across with still-living trees on them.

The Río Paraná and Río de la Plata in South America also generate floating islands. These are called *camalotes* and are basically matted masses of water hyacinth. A famous incident on the Río Paraná at Convento de San Francisco in Santa Fe, Argentina, involved the killing of two friars at the Convento by a jaguar that arrived in town on a *camalote* on April 18, 1825.

A 1905 flood on the Río de la Plata filled the waterway at Buenos Aires with *camalotes* as far as the eye could see – some a half-mile long and 100 feet wide, others just a few feet in diameter. As they came down the river, these islands had enough mass and momentum to rip ships from their moorings.

And the islands brought passengers with them, including snakes, deer, a puma, parrots and monkeys. An Indian baby was found on a floating island that came ashore near Rosario, and although he was weak from hunger and exposure (the flood occurred in July, which is winter in the southern hemisphere), he was brought back to health.

Most floating islands that come down rivers end up in the sea, where many are quickly destroyed by waves. Although some survive for quite some time, accounts of floating islands seen at sea are rare but fascinate evolutionary biologists, who see them as means by which plant and animal species may have been dispersed across oceans.

Buoyant Habitat

One would assume that floating islands provide refuge to animals during floods, but it has also been observed that they also provide important habitats during calmer times.

Several species of birds – terns and ducks, for example – nest quite happily on floating islands and enjoy the relative degree of protection they provide from predators. And because the islands rise with the water level, nest flooding is much less of a problem. In addition, the undersides of floating islands, which often have roots hanging down, provide sanctuary for fish.

People can live on floating islands as well. Loktak Lake in Manipur, India, has a huge number of natural floating islands known as *phumdi* (Figure 5), and the locals commonly reconfigure them as platforms for fishing. They assemble various pieces of *phumdi* into ring-shaped assemblies with diameters of 650 to 800 feet and surround them with a netting

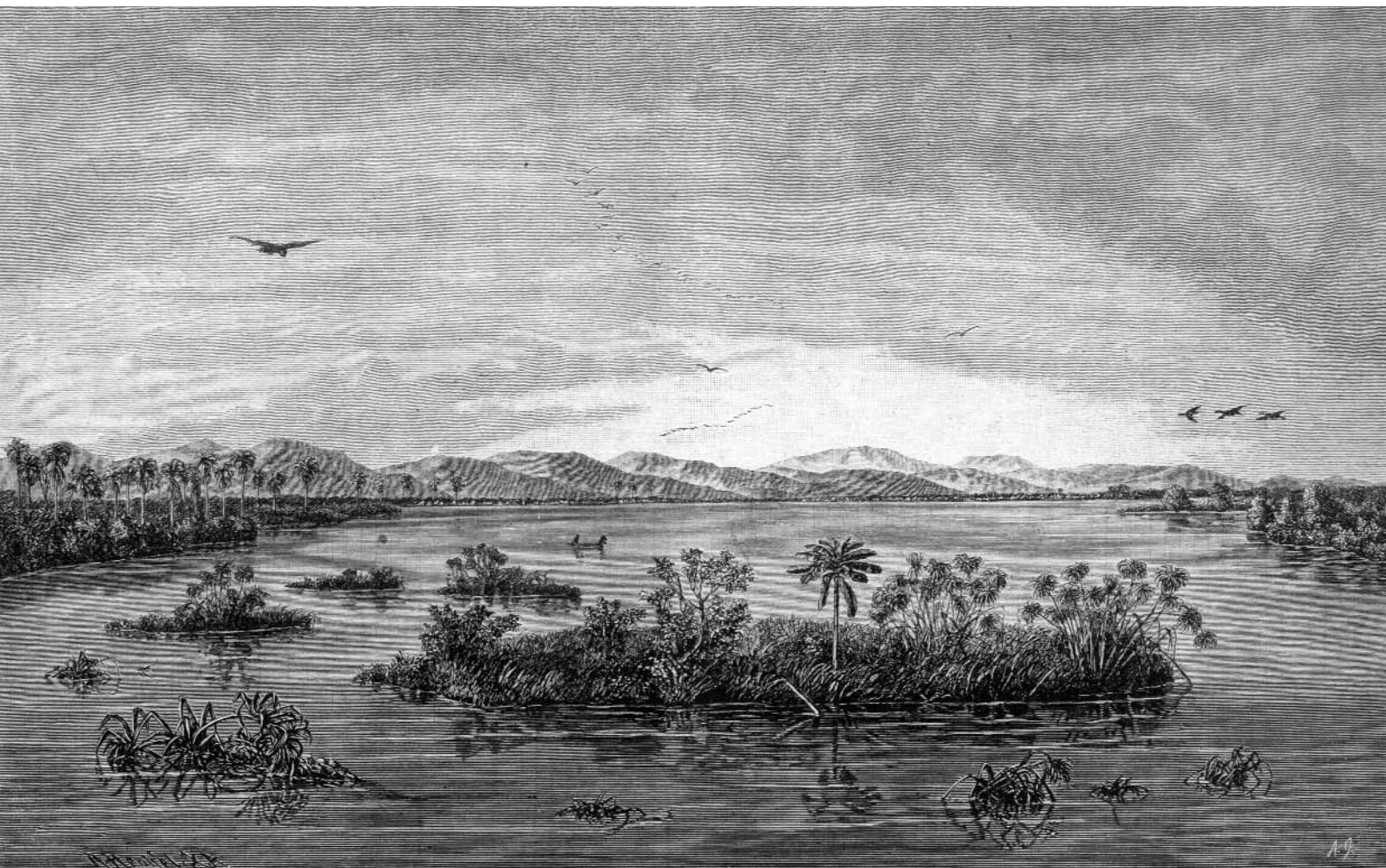


Figure 4: Woodcut illustration of floating islands in the Congo River by A. Goering, 1883 (from the author's collection).

