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WATER SHAPES

Design • Engineering • Construction

Volume 3
Number 7
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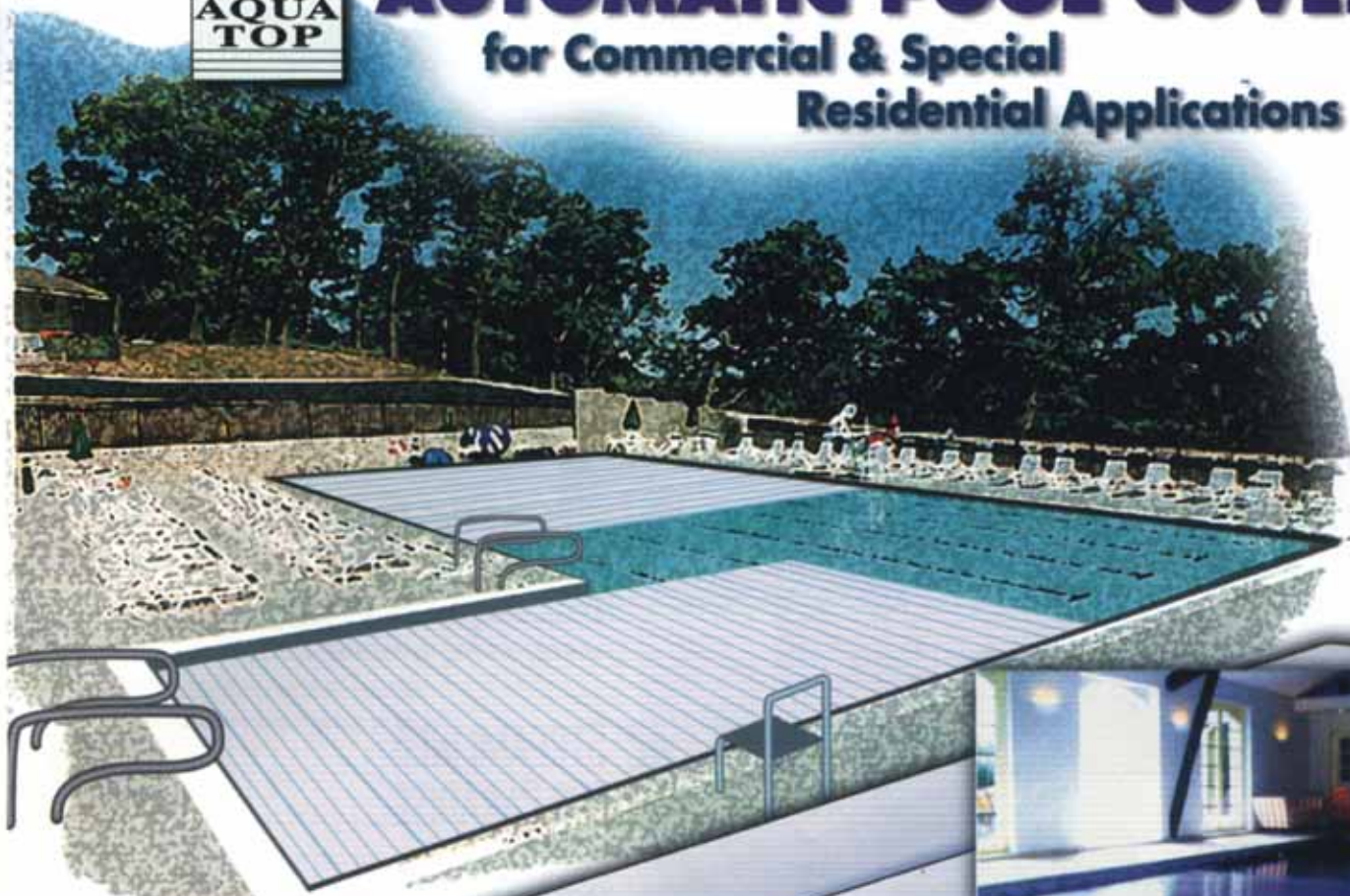
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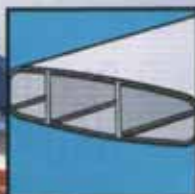


