

Inside: Brian Van Bower on Designing to Scale

WATER SHAPES

Design • Engineering • Construction

Volume 5
Number 9
September 2003
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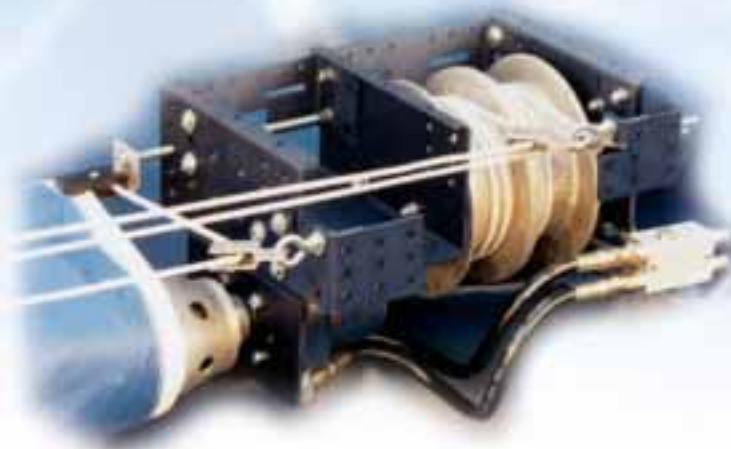
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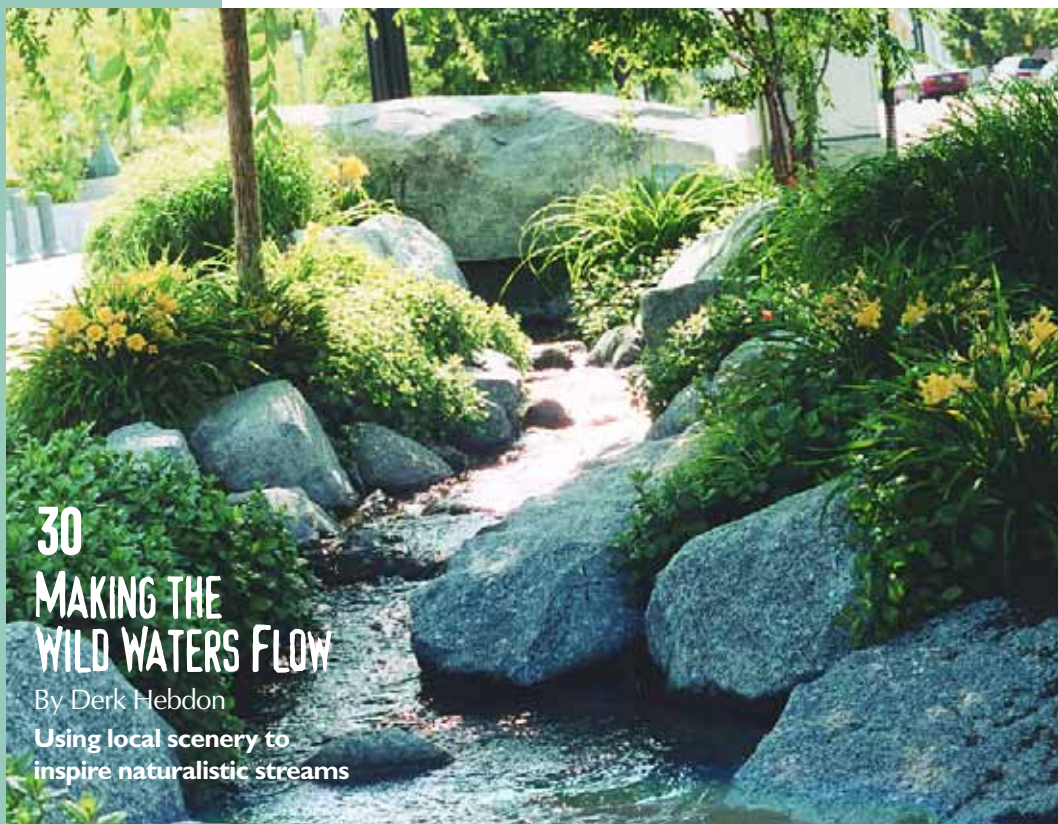
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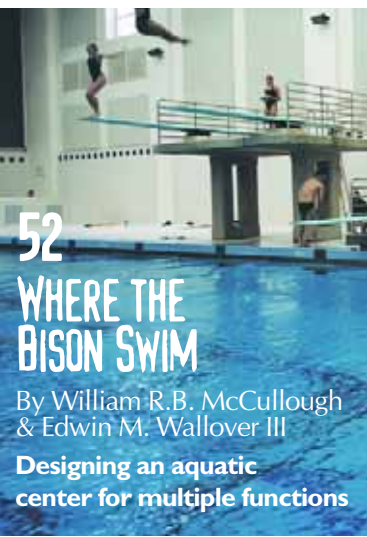
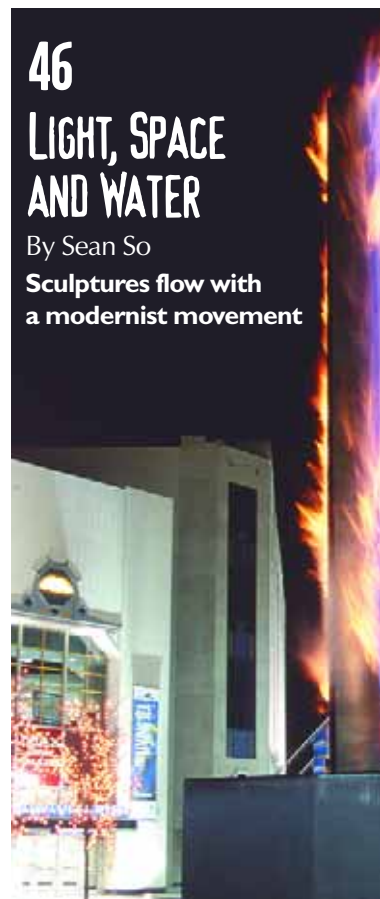


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Photo courtesy Omega Pool Structures, Toms River, N.J.

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

POSTMASTER: Send address changes to *WaterShapes*, P.O. Box 1216, Lowell, MA 01853-9930.

Periodicals postage rates paid at Woodland Hills, CA 91365 and additional mailing offices.

Almost *Too Easy*

It's a wonderful coincidence and a rare opportunity: From October 30 through November 3, the American Society of Landscape Architects will hold its 2003 meeting and exposition in New Orleans, followed the next day – in the very same city and in the very same convention center – by the International Spa & Pool Exposition, which will run from November 4 to November 7.

Although neither organization had anything to do with the other's plans for their big annual events this year, this confluence of expositions in the Big Easy presents a unique opportunity for people on all sides of the watershaping trades. I, for one, think it'd be great for people from both crowds to partake of this rare and remarkably convenient opportunity to rub elbows with each other and check out gatherings that seem miles apart despite serving many of the same people and business interests.

Ever since *WaterShapes* was launched five years ago, we've pushed the idea that people in the landscape professions and people who design and build pools and spas share many common interests so far as the practices, techniques and technologies of shaping water are concerned. And it bears repeating: Many pool designers and builders want to expand their reach beyond the water's edge as a means of enhancing the value of their work; conversely, a great many landscape architects, designers and contractors have been turning to watershapes of all sorts to add interest, fun and beauty to *their* work. Two missions, same inclusive goal.

Although the two sectors are quite different, the interests they share seem self-evident. Still, as often as that idea has been trumpeted in these pages and elsewhere in recent years, it never ceases to amaze me how the existence of common ground so often comes as a surprise to people on both sides of the watershaping scene.

To be sure, it's been gratifying to watch two well-defined industries break down some barriers and begin, at times with difficulty, to communicate with each other. Now, with the industries' two biggest shows happening in the same place at nearly the same time, I'd suggest it's the perfect opportunity for those of you who are so inclined to see what goes on in the magazine's other hemisphere all for yourself.

I've been to both shows many times, and I'd willing to bet a round of Hurricanes that lots of folks from the pool and spa industry would be fascinated by the array of water- and landscape-related products on display at the ASLA show – a ton of stuff you simply won't see at any of the swimming pool shows. At the same time, and despite the fact that the pool/spa expo has largely become a show for retailers, it would seem an equally splendid opportunity for landscape professionals to be surprised at the breadth of watershaping products awaiting them at the pool/spa expo.

Personally, I place a high value on cross-communication and think it's always a good idea for professionals to seek out new and unusual venues in which they can find new ideas and information. For that reason, I've done all I can through the years to persuade professionals on both sides of the divide to attend *both* shows, if only to let them see how the other half lives and compare what's available.

The 2003 event calendar lends that advice an economy of motion that should enable more of you to give both conventions a look. If this doesn't work out, I can only urge you to seek out other opportunities to cross over the line and see what's waiting on the other side.



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Derk Hebdon is owner and president of Salt Lake City-based Bratt Water Features, a spin-off of Bratt, Inc., Utah's largest landscape design and construction firm. A 1991 graduate of Arizona State University, Hebdon started in the landscaping design/construction trades in 1992, when he purchased a landscape maintenance and construction firm in Tampa, Fla. In 1995, he moved into the design and construction of ponds and streams – which quickly became a primary focus for the company. He sold that business in 1999 before moving to Utah to become manager for Bratt's waterfeatures division. That business

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Kevin Ruddy is president of Omega Pool Structures, a Toms River, N.J.-based firm that specializes in the design, engineering and construction of indoor swimming pools. Ruddy's career in watershaping began 18 years ago, after he spent some time in the home-building industry and decided to apply what he'd

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learned to building entire backyard spaces that included pools, spas, landscaping and associated structures. Before long, he saw the need in his area for a company focused on the indoor-pool market and established Omega Pool Structures in 1987. The company now works on indoor pools nationwide and established a pool-construction division in 1993 so it could build many of the pools it designs. Ruddy is an active member of both the National Spa & Pool Institute and the National Homebuilders Association.

Sean So is principal designer and artist for Orr Studio in Venice, Calif. Born in Korea, he moved to the United States in 1980 and studied art and product design at California State University, Northridge. He began working with the studio's founder, Eric Orr, while still in college, soon became Orr's primary collaborator and protégé and has carried on his mentor's work in creating iconic and enduring fountains and sculptures that use minimal and innovative flows of water along with dramatic media such as light, fire and fog. Orr passed away in 1998, at which time So took up the studio's work at the request of Orr's family.

William R.B. McCullough, AIA, is a sports architect for Ewing Cole Cherry Brott, an architecture and engineering firm based in Philadelphia with offices in Cleveland, Los Angeles and Washington, D.C. McCullough joined the firm, of which he is now a principal, in 1997, and serves as a project design architect who specializes in meeting the unique needs of collegiate athletic facilities. His skills include facility planning and programming with an understanding of the technical implications of seating and sight-line design as well as the coordination of specialized equipment for athletics. **Edwin M. Wallover III, AIA**, is president of Wallover Architects, an architecture and engineering firm in Lancaster, Pa. He directs the development of athletic and aquatic projects, including their programming, planning and design standards. Wallover has 27 years of experience in a variety of projects for residential, commercial and municipal clients and is often involved in the development of project programs, functional planning concepts and alternative design strategies.

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Proportional Response

One of the real tricks in any art form can be the challenge of exercising restraint. Bigger isn't always better, and both scale and size do matter. In other words, just because you *can* create something grand, it doesn't always mean that you *should*.

This principle of proportionality has a sharp, specific meaning in the world of the custom watershaper, especially when clients ask for something that is oversized for the property or more elaborate than called for by the setting or surrounding architecture. We all know where it comes from: Clients have seen something they like, and it drives them to ask for features or an overall project scope that is simply too much for the available space.

And we have a natural tendency to go along: After all, we're in business to please our clients, and we also have an urge as businesspeople to include lots of features that will make us money and give us a chance to demonstrate our ability to create sophisticated projects. Often, the result is that a client ends up with something that is out of whack, out of balance and out of scale for the setting and even for its intended use.

GROWING INTEREST

In large measure, this problematic tendency toward grandeur is the result of some otherwise positive trends.

A great many clients these days, for example, are collecting a tremendous amount of information about design possibilities and features from an in-

creasing number of publications and resources about everything from pools and spas to streams, ponds and fountains. And with the advent of design-oriented shows on cable television – specifically on HGTV but even the Travel Channel – prospects are seeing more and more beautiful watershapes put on display and discussed in detail.

In many instances, these publications or broadcasts feature extremely high-end work, quite often situated on extremely large properties. Clients may get excited by what they see (and rightfully so), but they fail to consider that their *own* space is a fraction the size of what they're seeing.

We know that client desires are built up over time and that, by the time clients are ready to take steps into the world of watershaping, they often come to the process with large sets of ideas. That's great and helpful – but less so when their dreams don't align with the space they have at their disposal. More and more, I for one am finding this to be an issue.

When you stop and think about the list of elements and embellishments so common to projects these days, it's easy to see how things can very quickly go over the top in terms of scope and scale. Things that were rare even ten years ago are in everyone's minds these days, and we can expect clients to inquire about every conceivable permutation and combination of beach entries, waterfalls, grottos, slides, lounging areas, streams, bars with submerged barstools, bridges, islands, all manner of rockwork, various edge treatments, tile mosaics, overhead structures, decks, cooking and entertainment areas, lazy rivers, sculpture areas, fire effects and even fish tanks.

These are all wonderful ideas in the right context, but I believe we need to ask our clients and, ultimately, ourselves: Do they work in the space we're being given?

I've seen many projects where it looks as though the client ran through a laundry list of wants and the design/build team gave it to them with little or no thought to proportion or to how all of these various elements would work together visually or even functionally. At some point, the fact is that those who are serious about performing at a higher level, particularly in design, must learn the gentle, subtle art of restraint.

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LESS CAN BE MORE

Restraint begins with the obvious point that you have to be able to fit a project into a given space while leaving room for landscaping, decks and areas where people can comfortably move around the watershape.

One of my Bermuda projects, just completed, has a pool measuring 75 by 45 feet. That's truly a large body of water in a residential setting, but considering that the pool graces a 12-acre estate, it doesn't seem large at all. The house is three stories high, and there are five other houses on the same one-family compound. The pool may be enormous, but it's in a grand setting and would look out of place were it much smaller.

By contrast, another of my projects was placed into a yard so small that it's a comparatively tiny 18 by 10 feet. In this cramped space, everything had to be thought out precisely with respect to spatial relations, beginning with the basic parameters for a pool that had to be small to exist.



When space allows, a pool as large as this one – quite expansive for a residential watershape at 75 by 45 feet – can fit comfortably and gracefully within the scale and dimensions of an out-sized backyard.



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The small yard, of course, didn't alter that fact that these clients were no different from the owners of the behemoth property in their desire for something special. So we worked to enhance the small pool, using rich materials and top-flight detailing to draw attention and demonstrate that what the vessel lacked in size, it more than made up in visual interest and appeal.