Figure 5: The *phumdi* or floating islands of Loktak Lake, Manipur, India (photo by C. L. Trisal).



A Seafarer's View

A story published in several newspapers in June and July of 1902 gives a remarkable account of two floating islands spotted at large in the Caribbean.

The Norwegian ship *Donald*, steaming from Banes, Cuba, on its way to Philadelphia, encountered a floating island about 30 miles from the island of San Salvador:

"On passing Watlins Island, which lay off about 30 miles," said Skipper Warnecke, "we steamed close to a floating island. Upon it were what appeared to be a large number of stately palm trees. I had never encountered anything like this in all my seafaring life.

"The floating island was moving, and that, too, at a slow rate. Curious for a thorough investigation, I steamed still closer to the object and was amazed to find what I took to be palm trees were full-grown coconut trees, and laden with fruit of the largest kind. Then I ordered a boat lowered and, together with the first mate, made a landing on the still-moving island.

"Then another surprise awaited us. High up in the trees was a small colony of mischievous monkeys, and as we got nearer they shied a number of coconuts at us. After a lot of trouble we secured two of

the attacking simians and at least a dozen coconuts. Then we took to our boats, boarded the steamer, ordered full steam ahead, and soon the strange floating island was lost in the haze astern.

"But another surprise was in store for us on the following day, when we passed within glass-sight of another singular floating object just off the port bow. The lookout sung out 'Land ahead.' This amazed me, for I knew according to the chart land was not miles near. Still, curious from the previous day's experience, I determined to solve this further mystery of the sea, so I gave orders for the ship to steam close to what I now made out to be another floating island. Again I had a boat lowered, and with the same crew we landed on the island.

"We found it to be an exact duplicate of the day before, with this exception – instead of monkeys we found a big covey of parrots of most brilliant plumage. Among them was one who was evidently the patriarch of the tribe, and I do not exaggerate when I say that the aged fellow could cuss in two languages. He was evidently a lost pet. We took him and a couple of his fellows aboard the steamer, and soon left the floating island in the distance."

—C.V.D.

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that reaches to the lake bed to corral the fish. They then stir the silt with bamboo poles to deoxygenate the water and bring the fish to the surface where they're easily caught.

Beyond that, many fishermen and their families live in huts called *khangpok* built right on the *phumdi* of Loktak Lake. In 1986, 207 *khangpok* were reported on the *phumdi*; by 1999, this number had risen to 800—an increased population that has put unfortunate pressure on the lake's ecology.

There are other parts of the world where people live or have lived on floating islands. Some 6,000 people live, for example, on the floating islands or *sudds* that move freely about Lake Kyoga in Uganda. These islands are large floating masses of papyrus that originate in the swamps along the lake's shore; when the water level rises, large sections of matting are torn free to float out into the lake.

Some of the inhabited *sudds* are very

large. One in particular is big enough that it takes two hours to row around it in a canoe. But life on the *sudds* is difficult: Malaria is rampant, and the lake waters are both the islands' sewer and their source of drinking water. The islands are buffeted by high winds, and the lake is large enough that waves are an issue. Even though the inhabitants maintain their islands by adding papyrus to their surfaces, the *sudds* do not last more than five years.

Naturally many of the islands' residents are fishermen—and very few are women. On Lake Kyoga, there's also an element of the Wild West: The lake is divided into 13 districts, and because the islands move unimpeded from one district to another, jurisdictional issues are rampant and have led to the islands becoming a refuge for those who face problems with the law.

Natural Surprises

This has been just a quick overview

of the natural history awaiting discovery in the world of floating islands. Although they strike most people as little more than a natural oddity, it's clear that by understanding these surprising buoyant masses, we learn much about the nature of aquatic environments, biology and, possibly, our evolutionary history.

In that sense, it's not such a reach to suppose that a time will come when watershapers will start looking to man-made floating islands as part of their milieu, either as the object of environmental fascination or as an unusual garden-pond environment that can support human occupation.

Whether this study is for professional inspiration or simply in the spirit of understanding the fullness of the amazing world of aquatic environments, it's clear that floating islands should be part of our collective passion.

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The Central American nation of Costa Rica has gained a reputation as a place open to investment and real estate development by Americans and Europeans looking for affordable slices of paradise.

Recognizing that trend and welcoming a new, upscale, quality-minded clientele, watershaper Juan Roca decided to shut down and retool his midrange swimming pool company to transform it into the country's only custom watershape specialist.





Pure Vision

By Juan Roca



In Costa Rica, the people have a saying, *pura vida*, which in English roughly translates to “pure life.” We also are known to say, *cual es el apuro*, which means, “What’s the hurry?”