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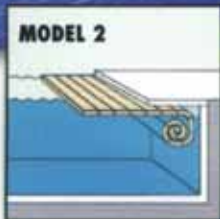


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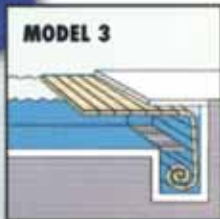
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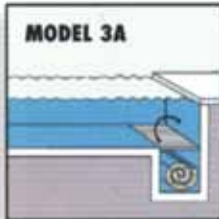
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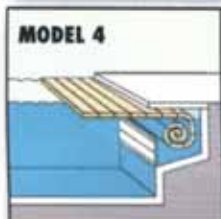
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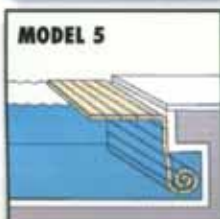
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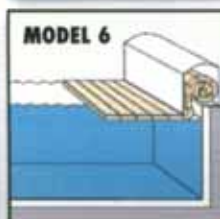
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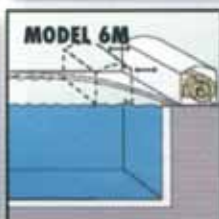
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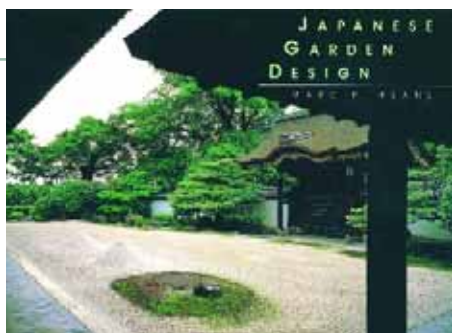


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Photo courtesy SCS Interactive Inc.,
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Echoes of Laughter

When I was kid in the '60s, my mom would take my sisters and me to a place called Penn Park near our home in Whittier, Calif. It was a beautiful old hillside city park with towering trees, winding paths and a very popular watershape.

It was called a *wading pool*; at least that's what my mom called it. It was little more than a circular slab of concrete that sloped gently to a depth of about 10 inches of water at the center. In the middle was a single stand-pipe that rose about eight feet. Mounted at the top was sort of an upside-down showerhead that sprayed a ragged curtain of water in all directions.

Using today's parlance, I guess you'd say the wading pool was an early interactive watershape with a 360-degree, zero-depth entry. I remember my mom saying that she thought it was California's answer to the open fire hydrants used to cool off neighborhood kids in cities back east.

All my sisters and I knew or cared about was that this was *the* place to be in the summertime. I can still hear the peals of laughter and see the scores of suntanned kids frolicking in the summer heat. I'll always remember the warm smile on my mom's face as she would sit by the side of the pool and watch us splash the day away.

Thirty-plus years later, my own family goes to aquatic theme parks where the single stand-pipe with a spray nozzle has evolved into a truly mind-bending array of fantastic interactive watershapes. Unlike the wading pool at Penn Park (which was free to everyone), it can cost a day's wages to get the kids in on this modern-day water play. But when you hear the laughter and see the smiles, I know my family is getting something good in return for the price of admission.

On page 28 of this issue, you'll find a fascinating article, "Invitations to Play," by Pam Pasotti of SCS Interactive, a manufacturer of interactive watershapes for waterparks. In it, she defines the surprisingly sophisticated behavioral psychology that drives the design of interactive waterfeatures and how these systems are currently being scaled down for use in a variety of community pools.

According to Pasotti and others working in the interactive water business, much of what can be found in big waterparks is now being transferred to a variety of settings, adding interest and value to traditional swimming pools as well as public play areas. The result is a powerful arsenal of fun-inducing contraptions that any watershaper can incorporate as part of larger designs or use as stand-alone attractions.