On that point, I've always held that small projects afford the designer an opportunity to "turn up the volume" by using higher-quality materials to outstanding effect. First of all, the costs associated with using expensive materials are tamed by the small space. In addition, observers will be viewing and absorbing the work from what is necessarily an up-close perspective.

By using quality tile, natural stonework or other materials, you can keep things simple and allow beautiful colors, textures and reflections to come forward. This is why, in smaller spaces, I often try to nudge clients toward designs that include fewer and simpler visual elements. In the small yard discussed just above, we were also careful to blend the watershape's design into the architecture of the home so that it was congruent with everything around it – in shape, style and basic design as well as materials.

MAXIMIZING POTENTIAL

When confronted by the small spaces that are increasingly common in today's urban and suburban neighborhoods, I often begin by focusing on areas that will *not* contain the watershape.

I work with local codes and determine things such as clearances and setbacks from property lines, but it's also a matter of applying some common sense or thinking in terms of functionality. Although in most situations that means locating the watershape someplace other than the middle of the yard, it doesn't always mean pushing the water as far from the house as possible. In fact, I've found in small spaces that you can use relative intimacy with the water to your design advantage.

I'm currently working on a project in Boca Raton, Fla., for example, where the distance between an existing covered patio and the rear property line is just 24

feet. In this case, making things work has meant bringing the pool in close to the covered area – and even placing a portion of the pool's steps beneath the existing patio cover.

In addition, we're going to bring dual functionality to this covered area by incorporating a fountain and creating a focal point that can be seen and enjoyed

from inside the house. Rather than exile the pool, we've integrated the space and tied everything comfortably together.

Without bringing the pool so close, we would've been limited to about 12 feet of pool width. As it is, we're working instead with 18 feet of width. And we've used the extra span to maximize the potential view across the water, both from the deck and

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from inside the house.

In this situation, in other words, we chose to increase the visual significance of the watershape rather than minimize it by pushing the water away from the house. We're also making simple (yet rich) material selections to blend with the shade structure, which features a beautiful, honed-limestone decking inlaid with diagonal brick borders.

Another step we're taking involves the landscape lighting: Adjacent to the home is a large church property containing a huge oak tree that looms over my clients' yard. We're going to "adopt" the tree by uplighting it and drawing it into our space, leading the eye above and beyond the dark perimeter hedges at night.

JUST SAY 'NO'

Implied within all of this discussion is a key point: If you're going to design great spaces for your clients, you need to learn to say "no" in certain situations. It's empowering when you gain the courage of



When the available space is small, you need to rein in proportions, details and ornaments, consider your design in more intimate terms and keep the watershape from overwhelming its setting.

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your design convictions, and I've found that clients who are interested in finding the very best ideas for the space they have available will respect a strong opinion – even if it's negative – so long as your position is reasoned and you can communicate exactly what you mean.

Staying with the Boca Raton project as an example: The homeowners initially wanted raised patios on either side of the pool, the thought being that changes in elevation would lend variety and visual interest to the small space. They also wanted to create a step down from the patio into a narrow area around the pool.

To my eye, these elevation changes would have broken up the space in a way that would make things feel cramped and claustrophobic, so I urged them to keep everything on the same level and thereby impose a sense of visual continuity and spaciousness even within the small yard. If we split the level between the patio and the area immediately around the pool, I told them, both spaces would be compromised.

After some discussion, my clients came to appreciate the idea of keeping things simple and heeded my advice – testimony to the value of open communication and to the fact that they respected my need to tell them what I thought.

Another example: New clients have an existing (and truly horrible-looking) pool that they rightfully want to replace. They have lots of ideas and see a lush, naturalistic, lagoon-style pool as the perfect complement to verdant landscaping and their backyard aviary. The yard is big enough to support the basic game plan and to accommodate a solid-overhead shade structure they want to use in setting up an exterior room.

It was all a “go” until they shared with me the thought that they also wanted the pool to feature a deck-level, perimeter-overflow system, at which point I told them I didn't think it was a good idea. First, there was the formal appearance of the slotted deck in the context of the naturalistic style. Second, there would be a requirement for additional decking to capture the splash out. This conflicted with the desire to include more tropical landscaping elements, not fewer.

I shared my views: Although I think perimeter overflows are great and I have designed and built many through the years, deck-level systems offer a sleek look that's simply inconsistent with a lagoon-style pool. And I felt good about saying “no” in this case because it was better for the clients and their project.

Continued on page 16

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A QUESTION OF BALANCE

There's a wonderful feeling that comes when you stand by your convictions in this way. As watershape designers, we generally know more about watershaping than do our clients. When we can use our senses of proportionality, scale and context and stand our ground when our clients' desires

conflict with what we know is best for the project, the results can be positive on many, many levels.

At first blush, what I'm saying here might seem to fly in the face of the notion that, as watershapers, we should do everything we can to make our clients happy. Quite the contrary. In fact, I'd argue that adherence to principles of

proportion and scale – and learning to say “no” as the situation requires – are completely harmonious with the idea of healthy client relations.

I'm not imperious in what I do. Indeed, my clients with smaller projects are exposed to the same full menu of options I offer clients on large-scale projects based on the simple notion that our mission is to land on the right set of options. Clients with smaller properties tend to see their limitations pretty quickly, and it's a simple process of guiding them along the best available paths. In that sense, scale and proportionality are not purely spatial issues, but stylistic and functional ones as well.

And once you nurture and internalize your own senses of proportionality and scale, you'll find they reach into every layer of the design process – not just the initial ones having to do with where you place a watershape and how large it should be, but also those having to do with relative sizes of features within a design as well.

A common mistake, for example, has to do with oversizing a spa in relation to an accompanying pool – or oversizing waterfalls or spillways or other waterfeatures that are either too large or too vigorous or too noisy for the main body of water. I've also seen cases where color selections throw things out of whack.

To be sure, beauty is in the eye of the beholder, and if a client insists on building out a small backyard with a pool that covers three-quarters of the available space with water, then that ultimately is their choice.

How far you're willing to go along with them is a decision only you can make. Speaking for myself, I rest easy knowing that the design principles and practices I use tend to suit the needs of the space, all while satisfying my clients' desire for something truly special. **VS**

Brian Van Bower runs Aquatic Consultants and is a partner in Van Bower & Wiren, a pool-construction firm in Miami. He is also a co-founder of Genesis 3, A 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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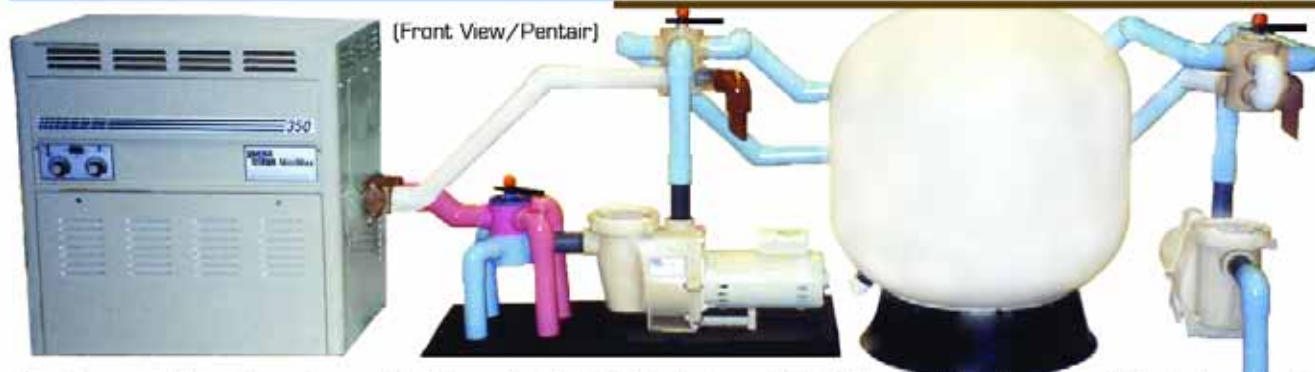
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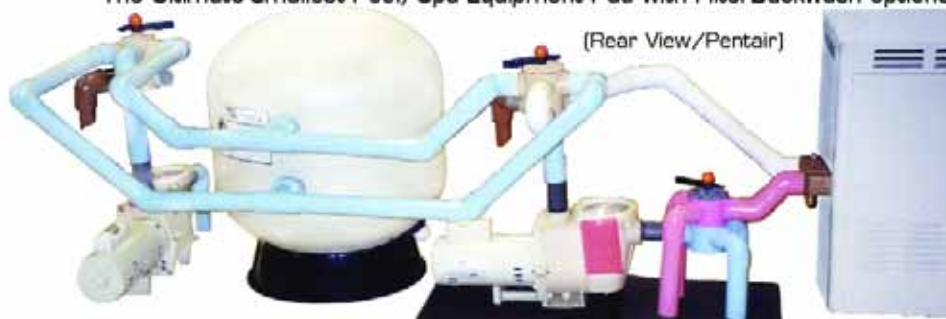
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(mounted on the
Filter Pump riser
Discharge Pipe).
Facing rearward.
Filter Pump *behind*
and perpendicular
to front of Pad.
Sand Tan=====
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Warm Brown=====
Dirty Water
Pure White=====
Filtered Water

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Going Grey

Nobody seems particularly thrilled by environments devoid of light. Even at times when a lack of light is welcomed – as in the desert when you want to see the stars, or on a holiday night when you want to see a fireworks display – the events are related to light in some important way.

The same attitude about light comes up when we speak of landscapes. We're always talking about "brightening up" a dark corner, for example, or "adding light" at one point or another. Whether the absence of light makes us uncomfortable or its presence is simply a design convention, we seem to have a need to incorporate light in what we do in one form or another.

I bring this up because several of my recent columns have discussed ways to bring light into or brighten up an otherwise shady or dark area of a garden. So far, however, I've yet to mention a brightening role for plants with grey foliage, largely because I have been focused on ways to bring light touches to shady areas and grey-leafed foliage tends instead to be sun loving.

Now we'll step into the sun, talk about a number of the lighter-leafed plants we can use and explore the special opportunities they offer watershapers to pick up grey or silver tones from tile or other hardscape features and further integrate a watershape with its landscaping.

USED AS A HIGHLIGHT, GREY FOLIAGE ADDS LIGHT, BLENDS IN WELL WITH OTHER PLANTS AND DRAWS ATTENTION TO AN AREA WITHOUT OVERWHELMING THE SENSES.

WAYS TO USE GREY

Of all the gardens I've designed during the past 15 years, I recall less than a handful in which I didn't use some grey- or silver-foliage plants. They add a variation to the design without being "in your face" in the way a yellow-leafed or flowering plant might be.

Grey tends to be a "warmer" color by comparison to yellow, which is generally considered to be "hot" – that is, a color that really stands out in a landscape. Yellow used sparingly can be soothing, but if you use enough of it, it predominates. Grey doesn't stand out the way "hot" colors do.

Used as a highlight, grey foliage adds light, blends in well with other plants and draws attention to an area without overwhelming the senses. Grey-leafed plants are therefore good, considerate and caring neighbors to other plants. This effect is, of course, rooted in color theory and the ways our minds balance colors.

It's why using *Stachys byzantina* (Lamb's Ear), for example, next to *Heuchera* 'Palace Purple' (Purple-Leafed Coral Bells) will draw attention to that area of a design without causing either plant to be the focal point. By itself, the *Heuchera* might get lost, but when set off by the Lamb's Ear, there's much less of a chance it'll either get lost among dark-leafed plants or blend in with the soil.

I particularly appreciate the way grey- or silver-leafed plants can be used to add a sense of depth and dimension to a design. Too much green can flatten a landscape's appearance. Bronze- or burgundy-leafed plants added to that design will recede into a newly defined background, while grey foliage will step slightly toward the foreground.

Working with a sense of depth within a design creates a lot more interest and dimension than would be created even by varying such elements as texture or plant size. Basically, what we are doing is creating a highly effective optical illusion.

Also, I prefer placing grey-foliage plants next to plants of other foliage colors (such as green, blue or burgundy) rather than next to other grey plants. A grouping of grey plants can give a *very* flat appearance – even more so than a completely green palette. I do, however, favor massing the same

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NATURAL COMPANIONS

grey plant in a design, using, for example, five one-gallon Lamb's Ears in a spot surrounded by green or other colored foliage.

TAKING A LOOK

Grey foliage plants come in all shapes and sizes. The ones I've included are predominantly perennials – and are those with which I've had the most success.

► **Achillea (Yarrow).** There are many varieties of this hardy perennial. Aside from the addition of its grey foliage to a design, the advantage of this plant is that it comes with flowers of many different colors. You have lots of choices and can tailor flower color to the situation: I've used everything from the whites and yellows through to the reds.

► **Artemisia.** These come in many shapes and sizes. The most common look, however, is grey foliage with a few insignificant flowers (if any at all) – at least that's been true in my experience. If you're



looking to add grey without the interference of flowers, this is your plant.



► **Cerastium tomentosum (Snow-in-Summer).** I love this ground cover. Among the many purposes it serves, it makes a great, tiny cut flower for small arrangements or accents. At less than nine inches in height, it stays quite low and spreads beautifully

over walls, slopes and hanging baskets. Cerastium prefers hot temperatures and full sun, but it can be adapted to partial shade if it stays hot enough.

► **Convolvulus cneorum.** This is a simple, mounding, elongated-leaf shrub that can grow to four feet, but which I've usually seen between one and two feet because they tend to look better when cut back (they tend to get rangy if not pruned annually). Its white, morning-glory-like flowers of about one or two inches across add a little more light to its effect, and it looks great when placed toward the front of a border among green- or burgundy-leaved plants. It also looks great next to plants with blue foliage, as do many of these other grey-foliage selections.

► **Echeveria.** This large category of succulents is great in xeriscapes or dry-climate designs. Placed among rock gardens or surrounded by pebbles, it stands out perfectly as a specimen or when massed.



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► **Eucalyptus.** Most people in the water-shaping business would have a tendency to run from these trees, which can be murder on white plaster if a leaf settles undisturbed on the bottom for any length of time and leaves a permanent stain. (I can still hear my mother swearing at the Eucalyptus trees in our neighbor's backyard and the pain they made of maintaining our pool.) These trees create a statuesque, weeping backdrop for many design styles, are great as wind-breaks and, in a large setting, look spectacular in groupings. They also come in many varieties, large and small. But if you go this way near a swimming pool, think either a dark interior finish or a supercharged cleaning system!

► **Helichrysum petiolare (Licorice Plant).** This is another great addition to the middle of any border. It's a medium-size perennial that looks best if pruned back annually to remove deadwood. It can grow to three or four feet in height and width and definitely stands out more than the average grey-foliage plant. I use it in settings where I want to add more dimension.



▲ **Lavender.** I can't say enough about this genus, which is probably my favorite in the plant kingdom. The lavender fields of Provence are among the most spectacular sights I've been privileged to view: Seeing those fields of grey foliage blanketed by purple flowers and backed up by a vast field of yellow sunflowers is something you have to see to believe. (I use so many different varieties of lavender in my designs that I'll treat them all together in my next column; suffice it for now to say that they are varied, versatile and can be used in many different ways.)