Those two unofficial national slogans reflect the essence of life in this country, where relaxation, an appreciation of natural beauty, love of family and a peaceful spirit are defining characteristics for the society.

But even in a place like Costa Rica, where the pace of life is slow, relaxed and easy, timing is still everything. About three years ago, it occurred to me that a variety of social and economic factors were creating a watershape market in Costa Rica in which a truly high-end, quality-oriented custom company could become quite successful.

Those factors – Costa Rica’s rising profile as a destination for vacations and immigration and its well-known tropical climate, stable government, friendly people, beautiful beaches and more – have all contributed to making the country one of Latin America’s most desirable places. In fact, we’ve seen a tremendous influx of Americans and Europeans drawn by the affordable real estate to a place that is just as welcoming as it is exotic.

Country Comforts

Lots of our visitors are in a buying mood, purchasing second homes, retirement spots or snapping up tracts of land for real estate speculation. American enclaves have sprung up in several locations, complete with golf courses, luxury resorts, hotels, condominium developments, modern amenities of every kind and a growing number of American-owned and -operated private schools.

With this well-heeled migration has come a large number of affluent people who have created a demand for the same sort of beautiful swimming pools, spas and waterfeatures that are becoming so common in the United States. Until recently, however, nobody working in my country focused on the design, engineering and construction of these custom watershapes. Having spent most of my life in the rank-and-file pool business, it dawned on me that the time was right to swing up to the high end.

Costa Rica’s seductive appeal stands at the heart of this trend. Beyond the country’s physical beauty and warm culture, there’s also a stable democratic government, a sensible court system and a growing economy. There’s no standing army, and we’ve seen neither internal nor external military conflict in more than 70 years. The crime rate is low, and the thriving economy is appropriately focused on agriculture, tourism and manufacturing.



Our company built some decent pools before I began my education in design, but they were quite basic compared to what I began doing when I came home with a headful of ideas from my first Genesis 3 experience.



My first breakthrough came with this hilltop project, where everyone was impressed by my thought of mimicking the contour of the distant shoreline in the sweep of the vanishing edge. The design and materials I selected also fit in perfectly with the styling of the home.



Moreover, Costa Rica's tax laws and laws governing foreign ownership of real estate are designed to attract investors. To be sure, real estate prices have increased in recent years – in some cases dramatically, especially along the coast. But compared to many regions in the United States and Europe, even prime property is comparatively affordable.

The country is roughly the size of West Virginia but has a population of just four million. There's a low infant-mortality rate, and fully 96 percent of the people are literate. The landscape is dominated by tropical rain forest on the Caribbean side and by tropical dry forest on the Pacific, and less than 15 percent of the land is developed. There's tremendous diversity of plant and animal life, and the country is also known for world-class fishing, diving and surfing.

What happens is that Americans or Europeans hear about Costa Rica and come for a visit. When they see the land and interact with the people, the decision



My sense of what I was doing really began to take shape with this water-on-greenery vanishing-edge project, with its sweeping deck, beach entry, large water surface and rocks in and around the water for kids to play on.

to invest and/or move here becomes as much an emotional issue as a financial one. The warm weather, the lavish greenery draped over the hilly and mountainous terrain and the warm, sweeping expanses of coastline give visitors a feeling that they have come upon an undiscovered paradise.

New Ground

Of course, every paradise has its rougher edges. In many areas outside the cities, for example, the infrastructure remains relatively undeveloped: Many roads are unpaved, and modern amenities such as electricity and public water have not reached some remote areas. There is, however, comprehensive cell phone and Internet service throughout much of the country.

In short, it is a place where the immigrant population has been welcomed, has settled in and is now coming to expect the sort of luxuries and comforts to which they've been accustomed back home, wherever those luxuries might happen to be. One result of this process is a dramatic increase in the demand for custom watershapes.

My company is uniquely positioned to recognize and meet this demand. My family's business, Piscinas Acuarium, was the first-ever swimming pool firm in Costa Rica. It started in the early 1970s: I grew up in the business and have been building pools for more than 25 years. Through most of those years, we produced affordable pools that were built for quality but were not particularly distinguished when it came to design.

Although I could see the emerging demand for performance at a higher level, I wasn't quite certain how to approach the market from a new perspective. That was when I heard about the Genesis 3 schools and, in November 2003, attended the Level I and II schools back to back at Morro Bay, Calif.

This exposure to the philosophy and passion of David Tisherman, Brian Van Bower and Skip Phillips opened my eyes to a path to a higher ground. In fact, I returned to Costa Rica fully believing I'd found the answers to questions I had been asking myself throughout my entire career. Just seeing other people actually doing work that I had only been able to *imagine* was an enormous inspiration.

There's no question I was primed for a transition: I had already separated myself from the family firm and opened my own business, Piscinas Roca, in 1995 in the northwestern part



Applying the things I've learned has led me to many interesting projects – including this one, in which the pool was built before construction began on this Frank Lloyd Wright-inspired hilltop home.



Many of the lessons I've learned are simple – about taking advantage of water's reflective qualities, for example, and working with simple shapes that complement and balance an environment instead of dominating it.



of the country. And when I returned from California, I closed my doors and completely rebuilt the firm from the ground up, repositioning it exclusively for high-end, custom work and renaming it Aquart J. Roca Disseny.