As I worked at preparing Pasotti's article for print, I found myself envying kids these days, imagining how fantastic Penn Park would have been had it been equipped with a modern interactive system. Yet for all of the refinement of thought and innovation that goes into water play these days, it occurred to me that the sound of the laughter is just the same.

I think it may be time to turn on the sprinklers . . .



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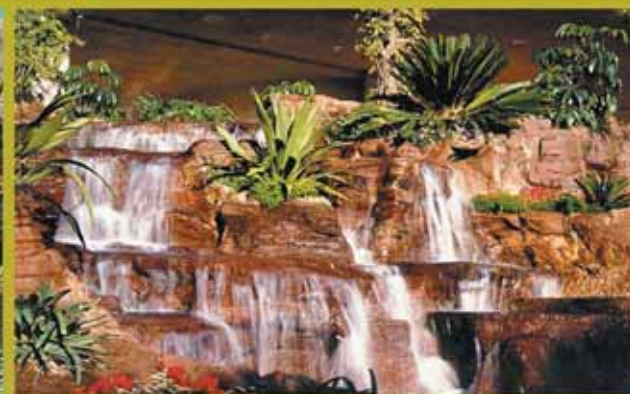
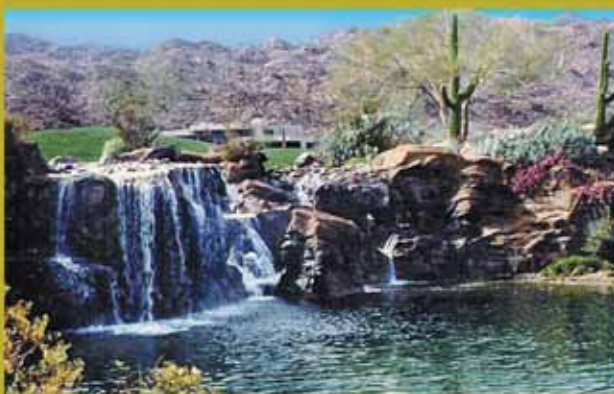
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Pam Pasotti is director of marketing for SCS Interactive Inc. in Tillamook, Ore., a division of Denver-based Koala Corp. and a manufacturer of interactive waterplay systems for waterparks, municipal aquatic facilities, resorts properties, semi-public properties and residential clients. Pasotti joined the company two years ago, after several years working in the computer manufacturing industry, where she developed her background in market research and sales psychology. Her decision to join the interactive waterplay industry was based in part on her desire to promote physical play and family interaction in today's increasingly sedentary, isolated society.

Mark Urban is founder and president of markUrban, a manufacturer of swimming pool valves and controls based in Tustin, Calif. A 20-year veteran of the pool and spa industry, Urban is well known for his highly innovative designs and technical concepts, especially in the area of energy efficiency, valve design and equipment-pad configuration. He holds patents on a variety of designs and concepts including FlowReversal and Thermapool. A native of Cleveland, Urban worked extensively in the restaurant industry before founding his own company in the early 1980s.

Greg Stoks is one of the principals of

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Commercial Aquatic Engineering, a Shakopee, Minn.-based consulting-engineering company that works with architects and owners to design and manufacture fountains tailor-made for the environments in which they operate. Stoks began working in the aquatic design and engineering business 18 years ago under the guidance of his father, Dick Stoks, a designer/entrepreneur. During his tenure with Commercial Aquatic Engineering, he has focused on fountain design and consulting. He may be reached via e-mail: gstoks@caqua.com.

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To the Good Life!

It's a statement that draws no argument: If you work hard, you should get to enjoy the fruits of your labor.

For all of the obvious truth of that idea, I wonder how many of us hard-working folks in the watershaping trades take the time for those things that bring us enjoyment and a sense of reward. To be truthful, my guess is that far too many of us let the hard work get in the way of keeping promises we've made to ourselves to stop and smell the roses every now and then.

Years ago, I hosted a radio program with my brother, Guy. It was called "The Good Life," and the tagline was, "The Bower Brothers sharing their enjoyment of food, wine and the good life." Neither my brother nor I were food and wine experts, which was precisely why we were chosen for the gig: The station master wanted two regular guys who enjoyed good wine and good food who could relate to the masses.