► **Leucophyllum frutescens (Texas Ranger).** This is a plant I've recently begun using more often. It takes the heat

quite well and works perfectly in the background as a large filler shrub. It's also great at lightening up the darkness created by use of too many darker filler shrubs at the back of a border, particularly in full-sun situations.

► **Lychnis coronaria (Rose Campion).** I planted this beautiful perennial in my

own garden only to find that I needed to pay more attention to it in a hurry. It self-sows, dropping seeds every season to create new plants, and it can become a garden pest. But it works well in a large area that needs to be well covered by a natural or wild planting, and its magenta flowers, though small, are quite beautiful. Just plant it sparingly and advise your

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NATURAL COMPANIONS



clients to stay ahead of it – unless they want it to take over, that is.

► **Santolina chamaecyparissus (Lavender Cotton)**. I haven't used this quite as much recently, but find that it works well when you need something to lighten up the middle of a border. It's a low, spreading shrub that tends to get woody if not pruned annually, but puts on a grand display of small, button-like yellow flowers throughout the season. Its foliage also has a pleasant aroma when brushed or pinched.



▲ **Stachys byzantina (Lamb's Ear)**. I love this plant and use it in many of my designs. Kids and adults all love its soft, fuzzy leaves as well as the softness it adds to the front of any border. It can be used in a variety of designs from contemporary to cottage and is easily kept in check by pulling out dead leaves by hand.

Next: Much more on Lavender and the best ways to use it in conjunction with any watershape or a good leg of lamb. **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. If you have a specific question about landscaping (or simply want to exchange ideas), e-mail her at sroseld@earthlink.net. She also can be seen this season in six new episodes of "The Surprise Gardener," airing Tuesday evenings on HGTV.

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Core Conditions

If the art of watershaping is ultimately about visuals, then creating a situation for yourself in which you're virtually guaranteed to create visual disruptions is something you certainly do not want to do.

That's the situation I currently face in the renovation of a pool at a stunning, 1920s-vintage home in the heart of Los Angeles. As I indicated in my last column, it's a remarkably beautiful setting that features a 70-year-old pool that was well designed, expertly installed, well worth keeping – and surrounded by a gorgeous, imported-limestone deck.

Trouble is, when you slice up a finely placed stone deck for the sake of renovating the swimming pool within it (or any other architectural element, for that matter), you can never, ever return that deck to its pristine condition. Even if you exercise *extreme* care in cutting and lifting it, when it goes back down there are going to be all sorts of subtle differences – in grout, in the matching of grain patterns, in color and patina, in minute differences in level and more.

And the stakes here are high: The house was designed by the famous architect William Dodd, and Lloyd Wright (Frank Lloyd Wright's son) worked with Dodd on the project and gardens. It's a joy to spend time in an environment that has seen meticulous care for so long and a delight to work with clients who are so well informed and knowledgeable – and it was immediately ap-

IT'S A JOY TO SPEND TIME IN AN ENVIRONMENT THAT HAS SEEN METICULOUS CARE FOR SO LONG AND A DELIGHT TO WORK WITH CLIENTS WHO ARE SO WELL INFORMED AND KNOWLEDGEABLE.

parent that messing up the deck was no option at all.

BASIC DECISIONS

As suggested last time, the presence of the deck led us to develop an overall game plan that will have us renovate the pool from the inside out. We're now moving along in that process, and we've already run into some surprises.

The first had nothing to do with the pool itself, but rather with a substantial adjustment the owners wanted to make to the size of the spa we'd designed and had already framed within one of the soft, offset radiuses in the pool's shallow end.

The original idea had been to add a large spa with an inside diameter of eight feet and an outside diameter of ten feet. Even though we had discussed the spa's size many times in great detail, had laid it all out in the pool using tape and discussed it once again just before we began construction of the forms, once the forms were complete I received a call saying, "It looks too big."

So we reopened the discussion and broke it down to considering who was really going to be using the spa. Originally, they'd kept coming back to the idea of their kids and their kids' friends and thinking that a big spa that could hold eight or nine people made the most sense.

As we tossed things back and forth once again, they came to realize that, in fact, they only occasionally had many people over and that most of their entertaining involved groups of four to six people. Breaking it down further, they began to

see that the spa would most consistently be used by just two people at a time – the homeowners themselves or their kids.

So we reduced the circular spa, which now will measure eight feet on the outside and six feet on the inside. It's still in the same location and still has the same perfectly circular shape, but it's smaller. We *did* have to rip out the forms and start over, and while it was inconvenient and costly to tear down the solid two-by-four forms I use, we're all happy the decision was made now rather than later in the process.

Ultimately, the advantage of working with such involved customers is that they are doing everything they can to think about what they're doing and getting exactly what they want. As it turned out in this situation, it wasn't until they could actually "see" the spa in context that they understood how they felt about it.

BUILT TO LAST

I'm certain there will be other adjustments as we go along, and what's hap-



Once my clients saw the initial framework for their spa, they decided it was too large, reconsidered what they were after and asked me to set up a smaller vessel.

A Zeobrite advertisement. The top half features a woman swimming underwater, smiling. The text "make your pool EASY ON THE EYES with Zeobrite" is overlaid. Below this, a list of benefits is provided. On the right, a bag of Zeobrite Zeolite Filter Media is shown. The bottom section contains contact information for Zeotech Corporation.

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pened so far with just the spa confirms my observation that, to a large extent, high-end renovation work is a matter of expecting the unexpected. That was certainly the case with the swimming pool as well.

Work on the pool began, as do many rehabilitation projects, with stripping the plaster. The walls had been finished with two coats of plaster at different times, and both had obviously been applied by plasterers who knew what they were doing. The surface was rock hard, and stripping it took a lot of time.

With the plaster apparently in such great shape, could we have taken the easy way out and not bothered stripping it back to concrete? Maybe so, but there's no assurance that everything beneath a pristine surface is completely up to snuff, and it's never been my way to take chances with such things.

In this case, we'll be installing a beautiful, custom glass tile mosaic as the finish, and I can't see compromising a work of art



The cores were cut all around the pool to allow for complete replumbing and rewiring – 15 holes in all, each through 16 inches of old, superhard concrete.

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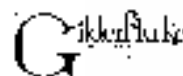
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by placing it over a questionable substrate. So we took off all the plaster we could, cleared away the tile, scored the surface to ensure a good mechanical bond with the new finish and then properly and completely cleaned the stripped shell.

While all of this was going on, I spent my time figuring out how to replumb the pool, set up the spa system and place the equipment.

Given the need to work everything from inside the pool – new lights, new controls, new suction and returns and everything associated with making the system work – we faced no small challenge. I'll get into detail on the approach we settled on next time, but to preview, we'll be setting up three sub-grade equipment vaults adjacent to the pool, use a new bench that will run the length of the pool to carry some of the key lines and take advantage of the fact that we'll be raising the floor of the ultra-deep pool by a foot to accommodate some new plumbing runs.

Before we get there, however, let's first discuss core drilling, the process of cutting holes in the shell in several key locations – and what we found when the dust settled.

PUNCHING THROUGH

Core drilling is one of those things where, no matter how well you plan, there's really no telling what you'll find. We didn't know if we were going to get through the wall and hit old plumbing, electrical lines, sub-grade rocks or foundations of some kind. We didn't really even know the thickness of the pool's walls.

In all, we needed to drill 15 eight-inch-diameter cores to accommodate all of the anticipated plumbing runs. Steve Skaggs of Skaggs Concrete Coring in Santa Clarita, Calif., did the heavy lifting here. I've worked with Steve and his dad, Phil, from the very beginning of my career as a watershaper, and they're the only people I'll use for concrete cutting in southern California. Not only do they do incredible work, but they're more than willing to jump into the unknown.

We laid out the cores' positions and

Steve went to work. We were lucky in one sense: We cut through the walls without running into anything unexpected. But getting to that point was another matter altogether: The walls turned out to be a full 16 inches thick. To be sure, 16 inches of today's gunite would be challenging enough, but this was 16 inches of poured-in-place con-

crete that had been getting harder and harder since 1931.

Let's just say the cores didn't pop the way most do: It took hours per core – three days in all to cut the 15 holes.

When he examined the shell, Steve guessed that it started out at about 5,000 psi and was now much harder than that.

Continued on page 28

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We shaped the smaller spa, then used the cores to set up all of the new plumbing runs and electrical lines without even touching the limestone decking.

The material featured extremely large aggregate and was extraordinarily hard and heavy, but to our amazement, we didn't run into much by way of reinforcing steel. That is extraordinary when you consider that the pool has been there, intact, on a sloped property in seismically active southern California – without apparent cracking or movement of any kind!

It would be fascinating to talk to the people who built this structure in the first place. I'd be curious to know if they had any idea that their pool would be in place more than seven decades hence and that it would still be in such incredible shape after big earthquakes in 1932, 1971, 1988 and 1994. As it is, we only have these big, nasty cores and this indomitable vessel as evidence of the way these pioneering watershapers applied their skills.

The only thing that we can know for sure is that they certainly worked with a very different mindset than we see in today's world of minimum-standard construction – but that's another story.

Jumping back to the here and now: With the work done on the cores, I met on site with my ace plumber, Johnny Rodriguez, my top-notch electrician, Chuck Succa, and the best steel man I know, Jim Pope, to plan the runs in and out of the pool and to various remote locations – all of which we'll visit next time. **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.*



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Overseeing the design and installation of naturalistic, mostly large-scale watershapes for high-end developments three years ago and helped establish Bratt Inc.'s waterfeatures unit (which he now owns), he's watched strong

A photograph of a landscaped pond in a residential or park setting. In the foreground, there are large, light-colored rocks and green plants. A stone wall with a small opening runs across the middle ground, with a wooden fence to its right. The pond's surface reflects the sky and surrounding trees. In the background, there are more trees and houses on a hillside.

Making the

Wild Waters

ers and residential clients in the Salt Lake City area is clearly a passion for Derk Hebdon. Since he arrived in town, the local market has emerged and risen to a level where the watershapes are truly worthy of their dramatic surroundings.

By Derk Hebdon



Graced by an abundance of beautiful, natural streams, cascades, rivers and lakes spread across spectacular native landscapes, Utah is a dream location for watershapers.

Not only is there a rising demand for crafted streams, ponds and cascades that look like they really belong, but the state itself is also a genuine design laboratory. Indeed, I send our crews out into the “wild” periodically to do nothing more than hike up and down local watercourses to see how Mother Nature does things. These waterways are easy to find, and the exercise (both mental and physical) keeps us all fresh.

The steady contact with nature is a big help in our creative endeavors: I’ve found that even the most talented and conscientious watershapers can fall into design ruts if they spend too much time with their noses to the grindstone and don’t get out and about to seek inspiration. Once the batteries are recharged, we’re ready to participate in projects we all see as functional works of art.

Down to Business

My company, Bratt Water Features Inc., is a wholly owned cooperative with Bratt Inc., one of the largest landscape design/build firms in the country. We pursue both commercial and residential projects, mostly upscale, and about 60% of what we do is best classified as commercial. Reflecting that balance, two of our three crews focus on commercial work, while the other specializes in residential projects.

Most of our jobs start with our landscape architects, who conduct the initial meetings with clients, set basic project parameters and carry things through to preliminary drawings. Once it’s determined that a project will include a watershape of some kind, our waterfeatures division steps up and joins the design team.

At that point, I start discussing the project and various ideas with our architects, determining whether, for example, the watershape will have an architectural or natural appearance and getting some idea of desired flow rates and volumes, basic visual elements, key vantage points and, in a more general sense, the overall “mood” of the feature.

Often, we’ll move through three or four different options developed to the point where they’re discussed with the developer or homeowner, and ultimately we arrive at an overall design scheme. Generally speaking, these are free-flowing, immensely positive creative processes, and we use them as a means of setting

→ *Flow*

expectations for how the project will proceed and what clients can expect to see once we're finished.

We also develop the budget during this design/planning stage. To speed the process, we show clients photographs of past projects and use them to define levels of detail they want to see and enable them to align their desires with relative levels of cost. For large bodies of water, those details and costs can vary substantially based on the client's wish list. Once this part of the discussion is settled, we begin developing more definite plans.

Occasionally, we run into developers and other commercial clients who've had difficult experiences in the past with large waterfeatures. This is actually helpful in the long run because they're aware of the kinds of issues that can arise, but in the *short* term it puts us in the position of talking through potential problems in great detail by way of reassuring them that we know what we're doing.

Usually, our belief that these are positive exchanges of information and that great things will ultimately be accomplished wins out: By the time we're through, the topics of discussion change from what might go wrong to productive conversations about good hydraulic design, the achievement of credible natural aesthetics and getting the most from whatever budget has been set.

Another reason developers are willing to engage in the process of watershaping is because, despite any troubling past experience, there's an increasing acceptance of (and demand for) water in public spaces, commercial settings and residential developments. In a nutshell, these entrepreneurs and enterprises recognize the part water has to play in distinguishing and adding value to their properties.

Of a Piece

Our aim in the design/build process is to deliver a watershape that blends in perfectly with the overall landscape setting. As a result, integration is on our minds from the start.

We always think of what we're doing as an exercise in working within the context of fully designed landscapes (often very *large* landscapes), and we see a clear advantage in placing the water elements within those settings in such a way that observers gain a sense that our watershapes truly *belong* where we've put them.

This is probably easier for us in our waterfeatures operation than it might be for firms who only do the watershaping, because we know and work with our company's landscape architects all the time and know the control they have over the planting plan and the hardscape design. We use this intimate contact with the overall project to inform what we do with the water.

We're all in the same co-operative, so we share ultimate responsibility for the way the project proceeds. And this is just as true in planning and designing residential projects as it is for commercial work – although it's fair to say that we tend to find much more freedom on residential projects than we do on the commercial side.

Either way, it's basically a process of defining basic shapes and the ways they all fit together in the allotted space and of putting those relationships down on paper. Most of the time, the finished product will differ, sometimes in significant ways, from our initial sketches or drawings – we are, after all, dealing with real boulders, stones, plants and free-flowing water – but through open communication we're able to prepare our clients for the journey toward completion, whatever turns we all might take.

This works because our installers have become very good at designing fine aesthetic details as part of the flow of construction. Indeed, they're required to display a certain spontaneity and a high level of artistic expres-





A City Creek

Located in downtown Salt Lake City adjacent to the LDS Conference Center and across from the Mormon Temple, this project was challenging because we were working with a swath of land just 15 feet wide in which we were to create a meandering and believable mountain stream.

The system makes up in length what it lacks in width, running for 525 feet with about 20 feet of vertical transitions and three pedestrian crossings that provide key vantage points for the stream and its large boulders, big cascades and dense plantings. The key to pulling this off visually is tremendous variation in the size of the boulders and the way the pockets of plant material are dispersed amid the rock formations, along the edges and in the streambed itself.