It was risky, but once my eyes had been opened to the potential of applying artistic design, quality materials and complex systems, I knew that I could not revert to the way things had been before.

Slow Going

The biggest challenge we faced in our revamped business had to do with raising awareness of what we now had to offer among architects and landscape architects working at the high end. I needed to spread the idea that a whole new level of work was available in the country. I took my lumps for a while, but I knew I was in it for the long haul and stood my ground.

What I had to do was break the traditional way of doing business – a system in which architects were hired to design and manage entire projects, including the pools. What I had to do was make clients see that if they wanted a truly high-end watershape, they needed to work with a specialist.

There was no shortcut. I spent months in networking with architects and landscape architects, and I definitely exploited the fact that I had been in the business for a long time in getting doors opened and having my ideas heard. Before long, I found myself designing some tricky hillside pools on spectacular hillside properties with beautiful custom homes, but it was still *painfully* slow going.

To get the ball rolling more swiftly, I designed and built a pool on my own property as a sort of “showroom” for clients and architects. It was large, with a curved, 70-foot vanishing edge, a small island, natural boulders, a fountain, a beach entry, beautiful stone decking and a pebble finish. I also picked up stone details from the home to demonstrate how watershapes can harmonize with settings.

(One unexpected benefit: The pool overlooks a beautiful valley with distant views of mountains, and I never cease to be amazed at how *constant* a source of inspiration it has become.)

Because the architects with whom I was currying favor were in the habit of developing their own pool designs, I had to walk a fine line by suggesting changes that didn't offend them. I also ran into the common issue that a great many of these architects created watershapes that were not always fully developed.

On one early project, however, I was working with an architect and ultimately met clients who wanted something *truly* spectacular in their backyards – something that fit with a breathtaking ocean view in the distance. I met with them and shared my

thoughts about a vanishing-edge detail that would echo the shoreline of the distant bay.

The clients loved the idea and insisted that the architect go forward with my design instead of his. It was just the break I needed.

Making Headway

One of the key points behind this project was the fact that the architect's original design for the pool didn't completely address the requirements of the hillside setting and could not really have been built as planned.

Given the fact that so many of the Costa Rican properties now being developed sit atop hillsides, my performance with these ambitious clients gave me the credibility I needed to go after and persuade a number of prominent architects in the area that fully maximizing the aesthetic potential of these beautiful properties needed the participation of someone like me who understood how to design for – and build on – challenging terrain.

Slowly but surely, I worked my way into a string of jobs that have in turn led to referrals and numerous opportunities ever since.

As this was happening, I had to confront some business basics: We needed, for example, to work out access to construction materials and find skilled labor, and we also needed to address issues related to working in remote locations. It has taken patience, but we've developed ties to several firms that have helped us in ways both large and small, including Oceanside Glasstile of Carlsbad, Calif.; Jandy of Petaluma, Calif.; and CLI in Orlando, Fla.

I've also undertaken the recruiting and training of a skilled, local workforce, including plumbers, tile setters, electricians and masonry crews. In all of this, I have counted on the emotional and practical support of people I've met through Genesis 3 and know I wouldn't have advanced this far without the education the schools gave me in drawing, art history and design.

At this writing, I'm completing work on the most spectacular pool I've ever designed and built – a big, vanishing-edge vessel with the largest shallow-water lounging area I've ever seen. The pool is integral to the structure of an ultramodern hilltop estate home, drawing energy from a spectacular ocean view as well as the soaring architecture of the home itself.

It's all coming together. In fact, we've come a very long way in a relatively short time, and everyone involved is immensely proud of the projects we've completed in our revamped company.

People have called me a pioneer and have pointed out that I've reshaped the industry in Costa Rica, but that was never my goal. Instead, what I had in mind was to design and build projects that stood up as legitimate works of art – projects that would have stayed only in my imagination had I not encountered visionaries who were actually doing the work in other places.

Yes, it's all coming together.



This is a work in progress and will, when I've finished it, signal to me an end to the current phase of my work and education – and my key to winning future projects that will help me turn my creative and artistic impulses into even more expressive works of art.



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EASYPRO POND PRODUCTS has introduced a new line of submersible mag-drive pumps designed specifically for pond and watergarden use. The competitively priced pumps range in size from 200 to 3200 gph and contain no oil, rotating shafts, shaft seals or bearings.

They also feature long power cords, three-year warranties and free fountain nozzles with pumps from 200 to 1,350 gph. **EasyPro Pond Products**, Grant, MI.

OUTDOOR LIGHTING

Circle 136 on Reader Service Card

LSI ARCHITECTURAL OUTDOOR LIGHTING has published an eight-page brochure on the Greenlee ALV Series of low- and line-voltage lighting systems. The series includes accent lights, direct-burial luminaries, recessed wall-mounted fixtures, surface-mounted wall cylinders, pathway spread lights and sign lights with multiple shield options for maximum design flexibility. **LSI Architectural Outdoor Lighting**, Cincinnati, OH.



CONCRETE PAVERS

Circle 137 on Reader Service Card



WAUSAU TILE has published a catalog on its concrete pavers. The 40-page, full-color booklet covers 14 product lines, including pavers made with recycled glass, cool decking, natural-look decking, pedestal-mounted systems, ADA-compliant products, exposed-aggregate pavers, inscribed commemorative pavers, embossed systems and more, including terrazzo tiles and various accessories. **Wausau Tile**, Wausau, WI.