As it turned out, the show was pretty popular for a while because the desire for the good life was (and still is) something that just about everybody un-

In a business that's designed to provide beauty and recreation for its clients, it has always seemed to me that food and wine are a perfectly natural extension of the rich, full lifestyle that's part of our deal as watershapers.

derstands. And in a business that's designed to provide beauty and recreation for its clients, it has always seemed to me that food and wine are a perfectly natural extension of the rich, full lifestyle that's part of our deal as watershapers.

Business with Pleasure

My friends know that the good life, particularly that part of it involved with food and wine, is a subject very near and dear to my heart.

I can't remember a time when I didn't appreciate good eats. When I was growing up, my mom and dad always made a point of cooking really great food for family dinners, especially on Sundays, and our time around the table was a big part of our lives together. That's where my love of food and wine started, and dining with friends and family is where I find some of my greatest pleasures to this day.

My interest certainly wasn't the result of an upper-crust upbringing. My dad was a middle-class workhorse who ran a warehouse and trucking business for a long time. His love of eating and drinking was immense, however, so at some point he decided to switch careers and open a restaurant.

The family restaurant was one of the first places I ever worked, and for the few years my parents ran the place I did everything from washing dishes and waiting tables to playing in the band that would perform on Monday nights in the bar.

I could go into detail here, but suffice it to say that the consumption of good food and wine have been a big part of my life. These days, in fact, I'm proud to be heavily involved with the American Institute of Wine & Food, an organization that's given me the pleasure of dining with and getting to know the likes of

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Robert Mondavi and Julia Child. I've met many great chefs and enjoyed meals in wonderful restaurants all over the world – and it's not that I consider myself an expert by any means, but as with anything that you truly enjoy, the more time you spend with it, the more you come to know.

As I've grown older, I've come to realize how relevant the good life is in all

aspects of my life, including my career designing and building quality custom watershapes.

I've brought it up before: It's interesting how many times conversations that I have with clients turn to the subject of food and wine. In fact, I'm so accustomed to it that it just seems like part of the process. We'll talk about great restaurants in different cities, recipes

we've made at home and, of course, our experiences with bottles of "the nectar of the gods."

On the surface, this all may seem like fairly frivolous chitchat, but I've come to regard these discussions as something far more important: It sends a message to my clients that I enjoy the good life, as they do, and I find that it puts them at ease to work with someone who has experienced many of the things that they hold dear.

When you stop and think about it, it's not surprising at all that many people who care enough about their lifestyle and can afford to build a custom watershape also tend to enjoy eating and drinking. Watershapes are, indeed, part and parcel of "the good life."

Breaking Bread

For reasons that are quite fundamental to the human species, sharing food and beverages with clients always has a positive influence on the situation. After all, breaking bread is all about making friends, and it's been that way since shortly after our species dragged itself up from the primeval ooze.

Some of the most historic decisions and events of all time have occurred over food and wine. Treaties have been struck, businesses formed and famous love affairs sparked. Whether in business, at home or on the stage of world events, situations that are difficult can be eased or even resolved simply by picking up the discussion over lunch or dinner.

In my own business, I've been in situations where a disagreement about a point of design or a problem with construction has brought progress to a standstill. I've found almost without fail that if we take a break and concerned parties all go to lunch together, somehow a solution to the problem seems to emerge.

I think that's why "doing lunch" is so important in places like Hollywood and Wall Street: Negotiations tend to go well over a good meal, if for no other reason than each party can get a word in while the other is eating. And of course, there's a great tradition in this country of selling over meals, and that's why so many corporations spend millions of dollars to

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For me, I don't regard the dining/sales connection in such deliberate, commercial terms. Rather, I look at sharing food and wine with clients as a natural and easy way to bond and make friends. The benefits to my business flow naturally from time spent together at the table.

One of the things I've noticed about those of us who work in the watershaping trades is that our time is becoming a scarce commodity. We tend to cram more and more things into our days, and this can make it tough to stop and smell the roses. We eat fast food all day long and spend too little time with our families. And it's understandable, given how demanding it can be to run a business in this trade. Just the same, I believe that our lives are diminished by the pace we keep.