Another integrating factor is that the rock came from a quarry owned and operated by the Mormon church – the same quarry that provided stone for the conference center and the temple. By using this material, we were able to visually align the stream with the landmarks surrounding it.



sion on site as we seek to mimic nature, and I'd go so far as to say that the more exacting the aesthetic details we create on site, the more believable the work ultimately turns out to be.

This attitude and philosophy gives our installation crews a great deal of independence in determining precise details of waterfall construction, edge treatment and headwaters configuration as well as integration of plantings and placement of rock material. We look at it this way: Every site is different, and being out there on the job gives installers a "feel" for the space and its viewpoints and a superior ability to understand the visual connections that can be made within the setting.

In other words, I believe we're at our best when we develop a good, comprehensive, interpretable plan and can cut our crews loose and let them create – another reason I'm so intent on having them all get out, clear their heads and spend some quality hiking time in observing and understanding nature.

Getting Real

Improvisation with finish details is one thing, but we're much more concrete at the planning stages when it comes to issues such as elevation changes, overflow designs, plumbing configurations, equipment locations, power service and site access.

These are issues that always must be sorted out ahead of time so that the installation can go smoothly and everything will work properly once the project is finished. In fact, all those issues can greatly influence our work on site, which means we place a premium on having them settled so our crews are free to consider the finer details.

Overflow capacity, to take one example, can have a significant influence on the volume of water the system can contain and thereby can affect the entire upstream design. The same is true of the extent and character of elevation changes and of location of the primary viewpoints. Once we've surrounded all of these issues and have established a general working plan for aesthetics, it's finally time to roll

in with the earthmoving equipment and begin shaping the space's substructure.

This is a time of care and precision: We set our benchmarks for elevations, mark precise locations for waterfalls, spray paint the basic layout – and maintain constant contact with the clients, architects and our own crews to be sure that everyone is visualizing the same things.

This phase is particularly important for projects with elevation changes, for the simple reason that water flows downhill. To be sure, the transitions can be set up with cascades that exploit the visual potential, but it's also true that it's possible to overstep the bounds and create cascades that are overly dramatic and end up causing unexpected problems with excessive noise and/or splash out.

Once we've excavated the site and are satisfied with the stream course and the location of the ponds, our next phase involves plumbing installation. We typically start at the top and work our way down to the pond or holding pool (or the



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Provo Estate

This estate, which is draped across a mountain and part of an adjacent valley, was undergoing massive renovation when we were called in to install a waterfeature off to the side of the main house and near a patio for a greenhouse. There was a waterfeature there already, but it was little more than a trickling eyesore – so much so that the owner was hesitant about replacing it with anything substantial.

Once we overcame his misgivings, we set up a deck that cantilevers slightly over the main pond to provide a great view of the cascade, groundcovers and aspens. (The railed walkways were an afterthought and, in my opinion, detract from the overall appearance – although they do provide a level of safety.)

In an odd twist, a homeowner who originally hadn't wanted a watershape decided that he wanted fish – but that the water could be no more than a foot deep because of his concern for his children's safety.

After advising him that success with koi and other specimen fish required water that would be at least three feet deep in places, we compromised by digging the pond to an adequate depth for the fish, then filled it in with 18 inches of gravel. For now, the pond is both shallow and devoid of fish. Later, the gravel can be removed and fish can be added without any need to renovate the pond.

The system runs on two five-horsepower pumps that create an extremely vigorous flow over the falls. The pond's overflow capacity was greatly diminished by the gravel filling; to meet the need for extra capacity in the short term, we located a holding tank off to the side below the deck.



surge tank, if we're working with a disappearing stream).

Next, we lay down geo-textile fabric to help protect the 45-mil EPDM rubber liners we use, topping the liner with another layer of fabric for added protection. To be absolutely sure in places where large rocks will be set, we'll also lay down a three- or four-inch layer of polystyrene padding. This protects the liner from being pinched or creased by big boulders and gives us some much-needed flexibility in shifting the boulders to expose their most desirable contours.

Flexible Durability

As a rule, we work with EPDM liners rather than PVC liners, but it's largely a preference based on our local climate and our observation that EPDM liners stay more flexible at lower temperatures than do PVC liners. We also like the fact that EPDM liners last 20 years even when exposed to ultraviolet light. Our liners are all completely covered either by concrete

or gravel, hence no UV exposure – and some extra confidence in the material.

The liners aren't fragile per se, but we're careful in placing them to avoid pinches and snags. And we're particularly deliberate in thinking things through and making certain we aren't creating points where they're likely to leak or flood – especially important as we close out this phase of the project and start working with the stone.

Safe to say, the selection and placement of boulders is the key to the whole process of creating naturalistic waterways. As a result, we spend a great deal of time in getting things just right. We work primarily with granite and quartzite as well as some basalt and limestone. Everything is mined locally, and we generate some of the material ourselves through our excavation work on various projects.

We like using rounded granite boulders in streams because the overall impression harmonizes with the appearance of natural streams we see all the

time in this area. But there's a challenge in using mostly rounded material in creating cascades, because the water will tend to hug the surface of a rounded boulder and won't "break" the way it will off sharper surfaces.

This is where the quartzite, limestone and basalt often come in handy, but there are occasions when only granite will do, which is why we've developed a technique for using a large track-hoe excavator to drop boulders on one another for the purpose of breaking them and creating flat planes we can use. This takes some care: The collisions can send shards of rock flying at high speeds in all directions!

We go to all this trouble because we want to avoid using flagstones to set our weirs. So often, a flat piece will be totally out of context, and it's just too obvious that someone has placed a stone there to create a waterfall. Our creed in such matters is simple: The true test of the aesthetics of a stream or waterfall is how they look when there's no water flowing at all. Flat weir

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Executive Retreat

Part of the Provo estate covered on page 35 was set up for non-family use and now includes several cottages set up as a retreat for personal and business guests.

The overall property contains several beautiful natural streams, but none were near the guest lodgings. To change all that, we were brought in to create a waterfall/stream system that would fit in visually with the existing natural streams and add the soothing sound of water to the retreat. This stream stretches 400 feet up the hillside to headwaters tucked in a forested area. The idea is to draw visitors up the hill and into the wooded area.

In keeping with the contemplative mood of the area, this stream is less vigorous than the one at the main residence, offering gently babbling cascades that descend along a rocky streambed. All of the rock for this stream was harvested on site and used liberally in the stream course, and the result is a manmade watercourse that fits in perfectly with the property's natural streams.



stones simply don't pass the test.

Once the boulders are all in place, we'll come in with concrete and pour it around the large rocks and waterfall transition areas. While it's still wet, we embed cobble in the concrete and then fill in any gaps with gravel. When we're done, you can't see any concrete or liner.

We do experience a great deal of cracking because of local freeze/thaw conditions – which is ultimately why we use liners along with partial concrete surfacing. This helps us control costs – and dodge the fact that it's often hard to conceal large expanses of concrete in natural-looking ways.

Starting the Flow

We apply the same attention we do in setting up natural-looking weirs to the job of establishing our headwaters. As a rule, we set things up with pipes that introduce water to the bottom of our upper ponds, covering the manifolds with rocks and allowing the water to well up and spill naturally into the watercourse.

But that oversimplifies things a bit, because deciding where the headwaters will be in the overall water system is crucial to believability. I'm disappointed, for example, when I see water emerging from the center of a berm or slope. Nature doesn't work that way. Instead, we'll set the headwaters at the crest of a slope or tuck it out of sight among plantings or rockwork – or even in a structure of some kind.

And whenever possible, we'll establish *multiple* headwaters outflows to lend the watershape a sense of variety and even greater believability. In our experience, this approach of introducing the water at multiple locations and at varying elevations gives us greatly expanded options for separating and conjoining streams, for example, or for creating pools or rapids and manipulating the way everything sounds.

Our target flows for cascades are about 60 gallons per minute per lineal foot, which means about an inch and a half of water moving over the falls – vigorous but not overwhelming. Obviously, that target will move up or down, depending on the design. But as an average for entire systems, the 60-gpm-per-foot standard holds up remarkably well.

As we move downstream, we're aware of the fact that plantings are as important as rockwork in conveying the visual impressions made by natural waterfeatures. Through the years, in fact, we've moved further and further along in our understanding and use of aquatic plants and of ways of bringing groundcovers right up to the water's edge and into the streams. We work a lot with marginal and bog plants as well as water lilies and floating hyacinths. We're also working more often at creating suitable environments for fish.

Again, our aim is integration. In our initial designs, we incorporate pockets where plants and groundcovers can take hold and spread out among and over the rocks and set up areas where we can use perennials or other plantings to add color and accentuate viewpoints.

If one side of a stream will be viewed more than the other, for example, it makes sense to locate plants with lower profiles on the vantage point's side and place taller plants on the other side. Instead of blocking critical viewpoints, these tall plants and trees can be used to draw the eye up from and beyond the stream.

Our watershaping process is detailed and deliberate, and everything flows from knowing where we're heading right from the start. This knowledge, this capacity for all of us to be on the same page and visualizing the same outcomes, has enabled us to meet our clients' demand for quality, take our place in pursuing what we all see as an emerging art form – and still have time to take the occasional walk along a stream.





Suncrest

This watershape is located near the entrance of a new residential development on a ridge above Salt Lake City at about 6,000 feet in elevation and constitutes a classic example of a developer seeking to use water to add interest and distinction to a space. The headwaters are near the development's information center and offer visitors a spectacular introductory view.

Our goal was to create a setting that had a park-like, mountainous feel and would provide a place where prospective buyers might stroll and take in the surrounding beauty and tranquil waters. To that end, the stream operates year 'round, includes several large ponds and cascades and is stocked with trout. For a watercourse of this size, the flow is at a relatively modest 600 gpm – just what we need to keep the water from freezing. And in the thick of winter it provides breathtaking views of snow, ice and water.

Of particular interest, several hardscape features are also integrated, including architectural bridges, pergolas and stone walkways that cross over or offer great views of particular points of interest along the waterway. Landscaping was also critical to lending a natural feel to the overall surroundings. The rock was primarily a very hard limestone quarried locally.





It seems so simple: No matter whether it's a residential or commercial project, the design parameters for indoor swimming pools generally call for warm water (typically 82 degrees, or a bit less for a competition pool), air temperature two to four degrees warmer than the water, and a relative humidity in the enclosed space of between 55% and 60%.

And it wasn't some committee of pool builders who came up with those figures: The numbers are endorsed and published by the American Society of Heating, Refrigeration & Air-Conditioning Engineers (ASHRAE) and have been accepted as standards for indoor pool ap-

plications for many, many years.

But the fact is that indoor swimming pool systems are more complicated than they would seem. If you need proof of that, all you need to do is visit a home or facility where a system has been installed by someone who wasn't up to speed with what it takes to hit the numbers. In those situations, odds are you'll find a client who's bleeding cash on energy costs and is most likely experiencing unpleasant conditions in the space that houses the pool.

Those traumas are unnecessary. Our firm, Omega Pool Structures of Toms River, N.J., has for a dozen years specialized in both the design and con-

struction of indoor swimming pool facilities and have found ways to develop successful, energy-efficient indoor heating/dehumidification systems that manage to balance a variety of key factors we'll cover here.

Fog Busters

The key ingredient in ASHRAE's operating standard for indoor pools refers to maintaining an air temperature that is *warmer* than the water temperature. This difference between air and water temperature serves to minimize condensation inside the room.

The logic of the standard is compelling: If you've ever been in a space where the

Inside Air

By Kevin Ruddy

The concepts involved in setting up fully enclosed swimming pools seem pretty straightforward, observes indoor water-shaping specialist Kevin Ruddy. But appearances can be deceiving, he adds, and the situation you encounter in balancing water temperature, air temperature and relative humidity can go from bad to worse in a hurry if you discover, much to a client's dismay, that you aren't completely sure of what you're doing.

opposite condition exists, you know that condensation can create unpleasant and even unhealthy conditions for people in the room and can lead to significant maintenance problems as well as damage to the structure through corrosion.

Helpfully, the ASHRAE standard allows for some flexibility, and the acceptable temperatures can rise or fall depending on the client's preference so long as the air is always a few degrees warmer than the water. Although water and air temperatures in the 80s may seem a bit warm, when you consider that the intent is to enable people in bathing suits to be comfortable, the recommended range is fully in keeping with a typical comfort zone.

Competition pools offer a notable exception: Where intense physical exertion is the order of the day, water temperatures are typically held at about 78 degrees.

It is possible, of course, to set up a system with water warmer than the indoor air, but keeping the humidity down would mean setting up a ducting system that operates like a wind tunnel. The energy expense would be incredible, and you'd need to worry about heating the incoming air in winter and cooling it in summer – another huge expense when you consider how much air you'd be moving through the space at a high rate of speed.

To put the challenge in perspective, con-

sider the fact that any indoor swimming pool will take up approximately half to two-thirds of the floor space of the room in which it is located. If you heat that body of water to 82 degrees with cooler surrounding air temperatures, it's going to produce a huge amount of humidity, especially in the colder winter months, relative to the volume of the room itself. With 80-degree water and 70-degree air, for example, those walking through the room will feel as though they'd stepped into a sauna.

If you reverse the situation and maintain an air temperature two to four degrees higher than the water temperature, you're in effect creating a thermal blan-

ket between the water and the surrounding walls and the ceilings. Moisture will not penetrate that blanket and will not condense on the walls, windows and ceilings. In other words, by circulating warm air through the space, you effectively prevent a good percentage of the moisture that might have done so from rising off the surface of the pool.

Striking Balances

If you establish a system within ASHRAE's operating standards and create a proper balance between air temperature, water temperature and relative humidity, you position yourself to install an indoor pool that is energy efficient and for which it is possible, with relative ease, to keep those

operating factors in balance.

What you will have at the end of the design process is a set of system components – a heater for the pool water and a heating unit and dehumidifier for the air – that have been selected to suit the specific capacities of the space and the size of the swimming pool.