LOW-PROFILE LANDSCAPE EDGING

Circle 138 on Reader Service Card

OLY-OLA EDGINGS offers three low-profile landscape edging products – Super-Edg, Slim-Edg and Bulldog-Edg – to address a wide range of residential, commercial and specialty landscaping needs. The black-vinyl or polyethylene products are a safe alternative to metal, wood and concrete edgings, with no sharp edges, easy installation, long-lasting quality and overall economy. **Oly-Ola Edgings**, Villa Park, IL.



VERTICAL-SURFACE FINISH

Circle 139 on Reader Service Card



SPECIALTY CONCRETE PRODUCTS offers Fossilcrete Vertical Wall Mix, a specially formulated, lightweight, polymer-modified cement that can be applied up to 3 inches thick to vertical surfaces and stamped within minutes of application. Applied thick like a plaster, the product comes in white or gray, can be colored and bonds readily to plaster, brick, stone or concrete. **Specialty Concrete Products**, Columbia, SC.

LIGHTING VOLTAGE REGULATOR

Circle 140 on Reader Service Card

RSL PROFESSIONAL LANDSCAPE LIGHTING has introduced a tiny (1 by 1 by 1-1/2 inch) device that takes a secondary transformer input voltage (15 volts) and regulates the output to 11.6 volts. The Low Voltage Regulator (LVR) is designed to offer longer, more consistent lamp life and color stability because it allows for no voltage variation between lamps. **RSL Professional Landscape Lighting**, Chatsworth, CA.



POND/STREAM LINERS

Circle 141 on Reader Service Card



FIRESTONE BUILDING PRODUCTS offers PondGard liners for waterfalls, ponds and streams. Made with an EPDM synthetic material that is environmentally safe while offering high elongation, long-term durability, high resistance to UV degradation and reliable weathering resistance at the waterline, the cost-efficient liners install easily and require little maintenance. **Firestone Building Products**, Indianapolis, IN.

ARTIFICIAL ROCK STRUCTURES

Circle 142 on Reader Service Card

COST OF WISCONSIN has acquired more than 300 molds for more than 30 different rock formations and themed ruins and added them to the company's extensive library of molded features. These molds are ready for use in replicating rock, ruins and other features for zoological and theme parks, aquariums, museums, botanical gardens and other facilities and institutions. **COST of Wisconsin**, Orlando, FL.



UNDERWATER LIGHTING

Circle 143 on Reader Service Card



FOCUS LANDSCAPE LIGHTING offers a four-page, full-color brochure on the SL-11, SL-33 and SL-40 series of 12-volt lights for underwater applications. All housings are made of solid cast brass and feature high-impact lenses in five colors (blue, red, green, amber or white), thumb-knob aiming brackets and 15-foot power cords. The brochure includes light-distribution charts. **Focus**

Landscape Lighting, Lake Forest, CA.

PAVERS AND WALLS

Circle 144 on Reader Service Card



BRADSTONE has published a 24-page, full-color catalog on its cast paving, wall and edging materials. Designed to replicate traditional forms in hue, complexity and texture, the high-performance, low-maintenance, high-durability materials come in an array of configurations, including flagstone, rustic brick, ledger and wall block. Log sleepers, steppingstones, edgings and accents are also available. **Bradstone**, Harpers Ferry, WV.

DECK/WALL JETS

Circle 145 on Reader Service Card

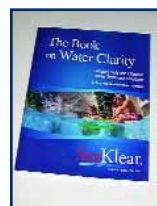


HALLXSTREAMS offers the XFJ20 and XFJ45 series of adjustable floor jets in bronze and brass and the XFJ20P and XFJ45P series as chrome-plated alternatives. All jets can be mounted in decks or walls, while the

XFJ20/20P models can also be installed in the pool below the water's surface to create aerated-stream effects. The brass models will develop a dark-brown patina with green highlights. **HallxStreams**, Fort Lauderdale, FL.

COPPER PATH LIGHTS

Circle 146 on Reader Service Card



VISTA PROFESSIONAL OUTDOOR LIGHTING offers a range of copper path and spread lights for use in garden applications. Available with a range of spun solid-copper shades and heavy-gauge copper posts, the fixtures are brush-finished and will age to a rich, bronze-like color. They also feature top-grade ceramic sockets with nickel contacts and stainless steel springs. **Vista Outdoor Professional Lighting**, Simi Valley, CA.

SELF-CONTAINED WATERFEATURES

Circle 147 on Reader Service Card



REPLICATIONS UNLIMITED has introduced a new line of self-contained waterfeatures. The rock-like textures are created using a patented process that mimics nature by replicating the product line from real rock formations. Each unit comes with pumps and hoses – everything but water – and is made with a composite polymer that offers structural strength as well as durability.

Replications Unlimited, Hazelwood, MO.

MODULAR WATERPLAY FIXTURES

Circle 148 on Reader Service Card



NORTHEAST AQUATIC DESIGN introduces Spray 'n' Play, a modular, stainless steel spray deck. The modules offer safety, ease of assembly and service, design versatility, portability and expandability and can be customized with respect to colors and textures. Perfect for rooftops, raised decks, upper levels of indoor waterparks and more, they are compatible with all spray products. **NorthEast Aquatic Design**, Peabody, MA.