In Europe, there's a much stronger tradition of partaking of evening meals at home or in restaurants. Time spent lingering around the table after a meal is, in fact, a social priority, and having dinner with someone is bound to mean spending a good chunk of time in conversation. I think we would do well in the United States to move in that direction and take more time to spend over good food and drink.

Take It Easy

These observations bring me to my main point: I'm not saying that you should go out and try to become an overnight connoisseur of fine wines and foods as a way to impress your clients. Instead, I'm saying simply that if you find you enjoy a good meal and a good glass of wine, you'll discover great rewards in simply taking the time to explore the vast world of culinary art.

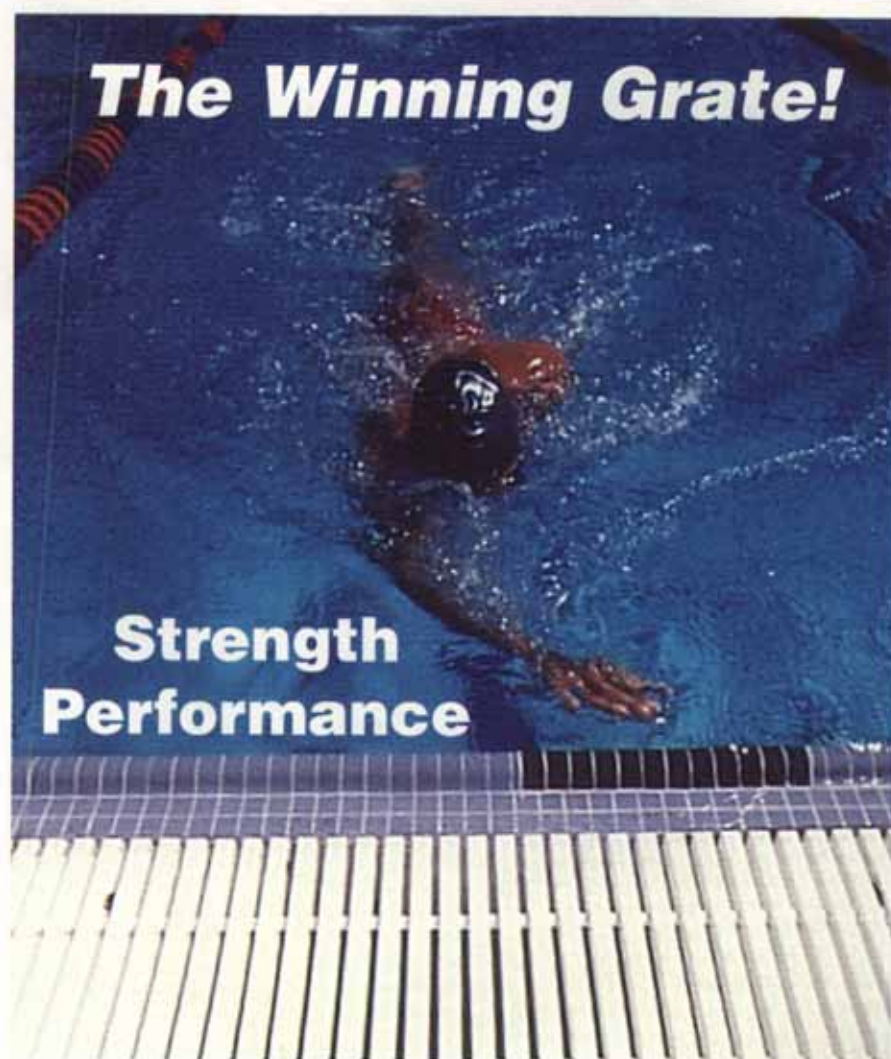
Food and wine are like anything else, you can never know what you like until you try it. This is why in organizing the Genesis 3 schools, we include wine tasting and great meals in the program.