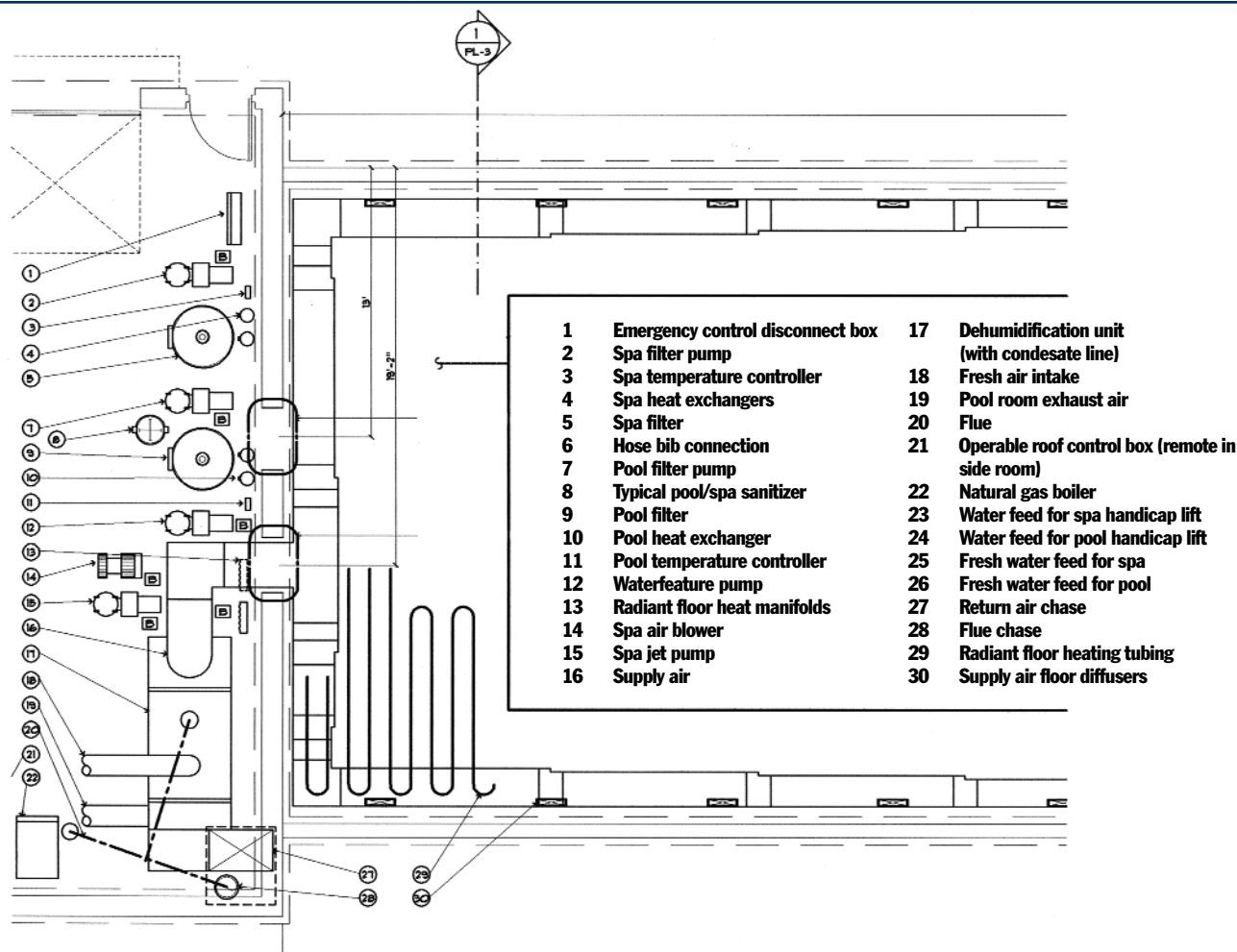
For watershapers accustomed only to heating water, the challenge of drying and heating air at the same time calls for new knowledge and a brand-new set of skills. Dehumidifiers, for example, are alien to most people in the watershaping trades but cannot be to those who work on indoor pools.

In essence, a dehumidifier is not much different from an air conditioner. It condenses moisture from the air using re-

frigerant coils. Where an air conditioner vents heat generated by the system to the outside, the dehumidifier uses its energy to help reheat the air in the space by heating another internal coil over which the air passes on its way back into the ducting system.

When it comes to heating the air surrounding an indoor pool, however, the heating capacity of a dehumidifier must be seen as no more than a supplement to the warming capacity of a dedicated air-heating system. And in both cases, the dehumidification and heating systems must of course be sized, placed and ducted in accordance with the needs of the space.

In other words, there's a great deal to juggle when it comes to designing an in-



The systems involved in maintaining indoor pools and spas can become both extensive and complex, depending on the vessels' size and intended use and the configuration of the enclosed space. The drawing shows a typical configuration for an indoor commercial facility, while the photo at right gives a clearer idea of just how much goes on in the equipment room – and how important it is to be organized and to take full measure of the space required for each piece of equipment and any associated ductwork, plumbing or wiring.

dividual system. In addition to this engineering challenge, there's also a client-relations issue that comes into play, because none of these systems, no matter how efficiently designed, is inexpensive either to install or to operate for the long haul.

Those long-term costs may be hard to swallow, especially for the typical residential client. This is why we have focused our efforts as indoor-pool specialists on finding ways to control ongoing costs and make it possible for more of our prospective clients to afford fully enclosed swimming pools.

Managing Costs

Topping the list when it comes to cost-control strategies is the use of automatic pool covers: Indeed, putting a mo-

Prime Chemistry

One of the constant issues raised by prospective owners of indoor pools is a concern about chlorine smell. To get around this hurdle, we assure them that we can set up a system that can reduce or eliminate the offending odor.

There are several approaches that work, but we favor the use of saltwater chlorine generators. Without stepping too deeply into the chemistry, we've found that these systems keep the pH balanced and minimize the formation of chloramines – the form of chlorine that creates most of the smell.

For commercial jobs, saltwater systems often aren't always an available option because of health-department rules, which generally call for bromine or chlorine systems or sometimes ozone. In these situations, we set up automatic control systems to give clients and service companies a way to maintain the tight control needed to keep odors at bay.

We do so knowing that smell isn't the only issue: For all indoor pools, close control over water chemistry is important because chlorine gassing off from the pool can contribute mightily to corrosion problems.

– K.R.



torized, solid cover over a pool will reduce the average operating costs by 65% to 80%.

Why the dramatic savings? When the pool is not in use and the water surface is covered, all of that potential humidity is trapped beneath the cover. In addition, it's easier to maintain constant water temperature (because much less heat is escaping the pool) and consistent air temperature (because the water becomes less of a heat sink) along with the steady relative humidity.

When the pool heater, air heater and dehumidifier are turned off or operating for lesser periods of time, the savings add up quickly. And if the pool is not going to be used for prolonged periods of time – for whatever reason – you can lower the

air temperature in the room without worrying about condensation, further increasing the savings.

This is why we recommend automatic covers for *every* project we do. Consider the math: If you have a room with 2,500 square feet and a 700-square-foot swimming pool maintained to ASHRAE standards, the average energy cost will run from \$1,500 to \$2,500 per month, depending on a variety of factors such as energy prices and prevailing outside temperatures. If you put a cover on the pool, all the escaping heat is dry – and the cost of maintaining the environmental conditions drops radically.

This can spell the difference between paying a few hundred dollars per month or having costs that run into the thou-

sands, which is why 98% of our clients opt for some form of automatic cover. And beyond energy costs, there's also a safety factor that comes in homes where indoor pools are typically accessible to children.

To be sure, the cost of automatic covers can be high if the clients want a free-form pool, and sometimes in these cases they'll opt for a removable bubble cover. In our experience, however, this isn't the best solution. We advise strongly that they reconsider the design – or go to the expense of engineering the deck system to accommodate an automatic cover for their free-form pool.

Whatever the cost, the simple fact is that an automatic cover will ultimately pay for itself.

Dry-Air Evolution

Dehumidification is a science unto itself.

In the old days, it was taken care of by firing up a furnace to create a huge amount of heat at one end of a building and placing a big exhaust fan at the other end to suck moisture and heat right out of the room. That was workable when energy costs were negligible, but the wastefulness of such systems in a modern context is both obvious and painful.

The next generation of dehumidification systems came with the advent of air-to-air heat exchangers. Originally used in factories in which it was necessary to evacuate dirty air from a space for worker health and safety, these systems dumped air outside after passing it over a system of coils that captured the heat. Cool air being pulled into the facility was warmed by that captured heat.

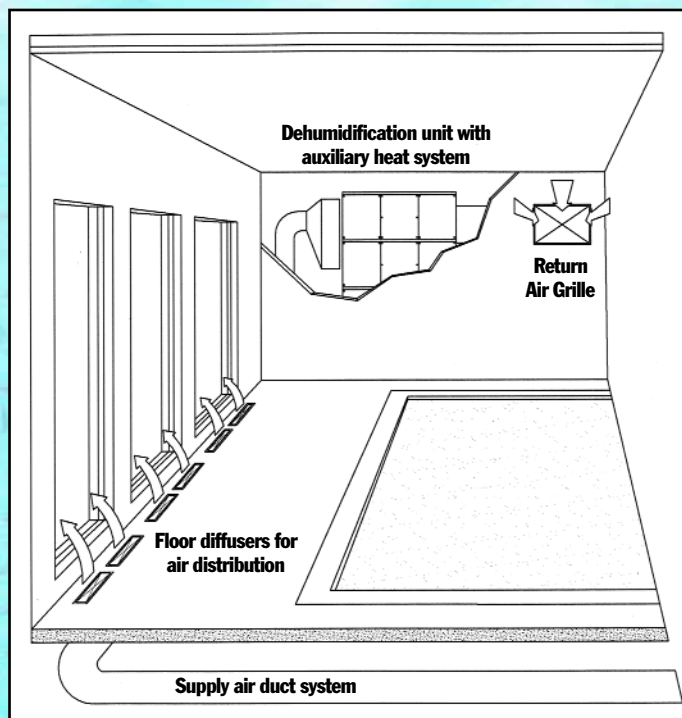
These systems still find application today, and we've used them on some of our own projects, mostly large commercial pools with motorized covers. The problem with that kind of system is obvious: If there's a great deal of moisture outside, you're inevitably bringing it into the facility.

Today, there are true, all-in-one dehumidifiers that dry, warm and recirculate air. These systems have coils that cool the air and condense the moisture, and they're the most efficient and reliable of all available options. When it's cold outside and the space is being heated, the heat generated by the cooling process is also used to heat the air. In the summer, when keeping the space cool is a priority, many dehumidifiers are equipped with a separate cooling coil that uses that same energy to cool the space, thereby becoming a true air-conditioning system.

The capacity of these late-model systems to recycle energy gives these modern systems big advantages over previous generations of equipment. Even so, and even in the most efficient of all systems, dehumidifiers must be used in conjunction with some sort of auxiliary heating system that can

keep the air at the desired temperature. In the best-balanced and engineered systems, the heater that heats the air can be used to add heat to the water as well.

– K.R



Systematic Gains

Certainly covers help control long-term operating costs, but they can't change the fact that indoor swimming pools also need balanced systems to warm and remove excessive moisture from the air. One of the keys to achieving that balance is paying close attention to the way the air is distributed and circulated within the space.

In fact, if you have the right systems and distribute air properly around the space, both energy efficiency and air quality will be greatly enhanced. If you don't, what you'll wind up with is a room of which parts are adequately dehumidified or heated and others are not. In those disregarded areas, condensation, mold and corrosion will develop.

The usual culprit in these cases is undersized ductwork – a situation completely analogous, by the way, to undersized plumbing and poor hydraulics on a watershape. A duct system should be designed so that the output of the dehumidifier is balanced with the capacity of the ductwork: If you have a unit that can force 3,500 cubic feet of air per minute (cfm) through the system, for example, you want the ducting to handle that airflow. If it doesn't have that capacity, the dehumidifier will play the ductwork like a flute, and the shrill, whining noise will drive your clients crazy.

As with watershape plumbing, the most efficient way to duct a room is to set up the registers (returns) on manifolds. In our own work, and just as with our return systems on watershapes, we always try to make sure that we have a complete loop with no dead ends, ducting out from the dehumidifier to a tee and then ducting around the entire room to create an even distribution of air within the space.

If it's necessary for whatever reason to set up a linear duct system, you'll have the need to close some registers and open others to equalize the flow – a waste of energy and a ready indicator of a system out of balance.

There's also a huge range in terms of available duct sizes – from as small as six inches up to five feet in diameter in some situations. Understanding air flow, velocity and volume are critical in designing these systems, and decisions

about sizing and configuration are best left to experts.

You should be aware without consulting an expert, however, that rooms containing pools should be isolated from all other rooms in a house or recreational facility with respect to heating, air conditioning and ventilation. Whatever else you do, you want to avoid introducing moisture to the other spaces and set up a situation where the critical need for temperature and humidity control extends beyond the room housing the pool.

Floor to Ceiling

Anyone building an indoor pool must also be aware of some other common features of these pools that are different from outdoor pools.

Outside, for example, decks slope away from the pool to channel rain and irrigation water away from the pool. Indoors, by contrast, decks slope *toward* the pool to route splash-out back into the vessel or into deck drains.

The decks for indoor pools also commonly feature zones of radiant heat in which hot water is pumped into series of tubes installed in the slab. Radiant-heat floors make for a comfortable experience for people getting in and out of the pool and have the advantage of heating the air closest to the floor – something that's difficult for forced-air heating systems to do.

We've even seen some projects where a floor-heating system is the room's sole heating system, but that's generally not the right way to go. With the water at 82 degrees, floor heating generally isn't capable of warming the air enough to avoid imbalances that invite condensation. As a result, we don't design radiant-heating systems to meet a temperature requirement, instead using them simply to take the chill off the floor.

Another possibility with indoor pools is to make them convertible – that is, setting them up so that, when the weather's right, they can be opened up and used just like outdoor pools. The advantages can be huge: If you can open the roof and doors in the warmer months, all of the expense of dehumidifying and warming the air will effectively be eliminated during that time.

We always set up our open-air systems



to open at the spine of the roof. The rationale is simple: As with a chimney, all the heat that builds up in the space will evacuate at the highest point. If you were to use skylights as an alternative, for example, a certain amount of heat will always be trapped higher on the ceiling, and in the summer months that trapping can make the air temperature uncomfortably high in an indoor pool room.

The use of polycarbonate panels is another factor to consider. In our experience, we've found that these materials act like solar panels, helping to heat a space through the cold winter months by as much as 15 to 20 degrees. Obviously, this represents a substantial potential savings in air- and water-heating costs.

When you combine all of these measures – a cover, the right ductwork, perhaps some deck heating and convertible rooflines – a well-designed, properly engineered indoor pool environment can cost far less to maintain than the \$1,500 to \$2,500 per month it takes to operate the space according to bare ASHRAE standards. In fact, you can reduce those costs by a factor of ten and deliver your clients a pool that will cost an average of \$150 to \$250 per month to maintain.

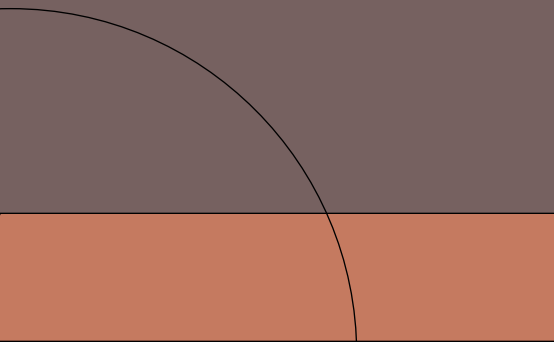
At that price, they can be comfortable around their pools in more ways than one.

Next time: More on finish materials and a look at the aesthetics of enclosure design.