MINIATURE GLASS TILES

Circle 149 on Reader Service Card



OCEANSIDE GLASSTILE introduces Facets, a collection of gem-like miniature glass tiles custom-made in the 38 colors used in the company's Tessera line. The hand-cut mosaics (1/2-inch square and 1/2 by 1 inch) can be combined with larger tiles to create complex patterns and can be used with various materials – glass, porcelain,

stone, slate and ceramic – and borders are available. **Oceanside Glasstile**, Carlsbad, CA.

PEBBLES AND STONES

Circle 150 on Reader Service Card



YARDCO offers a full line of imported beach pebbles, river rock and flat river stones in a wide range of colors – black, brown, white, green, red, gold, mixed and more – and in a full range of sizes. All-natural, hand-selected and hand-graded for quality, size and consistency, the material is ideal for landscape beds, Asian gardens and pathways outdoors and for indoor atriums and waterfeatures. **Yardco**, Boynton Beach, FL.

SALT CHLORINATOR

Circle 151 on Reader Service Card



INTERMATIC introduces the I-Pure Stand Alone Salt Chlorine Generators to take the hassle out of pool and spa care. The device is economical and easy to use and comes in two models – one for pools up to 25,000 gallons, the other for pools up to 40,000 gallons. Both feature corrosion-resistant plastic housings and a control dial that increases or decreases chlorine production with ease. **Intermatic**, Spring Grove, IL.

DEBRIS CANISTER

Circle 152 on Reader Service Card



PARAMOUNT POOL & SPA SYSTEMS offers a debris-containment canister that connects to the suction side of the circulation system between the main drain and the pump. Designed to collect dirt, sand and leaves when they sink to the bottom, the device has a larger capacity than typical pump baskets and features a high-flow, 2-1/2-inch drain port and a color-coordinated deck lid. **Paramount Pool & Spa Systems**, Tempe, AZ.

LIGHT CONTROLLERS

Circle 153 on Reader Service Card



CAST LIGHTING offers lighting control panels in a variety of configurations to accommodate the needs of any project. The Master Series (in 900-, 1,200- and 1,500-watt models), the Journeyman Series (300, 600 and 900 watts) and the Power Pro Series (900 and 1,200 watts) each have taps available with voltages ranging from 12 to 22 volts and can operate with a photocell or a time clock. **CAST Lighting**, Hawthorne, NJ.

PARALLEL GRATE

Circle 154 on Reader Service Card



LAWSON AQUATICS has introduced a revised version of its Quiet-Flow parallel grate. The new units are easy to install, cost less than previous models courtesy of advanced injection-molding technology and capture water quickly and more quietly. The patented system also conforms to any radius in any sort of free-flowing design and comes in six colors: white, gray, bone, sand, tan and black. **Lawson Aquatics**, Naples, FL.

STATUARY/INDOOR FOUNTAIN PUMPS

Circle 155 on Reader Service Card



OASE has introduced the Neptun pump line, which includes five high performance pumps. Designed for compactness and ideally suited for use in statuary fountain systems in gardens, on patio or balconies and even indoors, most can be set up outside the water, below the water level with in-line configurations as needed. The flat-priming units operate quietly and feature stainless steel filter baskets. **OASE**, Corona, CA.

POOL AND SPA PUMP MOTORS

Circle 156 on Reader Service Card



EMERSON MOTOR TECHNOLOGIES offers the EZ48 line of pool and spa motors. The 48-frame, single- and two-speed, 60 Hz, 1.5 compartment, through-units are designed for quick, easy installation and come with ratings from 1/2 to 1-1/2 horsepower, a slot for a standard shaft wrench, single (captive) screw mounting, and a convenient slot for a power cord. **Emerson Motor Technologies**, St. Louis, MO.

STONE MATERIALS

Circle 157 on Reader Service Card



SUTTON BRICK & STONE offers paving and vertical-cladding materials from both domestic and overseas sources. Products include tumbled marble and travertine, cobblestones in both granite and porphyry, clay pavers, Florida and Dominican corals and a wide range of natural building and paving stones as well as retaining-wall systems and specialty aggregates. **Sutton Brick & Stone**, Fort Lauderdale, FL.

HEAT PUMP

Circle 158 on Reader Service Card



PENTAIR WATER POOL & SPA introduces the ThermalFlo HP heat pump, which features digital controls with dual thermostats to control temperature precisely and maintain the desired separate water temperatures in pool/spa combinations without overheating or wasting energy. It also has a self-diagnostic control panel and comes in five models with outputs from 99,000 to 127,000 Btus. **Pentair Water Pool & Spa**, Sanford, NC.

DESIGN SOFTWARE

Circle 159 on Reader Service Card



NEMETSCHEK NORTH AMERICA has released VectorWorks Landmark 12 – updated design software with a variety of new features and product improvements that allow users to work faster and more easily. Significant changes include

Shapefile compatibility, so users can import and export geo-referenced maps and data, along with a huge plant-image library and various 3D features. **Nemetschek North America**, Columbia, MD.