Light,
Space



and Water



Contemporary artist Eric Orr and his protégé, Sean So, both use the flow of water to lend texture and bring distinction to basic, geometric forms. For them, these small flows embody ‘transformation,’ which stands as the ideological core of the Light and Space Movement they both represent. Here, So explains the tradition and creative essence of the movement and brings it into perspective as part of today’s commercial waterfeature market.

By Sean So



The Light and Space Movement first emerged in the beachfront community of Venice, Calif., during the 1960s, when a group of artists collectively began to explore and redefine the way art was observed and appreciated.

Leaders of the movement – painter and sculptor Eric Orr; Robert Irwin, who later designed the gardens at the Getty Center in Los Angeles; and environmental artist James Turrell – started by breaking down the transformative processes of art and minimalism, defining the character of their movement through its barest components of light and space. In a great creative rush, they explored the ways light affected spaces and how light could transform our perception of things within those spaces.

The result with Eric Orr was not what one would consider “decorative art” in a conventional or traditional sense. In fact, his art is devoid of any ornamental forms. I worked closely with him for seven years before he passed away in 1998; since then, I have faithfully carried on in his tradition and sought to bring his approaches, philosophy, shapes and sensibilities to a new generation of observers.

To do this, I have focused particularly on the ways Orr used water to interpret the spaces he established and how he saw it as a means for accentuating dramatic yet simple forms within those spaces. The results are waterfeatures and water sculptures that communicate with the observer on a primal, neutral level with a tranquil, spiritual nature.

Power in Simplicity

In its purest, simplest form, the minimalist elements of Light and Space art are impossible to capture in words. How can one, for example, persuade another to understand the concept of pure, empty space in a work of art? Although it may not be literally possible, the goal of the Light and Space

artist is nonetheless to explore these ideas and bring the observer as close as possible to experiencing concepts of transformation, purity and simplicity.

Under my guidance, the doors of the Orr Studio have remained open in Venice, and we now work with a far wider range of architects, landscape architects and interior designers than perhaps Orr would ever have imagined while designing and executing waterfeatures and water sculptures for contemporary settings based on his approach and philosophy. In essence, one could say that his movement has now stepped beyond the boundary of fine art and sculpture to become an integral facet of contemporary design.

In this way, what I do today as Eric Orr’s spiritual heir is an extension of his work, reaching beyond galleries and collections into a broader, appreciative world. The difference is, where Orr was a self-driven artist who blazed his own trail, we at Orr Studio see our current work as a service to our clients and our waterfeatures and water sculptures as forms of art that fit uniquely and appropriately within established spaces.

Those forms are simple – for example, water flowing over surfaces within a vertical rectangular shape – and do not challenge the observer to “understand.” For us to be successful, the ways water is used to accentuate the forms must be beautiful enough to engage the viewer and remain approachable.

To preserve the transformative and minimalist nature of our works, our “building blocks” of geometric shapes, light, water and, at times, fire and/or fog are simple, yet visually appealing. These basic expressive units are accessible to people regardless of age, culture or ways of thinking, and indeed reach out to what Carl Jung refers to as the “collective unconscious” – a level of innate, unspoken and thoroughly primal understanding of forms and ideas.

I think of this innate connection as the difference that has kept the Light and Space Movement vital since it first emerged more than 40 years ago and has given the movement its enduring value. Minimalist and transformative ideas and forms have been used in different ways through the years, yet because they are simple and beautiful, they reach *across* the eras and remain contemporary.

Fluid Presence

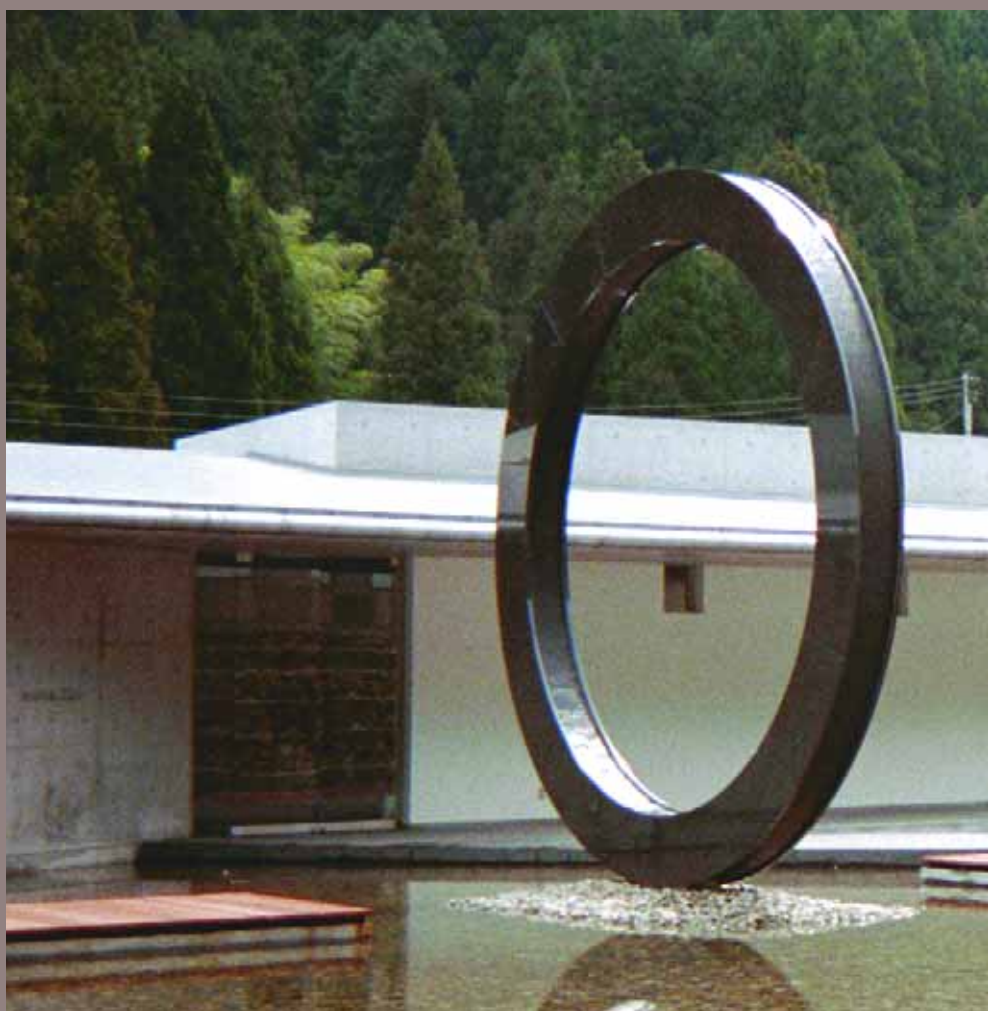
I cannot emphasize strongly enough the importance of water in making our pieces accessible, interactive and attractive. Even the smallest flow will draw the observer in and offers a source of subtle, yet constant change. I believe this to be the perfect contrast or foil to the stark, simple geometric shapes we use in our watershapes.

We use much less water than is to be found in most other artistic watershapes. Our hydraulic systems are small and simple, yet quite precise with respect to flow and distribution over a sculpture's surface. The way we establish and define spaces and set up shapes and water flows give our installations all of the drama and interest of larger, more elaborate projects that use much more water. It's partly the spirit of minimalism, but it's also our sense that water preservation and conservation are important and that water is a precious resource that must be treated with care and respect.

Equally important, the small flows of water in our features and sculptures convey a desirable sense of tranquility – not surprisingly when one considers that Eric Orr followed a Buddhist philosophy, as do I.

This meditative quality was present in Orr's work from the beginning, but our approaches have evolved and the Studio now works with a wider range of materials and shapes than Orr did originally. Orr himself preferred darker surfaces, but since his passing, the studio has branched out to include many lighter colored materials that we feel are less stark and more accessible.

That last word is the key: Orr Studio's current work is about making minimalism and the tenets of the Light and Space Movement *accessible* to more people in a wider range of settings. That's our continuing mission and goal.



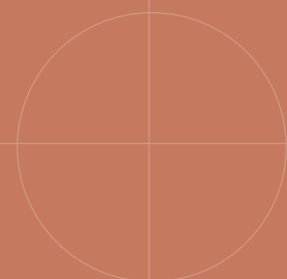
Three Graces

This project consists of three convex columns that describe a circle. But each column has a different height, so there's a forced, interesting interplay of vertical geometry – almost as though the forms are growing and differentiating themselves around a fixed, central core. In addition, there are two different textures, ridged on the outside and smooth on the inside, so the water flows more quickly down one side than the other.



Circular View

Known as the Archimedes Gate, this piece was commissioned by The Water Museum of Shimane, Japan, and is crafted of polished black granite faces set up with curved copper channels along which the water flows on the outer and inner surfaces of the ring. The small flow of water over the sculpture becomes apparent only when the observer comes close, commenting in a subtle way on the physical relationship between the museum and the mountains beyond.



Columns & Rings

In this case, we worked with a landscape architect to develop a design in which a copper ring interacts with two curved, concentric columns – a visual effect not dissimilar from the one seen with the Archimedes Gate. My own preference for ring sculptures has to do with the way they work with natural landscape, but here it works quite well in urban surroundings. The columns are the key, adding dimension and interest to the design that suits it well to its architectural setting.





Water Veils

Several of our projects are best described as 'water veils.' Eric Orr began working with this effect in about 1993, and it involves flowing a sheet of water over a very fine screen. From just a few feet away, you completely lose the screen visually and instead get a sense of water flowing slowly through thin air. We've completed a number of projects since that are based on this basic idea.

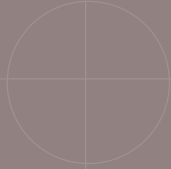
Columns of Flame



Fire can be a spectacular tool for minimalist art, as shown in these two projects. In one, three panels have been set up with flames crawling up each surface. The panels form a triangular column that sits on a granite pedestal covered in water, and we've played with the steamy potential of their interaction by introducing fog at the center of the column. In the oth-

Elegant Panels

Playing with surface tension has been a hallmark of Orr Studios' work with water flows for many years. Whether the base material is copper, granite or some other suitable material, the constantly changing impression made by small flows of water is immediately engaging. These are cases where up-lighting makes a strong visual impression after dark, drawing observers to watch the water dance across the surfaces in unpredictable, accessible and thoroughly gentle ways.



er, a fire-and-water sculpture set up as a hearth marks a home's key outdoor gathering place. The curved sculpture stands in a dark pool of water, and flames erupt from the pool's center in exciting contrast to the flat, dull pool. The curved shape serves a practical purpose by protecting the flame from prevailing winds.



Where the Bison Swim

By William R. B. McCullough
& Edwin M. Wallover III

Collegiate athletic centers are more significant than ever before because fitness and recreation are increasingly important components of modern students' lifestyles, observe architects Edwin M. Wallover III and William R. B. McCullough. That trend, they add, drives a need to make such facilities as flexible as possible – which is just what they accomplished in designing and building Bucknell University's spectacular new aquatic center.

The Arthur D. Kinney Natatorium was designed with a practical mission in mind: From the outset, the facility was intended to provide long-term performance, outstanding aesthetics, ease of operation and minimal maintenance life cycles while enhancing the university's recruiting efforts and fostering individual and team achievement.

In this case, however, the "individuals" aren't just star athletes pursuing records and titles. Rather, the natatorium on Bucknell University's Lewisburg, Pa., campus is unique in the sense that the school chose *not* to segregate varsity athletes from general student/recreational users. Indeed, the facility, part of the university's grand Kenneth G. Langone Athletics & Recreation Center, is designed to bring everyone on the campus together and provide a social hub for students.

As architects, we knew that system performance, aesthetics, constructability and budget would all play major roles in the developmental process. At the same time, the mission statement made sure we created an environment that encompassed the university's desire for a prestigious aquatics facility as well as the needs of swimmers at a wide range of program levels.

Our firms – Ewing Cole Cherry Brott of Philadelphia and Wallover Architects of Lancaster, Pa. – collaborated on the design and construction of the project and are proud to have been part of the team that made it all happen. From the university's





trustees, major donors and steering committee to our specialty consultants and in-house project teams, everyone played critical roles in turning the mission statement to a functioning reality.

Specific Insights

Bucknell University's main quadrangle is located on a hilltop. The Athletics & Recreation Center is positioned in the valley below, with the main entry on axis with the quad above. The valley was the perfect place for such a large building because it conceals the center's mass while maintaining high visibility. In addition, the location is central to the flow of campus traffic, reinforces the campus axis and provides great views up the hill to the main quadrangle.

Exploiting this high-visibility location and the identity of the new center at the core of the campus – as well as the potential synergies between existing facilities and new components of the recreation center – were all of primary importance as the project commenced.

The overall architectural program was accordingly designed to form an edge of the main campus. The center's visual connection to the campus is secured via large glass openings in the brick arcade that borders the center's front lawn, and everything is designed to fit into the Georgian architectural style that prevails on the rest of the campus.

A primary design goal was to create vitality within the space by making visual connections through openings that bring light into the facility while effectively making it transparent. We saw this as a way to "activate" the aquatic facility, which is situated between two other major components of the overall project – the Krebs Family Fitness Center and the Gary A. Sojka Pavilion – and as a way to make all of the facilities work together.

This open visual approach drove some interior design decisions as well. For example, the diving platforms are positioned at the closed end of the building, away from all of the natural light, to minimize glare for the competitors. By contrast, the shallow, recreational area is adjacent to a day-lit area and an arcade that provides views back to the main campus and into the adjacent fitness center. An addition-

Photo courtesy Ewing Cole Cherry Brott, Philadelphia.



Seen here under construction, the new recreation center at Bucknell University has been designed in keeping with the Georgian architecture that dominates the rest of the campus.

al glass wall divides a spectator concourse that is shared on the second level between the natatorium and the pavilion.

As a result of these configurations, students can now enjoy the sight of 100 foot-candles of light dancing off the surface of the pool as they approach the building at night – or they can take in a league swim championship as they work out in the fitness center.

Flexible Containment

The fact that Bucknell's "Bison" teams had an existing pool facility gave us yet another unique opportunity to connect the natatorium and the fitness center.

Eight brick arches on what used to be the exterior of the old swim center have now become part of the interior of the new natatorium.

We filled five of those arches with glass that now separates the natatorium from the fitness center, allowing for ready visibility in both directions and connecting the spaces while making a gesture to campus history. The old pool is now an instructional weight area – an extension of the fitness center perched eight feet above the new pool's deck.

Kinney Natatorium is three times the size of the original and is equipped with two moveable bulkheads that divide the

Monolithic Flexibility

Because of a high water table at the project site and unconsolidated soil conditions, the engineering specifications called for use of a double mat of steel reinforcement and pneumatically placed gunite in construction of the pool shell. This was intended to minimize the potential for structural or shrinkage cracking within the vessel.

Helpfully, the monolithic nature of this technology and the rectangular, square-sided contouring of the vessel provided us with an ideal substrate for the ceramic mosaic tile we set on the pool's interior surface.

– W.R.B.M & E.M.W.

A primary design goal was to create vitality within the space by making visual connections through openings that bring light into the facility while effectively making it transparent. We saw this as a way to ‘activate’ the aquatic facility.

water into three separate spaces. The fact that the university would be getting three pools in one led to the decision to eliminate the old pool rather than incorporate it into the new design.

Other preliminary decisions had to do with programming and anticipating how the facility would actually be used. Challenged by Bucknell’s administration and staff to provide a pool that served the interests of competitive athletes as well as

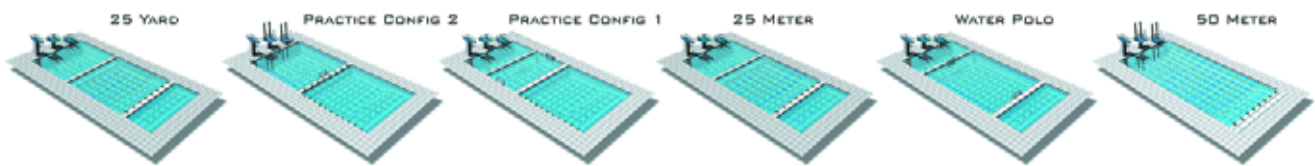
R.I. – enables simultaneous programming via eight distinct bulkhead locations – two practice, one recreation and five competition configurations – programmed into the pool’s operation and marked along the deck. These configurations provide virtually unlimited flexibility for collegiate activities as well as invitational, regional or national meets.

We recommended a slight oversizing of the pool on its long axis (an inch and

water surface. The fact that we managed to do so was confirmed at the 2003 Patriot League championships, when 20 meet and 16 league records fell during the pool’s inaugural event. This outcome for the Bucknell Bison was clearly what we had in mind when the pool was designed.

In setting pools up for speed, we’ve never been convinced that cavernous concrete gutters provide a greater degree of evacuation of surface pool water during

The dual bulkheads allow pool managers to configure the pool for a wide variety of uses, from recreational swimming to full-scale collegiate competitions.



Images courtesy Wallover Architects, Lancaster, Pa.

the general student population, we embarked on a process of identifying the major user groups, had them articulate their most desired features and examined the effect of a daily schedule of operations in reaching the final design.

These factors became the basis for a pool that provides flexibility of use while not inhibiting the necessary competitive attributes. Long- and short-course competitive swimming, one- and three-meter springboard diving (with provision for a future platform-diving stand), water polo and recreational swimming are all possible within the natatorium courtesy of the two movable bulkheads we set up in the 75-by-174-foot, ceramic-tile-clad vessel.

Simple relocation of the four-foot- and six-foot-wide bulkheads – manufactured by Neptune-Benson of West Warwick,

a half or two inches at each end) to provide a margin of safety in maintaining the distance accuracy needed for competition. The bulkheads can be precisely located within the vessel at sanctioned course lengths, and the flow-through design of the bulkhead grating minimizes the effect of rebounding waves during time trials or competitions.

In addition, multiple pool depths are provided to accommodate a limited non-swimmer area, swimming competition and the future five-meter platform-diving area – all without compromising the need for speed.

Fast-Pool Planning

In order to create a competitive venue that would enable Bucknell to attract the best and brightest athletes to its aquatic programs, we needed to ensure a “fast”

competitions – and certainly don’t provide enough of an advantage to justify the challenge of long-term maintenance of such features.

In this case, we worked instead with available, pre-engineered technology that had proved effective on other pools by selectively and carefully modifying a standard Neptune-Benson 316L stainless steel re-circulating gutter system. It enabled us to develop a water surface that provides high-quality distribution of sanitized and filtered water while significantly reducing rebound from the side walls of the pool and minimizing the effects of filtered-water return inlets on swimmers.

The modification had mainly to do with increasing the overall depth and profile of the gutter, which had the effect of moving the filtered-water inlets to deeper positions relative to the surface. The

Designing the Details

The most important things to consider in designing aquatic spaces are twin needs for negative pressure and for protection of materials.

❑ **Negative Pressure.** Placing an Olympic-size pool between a new 4,000-seat pavilion and a 15,000 square foot fitness center as we did for Bucknell University means the air system must be balanced correctly and that the system must be set up so any incidental odors stay within the aquatic space rather than bleed into surrounding spaces.

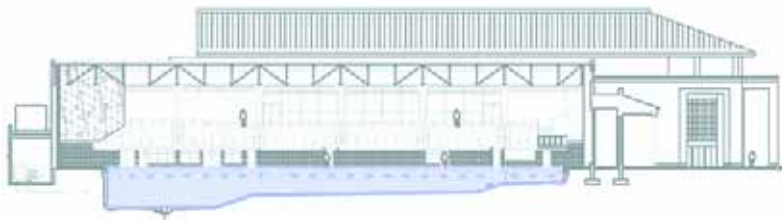
When you enter an athletic or recreational complex and smell the pool before you see it, it means the pool space's ventilation system is under *positive* pressure, allowing air to leak from the pool environment. By contrast, a successful system design will create *negative* pressure within the pool space so that when spectators open the door into the pool, they may feel a slight pull *into* the space.

❑ **Surface Protection.** Setting up for negative pressure has the added advantage of containing corrosive air, which means we only needed to concern ourselves with materials in the pool space. This meant a considerable savings, because it also means that only portions of the facility exposed directly to the pool needed treatment with (very expensive) high-performance protective coatings.

In this case, that still left a lot to be treated – including all exposed steel elements, which were coated with a three-part application of protective paint, and the structural and miscellaneous steel, which was shop-coated with a zinc-rich primer, then finished on site with two coats once all field welding and final connections were completed and the building was enclosed.

The roof deck was also a concern: All surfaces were coated, all penetrations were limited and everything possible was done to deny rust, corrosion, mold or efflorescence any opportunity to develop. In addition, most of the railings and ladders are stainless, while the window systems and doors are anodized aluminum.

— W.R.B.M. & E.M.W.



This cross-section shows water depth along the length of the pool, set up with functional gradations that allow for program flexibility as well as limited rebound when the pool is being used for competitions.

Drawing courtesy Ewing Cole Cherry Brott

deeper gutter retains more water during competition, while multiple suction dropouts at the rear of the gutter assembly maintain the trough at desired levels and provide another measure that works against rebound.

The precision of the stainless steel gutter also produces a uniform rim flow around the entire perimeter of the vessel, thereby minimizing cross-effects from

Another key design request was for a filter plant that would be easy to operate and maintain. In this case, we chose a multiple-cell, horizontal, high-rate sand filtration system consisting of four 60-inch-diameter Neptune-Benson fiberglass filters arrayed in two stacked groups. Each array is driven by a 40-horsepower, close-coupled re-circulation pump, and each is capable of moving 1,280 gal-

The facility is easy to maintain, comfortable for spectators and well suited to the needs of its competitive and recreational users.

multiple, simultaneous activities. All of this is achieved without multiple piping penetrations in the pool floor, as would have been required had this been a bottom-fed containment structure.

The depth of any competitive course also plays an important role in the overall success of the pool. In Kinney Natatorium, the depth of the 25-yard and 25-meter competition courses ranges from eight to nine feet – adequate to eliminate any significant bottom rebound. For long-course (50-meter) events, the shallow end begins at approximately five feet.

Clean, Clear, Comfortable

To keep the vessel's 942,000 gallons of water in top competitive condition, we selected re-circulation systems that would minimize the number of penetrations within the pool shell while providing an even distribution of filtered water throughout the complex.

lons per minute – a total water volume of water of 2,560 gpm for a six-hour turnover rate.

The sand filters' media is augmented with a 6- to 8-inch layer of Neptune-Benson's ClinoPure, a refined form of Zeolite. This additive has proved to be highly successful in providing outstanding water, and it also influences air quality by reducing odors associated with nitrogen compounds within the finished space. During initial start-up of the pool, we flipped a quarter into the water from the three-meter diving platform and could see that it came up heads – not bad for a 14-foot depth!

Sanitization is achieved with calcium hypochlorite supplemented by CO₂ for pH control. All systems are monitored through a Neptune-Benson Command Center, which monitors and provides readouts on pump performance, flow rates, ORP, pH and temperature for the

Out of the Water

Our design team tackled three key issues in wrapping up the design for the Arthur D. Kinney Natatorium at Bucknell University.

❑ **Noise control:** We used end-wall acoustic panels as well as a floating, perforated, sound-absorbing, anodized aluminum deck over the seating area. In addition, at some point in the future, the acoustic package will be augmented by hanging baffles from the trusses in two rows down the long axis of the pool.

❑ **Lighting:** We selected an indirect metal-halide lighting system made by SPI Lighting Group of Mequon, Wis., setting it directly over the perimeter of the pool so fixtures and lamps can be replaced from a lift on the deck. The ceiling and trusses are white to provide maximum reflectance. We also set up metal-halide downlights over the deck as a supplement to the indirect system. This was needed to help the facility meet NCAA requirements for 100 foot-candles of light for competition.

❑ **Air Handling:** We set up the system with an eye to making certain the ductwork didn't disrupt the indirect lighting system or compromise aesthetics. The air-return registers were set up on the diving end of the pool as low as possible on the end wall. Two roof-mounted units manage air temperature and humidification levels, and their registers blend visually with the acoustic panels in the west end wall.

Of course, all of these system considerations are integrated on one or more levels. Taking advantage of natural light-



ing at one end of the pool, for example, meant a potential opportunity for condensation, so we prevented it by setting up diffusers aimed to wash the windows with conditioned air.

For the most part, however, condensation isn't an issue because the building design includes an interior corridor that acts as a buffer between the pool and the exterior. By narrowing the temperature differential between the indoor spaces, we limited chances for the formation of condensation – and used a similar strategy to keep condensation away from the glass arcade between the fitness center and the pool as well as the glass wall separating the pool and pavilion concourses.

– W.R.B.M. & E.M.W.

staff. (Neptune-Benson equipment was chosen based on Wallover Architects' 15-year track record with the company's products.)

In setting up the control and monitoring systems, we worked closely with the team of building engineers, integrating the pool systems into the natatorium's overall environmental-control system. A combination space heating/ dehumidification system also provides start-up and maintenance heat for the pool water, which is maintained at 82 degrees F with an air temperature of approximately 84 degrees F and relative humidity in a range between 52% and 55%. These levels provide for comfort that has been well received by students, athletes and faculty.

The attention to detail applied with the pool's main systems was similarly applied to our work on the surrounding structure and fixtures. As the sidebars on pages 56, 57 and 58 relate, our focus was always



Once the pool was in and finished, we focused on the myriad details that went into making it visually attractive and physically comfortable for athletes and spectators alike.

Credit: Photo courtesy Ewing Cole Cherry Brott.

on the nature of the environment and on ways of making the facility easy to maintain, comfortable for spectators and well suited to the needs of its competitive and recreational users.

Go, Bison!

If our ultimate aim was to create a “place to be” for students and athletes on the Bucknell campus, then we’re confident that Kinney Natatorium is just such a place. The facility uses common materials in combination with readily available manufactured components, and the result proved to be an easily constructed pool that met the university’s budgetary and programming requirements.

We’re pleased that the solutions our team developed went so far toward complementing the functional needs of spectators and competitors while meeting the recreational swimming needs of Bucknell’s diverse student population. The dual-purpose, competitive/recreational requirement was somewhat unique, but the challenge led to interesting choices and some unique design solutions.

Spectator Space

The pre-cast concrete seating deck for loyal Bucknell Bison spectators was designed for comfort, as was the air-handling system installed in this area to provide a slightly lower supply temperature to keep spectators cool. This is a delicate balancing act: Too much cool air could potentially spill over the seating deck onto the pool deck, displacing the warmer air and giving swimmers a chill.

To avoid that situation as much as possible (and to save cooling costs), this subsystem only runs when the seating section is occupied for an event.

While most mechanical systems are controlled strictly by temperature, the control system deployed here continuously monitors both temperature and humidity and maintains them at ideal set points. There are also carbon dioxide sensors: In high-occupancy conditions, outside air dampers will automatically open to increase the fresh air supply into the environment.

— W.R.B.M. & E.M.W.



Photo courtesy Ewing Cole Cherry Bratt.

A view along the deck shows the arcade between the pool area and the fitness center; spectator seating and acoustic paneling; and the glass wall separating the natatorium from a pavilion on the second level of the adjacent structure.



Photo by Lori Stahl.

To keep the aesthetics at a high level, we masked the presence of air registers by blending them in with noise-reducing acoustic panels on the west-end wall.

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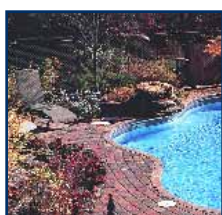


MULTIQUIP introduces the Rammax P33-HHMR-BD, the only walk-behind roller available with a leveling blade. The low-maintenance unit features dual compaction settings that allow the operator to change amplitude, frequency and compaction force with ease.

The roller also has two drum widths (33 and 24 inches) for flexibility in shored trenches and against trench walls and sides. Multiquip, Carson, CA.

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SIERRA BUILDING PRODUCTS offers Belgard's Dublin Cobble pavers for use around pools and spas. Set with a stabilizing sand grout, the material is durable, resists the rigors of winter and weed infiltration and can be sealed against staining for applications near water. The system offers the further advantage that plumbing lines

can be reached without tearing up monolithic decks. Sierra Building Products, Fontana, CA.

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PENTAIR POOL PRODUCTS manufactures the Admiral S15 line of molded ABS skimmers. The single-port product connects directly to the suction line and features a variety of base and throat options that make it adaptable to nearly all plumbing and construction requirements. Units can be rigged with flap or circular weirs for optimal water flow and surface-skimming action. **Pentair Pool Products**, Sanford, NC.

SMALL EXCAVATOR

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BOBCAT offers the model 316 compact excavator. Weighing less than a ton, the rubber-track unit can slip through gates and doorways as narrow as 31.3 inches and operates efficiently in unusually tight spaces. Despite its small size, the unit reaches a digging depth of five feet, can be used with trenching buckets of eight-, 12- or 16-inch width and offers independent boom swing for work close to walls. **Bobcat**, West Fargo, ND.