RETAINING WALLS

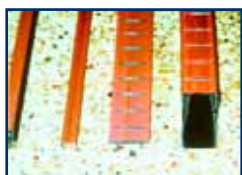
Circle 160 on Reader Service Card

TENSAR EARTH TECHNOLOGIES offers the Mesa Gardener Unit system for retaining walls. Designed for easy installation, the lightweight, long-lasting blocks include recessed hand-holds – no more pinched fingers – and can be used to set walls up to three feet high. Units fit together tightly and are made of a high-compression concrete that resists cracking and insect infestation. **Tensar Earth Technologies**, Atlanta, GA.



WOOD-TONE DECK DETAILS

Circle 161 on Reader Service Card



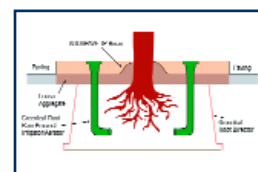
DECK-O-SEAL has introduced Signature Series Redwood to its line of decking products as an alternative to currently available wood and PVC products with a far longer service life. The series includes drains, joints, expansion joint caps and more – all offering

the look of real wood along with exceptional durability; chemical, moisture and heat resistance; and high UV and color stability. **Deck-O-Seal**, Hampshire, IL.

TREE-PIT SYSTEM

Circle 162 on Reader Service Card

CHAMELEON WAYS has introduced the Addapave TP Paving System. Designed to provide a long-lasting, appealing tree-pit solution, the system replaces mulch, paver blocks, and steel grate systems with natural aggregates in an array of colors and a clear binder that offers a seamless, natural, colorful, porous surface that is both functional and decorative while providing room for trunk growth. **Chameleon Ways**, Center Valley, PA.



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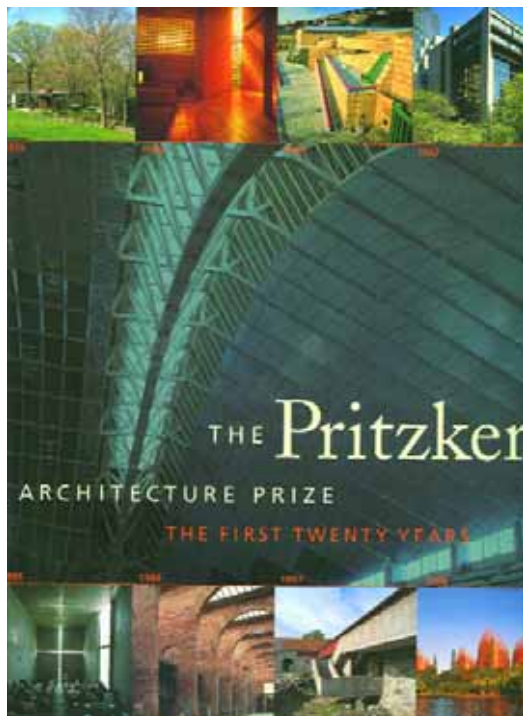
WATER SHAPES

Need More Information?

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By Mike Farley

Grand Prizes



Awards, prizes and accolades can serve as a great way to learn about the top professionals in any given field.

As a case in point, I recently picked up a copy of *The Pritzker Architectural Prize* (Harry Abrams, 1999), a beautifully illustrated 200-plus-page tribute to the first 20 winners of this prestigious annual award, which is given to recognize lifetimes of achievement.

Established in 1974 by Pritzker family (founders of the Hyatt chain of hotels), the stated goal of the prize program is to increase awareness of reigning architectural geniuses. Most of the prize recipients are still alive and working, and the list of winners includes some of the most extraordinary designers of the second half of the 20th Century, including Philip Johnson, Luis Barragan, I.M. Pei and Tadao Ando, to name a few.

Some I had heard of before, but several were new to me. In all cases, this anthology of design excellence examines bodies of work in detail, revealing wide ranges of styles and project types. In most cases, the recipients have worked on both large-scale commercial projects and residential designs. There's a distinct bias toward modernism, which isn't too surprising given

the contemporary focus of the program.

One of the things I found most intriguing is that the judging for the award takes place entirely on site and in person. As explained in the text, there are so many aspects of quality architectural designs that cannot be judged by photography that it would be impossible to create a meaningful program based solely on pictures. This in-person examination means that factors such as integration of structures with settings, relationships to views and myriad design details can be fully appreciated and judged directly.

As I read through the insightful text and perused its generous collection of images, I couldn't help thinking how much more relevant awards in the watershaping industry would be if similarly rigorous judging criteria were somehow applied. As it is, awards in both the pool and spa industry and in the landscape architecture profession are based entirely on photographs (and plans in some cases). Without serious reform, our awards will never rise to the level of prestige carried by Pritzker Prizes – a severe limiting factor when it comes to raising the overall stature of our industry.

This book offers a wonderful set of architectural references, underscoring the influence these great designers have had on generations of architects. For my part, I've found it a useful starting place for deeper exploration of the works of several of the featured architects. When I think how much I've already gained, for example, from studying the works of Luis Barragan (the architect with whom I was most familiar before reading this book), I'm eager to become more familiar with others among the stellar talents highlighted in this terrific compendium. **WS**

Mike Farley is a landscape architect with more than 20 years of experience and is currently a designer/project manager for Gohlke Pools in Denton, 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.