Continued on page 66

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WATERSHAPES

Meet the WaterShapers during the ASLA Expo

Saturday, November 1

11 am-12 noon

Brian Van Bower

WaterShapes columnist ("Aqua Culture"); swimming pool design consultant based in south Florida; co-founder, Genesis 3 Design Group

1:30-2:30 pm

Skip Phillips

Author of five WaterShapes articles, including an expert's guide to managing water in transit; designer/builder in southern California; Genesis 3 co-founder

Sunday, November 2

10:15-11:15 am

Paul Benedetti

Author of three WaterShapes articles, including "Strands of Light" and "Kitchens of Distinction"; pool designer/builder based in northern California

11:30 am-12:30 pm

David Tisherman

WaterShapes columnist ("Details"); author of ten articles on his projects; designer/builder with offices in California and New Jersey; co-founder of Genesis 3

1:30-2:30 pm

Randy & Martha Beard

Authors of two WaterShapes articles on the relationship between expert builders and top designers; watershape builders in southern California

... and during the International Pool & Spa Expo

Wednesday, November 5

11 am-12 noon

Mike Farley

WaterShapes columnist ("Book Notes"); co-author of an article on spa edges; landscape architect/pool designer in Texas

1-2 pm

Brian Van Bower

WaterShapes columnist ("Aqua Culture"); swimming pool design consultant based in south Florida; co-founder, Genesis 3 Design Group

3-4 pm

Skip Phillips

Author of five WaterShapes articles, including an expert's guide to managing water in transit; designer/builder in southern California; Genesis 3 co-founder

Thursday, November 6

11 am-12 noon

Mike Farley

WaterShapes columnist ("Book Notes"); co-author of an article on spa edges; landscape architect/pool designer in Texas

1:30-2:30 pm

Paul Benedetti

Author of three WaterShapes articles, including "Strands of Light" and "Kitchens of Distinction"; pool designer/builder based in northern California

3-4 pm

Randy & Martha Beard

Authors of two WaterShapes articles on the relationship between expert builders and top designers; watershape builders in southern California

BLANKETS FOR LARGE POOLS

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STRANCO PRODUCTS has introduced Strantex thermal pool blankets and storage reels. Designed for applications with large, busy aquatic facilities, the custom-sized blankets are made from a tough polyethylene material and prevent heat loss. The reel system, which can be used with covers of up to 9,000 square feet, prolongs the blanket's service life by limiting the usual wear and tear. **Stranco Products**, Bradley, IL.

COMMERCIAL POOL CATALOG

Circle 142 on Reader Service Card

RECREONICS has published a catalog covering its full line of systems, equipment and accessories for commercial swimming pools and aquatic recreation centers. The 180-page, full-color book covers the range from basic equipment, fountains and cleaning/maintenance products through to aquatic exercise and therapy equipment, competitive swimming systems and disability-access equipment. **Recreonics**, Louisville, KY.



WATERPROOF CONNECTORS

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KING INNOVATION offers DryConn Waterproof Connectors. Filled with non-hardening silicone to provide a dry, safe environment for wire splices exposed to water, condensation, vapors or dust in exterior and interior applications, the connectors are engineered to eliminate the need for pre-twisting, heat shrink, resin packs or multi-piece corrosion kits and are color-coded to ease installation. **King Innovation**, St. Charles, MO.

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shapes, walkways, decks and other structures from root damage. The system works through the long-term, slow release of a pre-emergence herbicide incorporated into a Tytar drainage fabric. The herbicide creates an inhibition zone that stops root elongation. **BBA Nonwovens**, Old Hickory, TN.

UNDERWATER LIGHTS

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FOCUS INDUSTRIES offers the SL-33 series of underwater lights. The redesigned fixtures are precision-manufactured out of die-cast brass, with four stainless steel screws on the face plate. Accessories include a shroud, an angle bracket, a side-mounting option and lenses in blue, green, amber or red. The fixture is rated for 12-volt use and works with sealed MR-16 lamps from 20 to 50 watts. **Focus Industries**, Lake Forest, CA.

RETAINING-WALL SYSTEM

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ANCHOR WALL SYSTEMS has introduced Landmark, a geosynthetically reinforced segmental retaining wall system. Designed to allow for construction of walls up to 70 feet high, the system uses polymeric locking bars and a unique channel and locking flange configuration to maximize the tensile strength of the reinforcement. In addition, units vary in face profile, creating a staggered appearance. **Anchor Wall Systems**, Minnetonka, MN.



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OF INTEREST

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CATERPILLAR announces the model 287 multi-terrain loader, a compact, rubber-tracked machine designed for construction and landscaping work. Featuring a suspended undercarriage and a vertical-lift loader linkage, the unit is designed for use in a broad range of terrain conditions and offers high traction, excellent flotation and low ground pressure for jobs on soft, sloped or sensitive surfaces. **Caterpillar**, Peoria, IL.

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W.R. MEADOWS offers SealTight Renu-Strip, a flexible, rugged vinyl capping strip designed to fill any 5/8-inch-wide joint or make faded or broken Deck-O-Joint look brand new. The strip is simply pushed into place after application of a good PVC adhesive to ensure a permanent bond and comes in three standard colors (tan, gray and white). It can also be special ordered in black or redwood. **W.R. Meadows**, Hampshire, IL.



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S.R. SMITH offers The Pool Bar, a unique poolside assembly that includes two submerged seats and an umbrella table with four recessed drink holders. The assembly mounts on the deck with six stainless steel lag bolts, can easily be removed for seasonal storage and folds up and out of the water to ease either automatic or manual pool cleaning. The 72-inch umbrella folds and tilts for optimal use. **S.R. Smith**, Canby, OR.

RECEIVER-TRACK CATALOG

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MODERN POOL SYSTEMS has published a 16-page, full-color catalog covering its complete line of aluminum fiberoptic receiver tracks for use on virtually every type of pool construction. The tracks receive flat or round fiberoptic systems, and the brochure includes installation instructions and a range of helpful hints for setting up lighting systems for either concrete or vinyl-liner pools. **Modern Pool Systems**, Columbus, MS.



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Tisherman on working in difficult soils; **White** on edge treatments; **Lacher** on expansive soils.

☒ **April 1999** (Vol. 1, No. 2)

Hopkins on designing with large rocks; **Hare** on basic hydraulics; **Straub** on shell curing.

☐ **June 1999** (Vol. 1, No. 3)

Phillips on water and decks; **Parmelee & Schick** on soils and geology; **Anderson** on water sounds.

☐ **August 1999** (Vol. 1, No. 4)

Anderson on stream design; **Adams** on community waterparks; **Gutai** on spa hydraulics.

☐ **October 1999** (Vol. 1, No. 5)

Holden on aquatic-design history; **Mitovich** on dry-deck fountains; **Tisherman** on site geometry.

☐ **December 1999** (Vol. 1, No. 6)

Finley on Japanese gardens; a roundtable on pools and landscape design; **West** on color rendering.

☒ **January 2000** (Vol. 2, No. 1)

Hart on designing for model homes; **Zaretsky** on retaining walls; **Chapman** on hybrid pool finishes.

☐ **February 2000** (Vol. 2, No. 2)

Hersman on lighting design; **Macaire** on faux-rock installations; **Andrews** on glass mosaics.

☐ **March 2000** (Vol. 2, No. 3)

L'Heureux on project management; **Long** on steel cages; **Forni** on installing and maintaining lakes.

☐ **April/May 2000** (Vol. 2, No. 4)

Schwartz on garden access; **Anderson** on streambeds; **Nantz** on watershapes and architecture.

☐ **June/July 2000** (Vol. 2, No. 5)

Holden on fountain-design history; **Bibbero** on large stones; **Anderson** on making streams work.

☒ **August 2000** (Vol. 2, No. 6)

Tisherman on shapes; **Lucas** on watershapes for wildlife; **Ryan & Medley** on the vertical axis.

☐ **September 2000** (Vol. 2, No. 7)

Davitt on designing for small spaces; **Altwater** on the importance of aeration; **Hetzner** on sheet falls.

☒ **October 2000** (Vol. 2, No. 8)

Lampl on natural design; **Anderson** on finishing streams; **Rubenstein** on kinetic water sculpture.

☐ **Nov/December 2000** (Vol. 2, No. 9)

Arahuete on John Lautner; **L'Heureux** on stretching laminar flows; **Benedetti** on satellite surveying.

☐ **January/February 2001** (Vol. 3, No. 1)

Holden on a retro-look design (I); **Fleming** on upscale approaches; **Gutai** on pump technology.

☐ **March 2001** (Vol. 3, No. 2)

Moneta & Farley on site-specific design; **Benedetti** on fiberoptics; **Alperstein** on golf-course water.

☐ **April 2001** (Vol. 3, No. 3)

Jauregui on inspired clients; **Dirsmith** on frosty fountains; **Tisherman** on deluxe finishing.

☐ **May 2001** (Vol. 3, No. 4)

Reed on sculpture gardens; **L'Heureux** on sequenced water; **Brandes** on restoring riverfronts.

☐ **June 2001** (Vol. 3, No. 5)

Winget on fun-inspired waterforms; **Holden** on survey formats; **Schwartz** on classic stonework (I).

☐ **July/August 2001** (Vol. 3, No. 6)

Rugg on pond basics (I); **Ruthenberg** on perimeter overflow; **Schwartz** on classic stonework (II).

☐ **September 2001** (Vol. 3, No. 7)

Rugg on pond basics (II); **Urban** on energy savings; **Pasotti** on interactive waterplay.

☐ **October 2001** (Vol. 3, No. 8)

Tisherman on hilltop views; **Hagen** on natural stream work; **Schwartz** on classic stonework (III).

☐ **Nov/December 2001** (Vol. 3, No. 9)

Straub on Kansas City's fountains; **McCloskey** on the Getty Center; **Tisherman** on Fallingwater.

☐ **January 2002** (Vol. 4, No. 1)

Phillips on Hearst Castle's watershapes; **Bower** on the Raleigh Hotel pool; **Roth** on Katsura Rikyu.

☐ **February 2002** (Vol. 4, No. 2)

Marosz on project integration; **Moneta** on spa-edge details; **Affleck** on sculpture and water.

☒ **March 2002** (Vol. 4, No. 3)

Holden on a retro-look design (II); **Morris** on wild water; **L'Heureux** on fountain lighting (I).

☒ **April 2002** (Vol. 4, No. 4)

Oliver on multi-layer flows and transitions; **Gutai** on pump basics; **Dews** on hiding headwaters.

☐ **May 2002** (Vol. 4, No. 5)

Anderson on pond essentials; **Pasotti** on interactive waterplay; **Gibbons** on 'stellar' fiberoptics.

☐ **June 2002** (Vol. 4, No. 6)

Altorio on civic fountains; **Gutai** on skimmers; **Beard** on working with landscape architects.

☒ **July/Aug. 2002** (Vol. 4, No. 7)

Holden on retro details; **Orin** on quality, mid-range pools; **Varick** on grand-scale watershaping.

☐ **September 2002** (Vol. 4, No. 8)

Rosenberg & Herman on site-sensitive design; **Dirsmith** on long-term design; **Gutai** on filters.

☐ **October 2002** (Vol. 4, No. 9)

Copley & Wolff on modernizing fountains; **Bethune** on imitating nature; **Tisherman** on edgy colors.

☐ **Nov/December 2002** (Vol. 4, No. 10)

Holden on Villa d'Este; **Hobbs** on Maya Lin's watershapes; **Phillips** on water in transit.

☐ **January 2003** (Vol. 5, No. 1)

Fleming on high-end ambitions; **Harris** on decorative interior finishes; **Gutai** on surge tanks.

☐ **February 2003** (Vol. 5, No. 2)

The **Beards** on collaboration; **Yavis** on custom vinyl-liner pools; **Mitovich** on Microsoft's campus.

☐ **March 2003** (Vol. 5, No. 3)

Fowler on habitats for marine mammals; **Benedetti** on outdoor kitchens; **Dews** on planting pockets.

☐ **April 2003** (Vol. 5, No. 4)

Shoplick on watershapes as teaching tools; **Gutai** on water flow; **Schwartz** on Maya rockwork.

☐ **May 2003** (Vol. 5, No. 5)

Zaretsky on sensory gardens; **Freeman** on hydraulic retrofitting; **Hanson** on water/stone sculpture.

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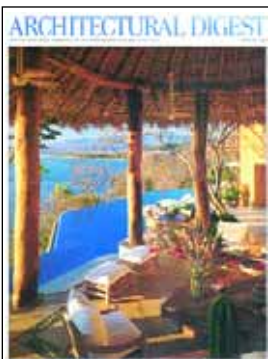
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Periodic Resources

As a reader of *WaterShapes*, it's likely you appreciate the valuable information published by quality magazines. I certainly do, so in addition to the steady diet of books I read to keep up on technical and design issues as well as business approaches and philosophies, I also turn to a handful of periodicals for the helpful and inspiring information they have to offer.

For one thing, I find that these magazines fill gaps I perceive in my own background. For another – and even though some of the ones I read run far afield of the industry-specific information I value in trade magazines – I'm uniquely surprised by the number and quality of ideas I pull from these titles.



First up is *Architectural Digest*, a venerable monthly for architects and designers published by Condé Nast. It took me a while to warm up to this magazine in any meaningful way because of its general focus on interiors. Recently, however, I've stepped beyond my own prejudice and now see the magazine's general usefulness to me as a watershaper.

Once you dig in just a bit, you'll find rich, detailed discussions of styles, textures, colors and materials, and I've also noticed a strong trend lately toward coverage of water. In fact,

where it was once rare ever to see a photo of a pool or a discussion of a fountain, now almost every issue includes information on watershapes – and I believe the publication is stronger and more valuable for the change.



Next is a set of magazines collectively known as *Trends*, published by Trends Publishing International Ltd. out of Auckland, New Zealand. Every quarter, *Trends* publishes a home-and-architectural edition that focuses entirely on residential projects and usually highlights exteriors as part of the package. It sells for about \$10 at major bookstores, and I find it to be well worth the price of admission.

Bottom line, *Trends* routinely features some of the most spectacular homes, gardens and watershapes I've ever seen. And because the projects originate almost entirely among architects, what you'll see is generally brand new, unlike some of the projects that tend to be seen again and again in the trades. The photography is uniformly spectacular, and each page is loaded with work that is flat-out gorgeous.



The publication farthest off the page in terms of apparent applicability to watershaping is *The Robb Report*, published monthly by Curtco Robb Media of Malibu, Calif. This magazine is perfect for those of us who have a need to find out how the "other half" lives. The value for me, as a blue-collar watershaper, is a work-

ing familiarity with the fine watches, automobiles, resort properties, cigars, artwork, textiles, design ideas and furnishings being marketed to my clientele.

I doubt that I'll ever have occasion to indulge in my own in the top-market realm of goods and services presented in this beautiful publication; instead, I value the confidence it gives me in being conversant on these things when working with affluent prospects and clients. And frankly, it's just good fun to check out some of these things, because you never know which sorts of fineries will fire one's own imagination and ambition. **WS**

Mike Farley is a landscape architect with more than 20 years of experience and is currently a design/project manager working in 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.

RESOURCES

Lots of you have asked where I buy my books, so here's a recommendation and plug for Half Price Books of Dallas. This shop offers an incredible selection of all sorts of books, and they are always *at least* half off the retail price (and often more). Check out their web site – halfpricebooks.com – to see what they're about.

For some of the more obscure books I've covered, a key resource is Hennessey & Ingalls, a seller of art, design and architecture books in Santa Monica, Calif., and its web site, hennesseyingalls.com. They don't do much by way of discounting, but they're a great resource for many harder-to-find titles.

–M.F

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