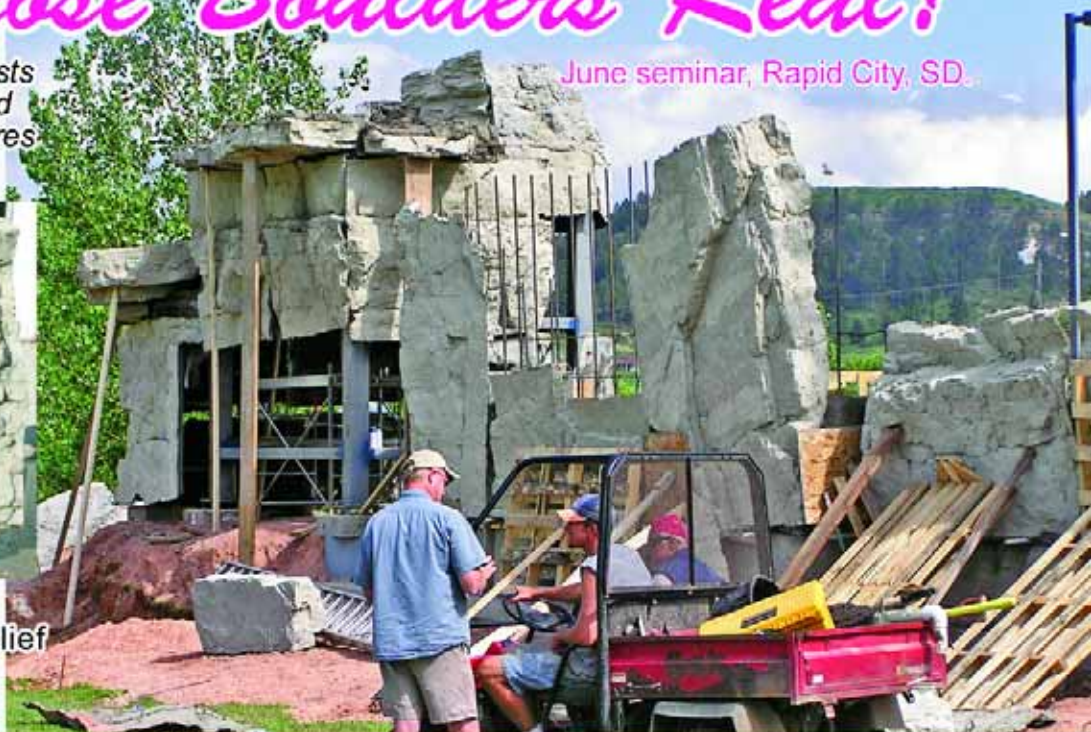
Are Those Boulders Real?

FRC castings for Rock Artists
who have a passion to build
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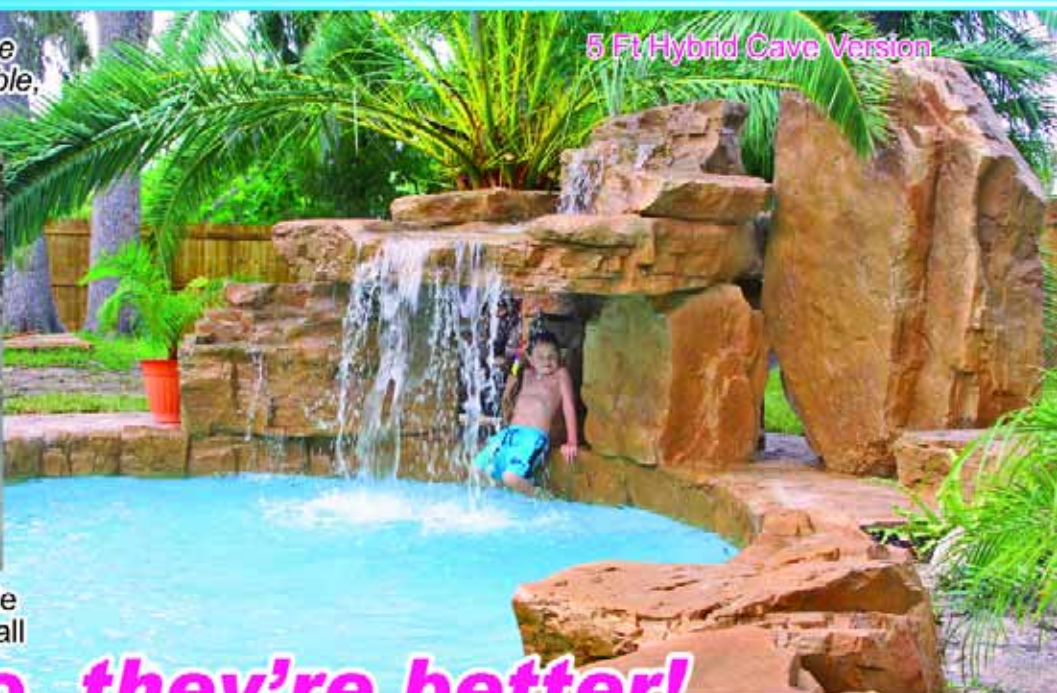
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Trade Show Update

Be sure and stop by and see us at the following trade shows.

ASPA, Pool and Spa Expo, Orlando, FL, Nov 1-3, 2005 Booth# 1615

Aqua Pool Show, Las Vegas, NV, Nov 16-18 Booth# 327

World of Concrete, Las Vegas, NV, Jan 17-20, 2006 Booth# C8255



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