We invite local wineries (and there are some great ones in Central California!) to come and pour a few of their best vintages, and we encourage our students not only to enjoy the libations, but to pay attention to what they like or even make

notes and certainly ask questions. We go to some good restaurants, too, and make a point of describing the dishes in our class literature (along with the compatible wines) — the same as we do with technical course content on edge details, hydraulics, drawing and design.

We do this for the simple reason that until you've tried something, you can't know if it's to your taste or not. It's real-

When you stop and think about it, it's not surprising at all that many people who care enough about their lifestyle and can afford to build a custom watershape also tend to enjoy eating and drinking.



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AQUA CULTURE

ly very simple: If you take the time to try new things and pay attention to what you like, you're sure to make some wonderful discoveries.

One of the great misconceptions about food and wine is that they have to be expensive to be any good. Sure, some dishes and bottles can be tremendously costly, but I've found that there are many quality restaurants that serve wonderful meals at reasonable prices and there are huge numbers of fantastic wines available for less than \$25. Fact is, anyone can spend a hundred dollars and get a good bottle of wine, but it takes some knowledge to get great juice at a fraction of the cost.

It's also worth noting that there are abundant ways to enjoy the good life. Food and wine have certainly worked for me, and I've also indulged a fondness for good cigars, too. You can express your passion through a love of great cars or boats or art, but I've found that, because dining is something that everybody does in one way or another, there's a wonderfully universal quality to food and wine. It's something that you can enjoy almost anywhere in the world at almost any time.

However you choose to reward yourself, it's useful to remember that the lifestyle that goes along with success is an important part of that success. It influences the way we think about ourselves—and as I said above, it defines and celebrates our ability to relate to our clients' desire for the good life.

Bottom line: Enjoying food and wine is good for business and the soul! **WS**

If you are interested in getting more information about the American Institute of Wine & Food, please visit its website: www.aiwf.org.

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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Edibles by the Water

Imagine your clients in this scene: It's a warm, summer evening, dinner for two on the patio is almost ready, the waterfall is on, and candlelight is reflecting on the surface of the pond.

But the salad isn't quite complete, so this evening's chef steps into the yard, clips some chives from a clump near the water's edge and adds a finishing touch to the composition. Later, they pick a few plums and apricots for dessert, relaxed and about as happy as they could be in their backyard.

Though the setting is delightful, it's the edible plants that complete the experience. And as was mentioned last time, with more and more people wanting good food and fresh ingredients, it's the perfect opportunity for a designer to get clients even more involved in what's going on in their backyards.

Last time, we covered the basic considerations of working with edible plants. This time, I'll focus on plants that will work well with any watershape.

Ready to Plant

A quick recap first. Before you start designing, remember the basic rules of planting edibles: Arrange the plants for ease of ac-

Sure, you can plant a kitchen garden that's set apart, but what we're more interested in here is in integrating these plants into an overall watershape garden and using them to increase your clients' pleasure in the entire setting.

cess, position them in the right places relative to the watershape, and make certain your clients know which plants and parts of plants are edible – and which are not.

For various reasons, some plants need to be situated further away from watershapes than do others. For example, a deciduous plant that drops a lot of fruit should be placed far away to minimize debris in the water, while an herb such as basil can be placed close to the water because it doesn't produce significant enough debris to affect the water.

Beyond that, there's actually little specialized knowledge you need to start designing with edibles. Place the lowest growers toward the front of a border and in the fullest sun possible. Larger plants and trees should go in the background, away from other plants so they don't block the sun.

And remember access: Always set up pathways or stepping pads, because the more difficult it is to pick the fruit, the less likely your clients will be to enjoy it.

Some people prefer planting edibles in a separate area, but that's definitely a preference rather than a requirement. Sure, you can plant a kitchen garden that's set apart, but what we're more interested in here is in integrating these plants into an overall watershape garden and using them to increase your clients' pleasure in the entire setting.

Scattering edibles in between other (non-edible) plants opens up many design options. Most edibles camouflage nicely when located among ornamental plants. At this level, all you need to do is remember the basic rules of designing and consider the plant's texture, color, size and function aside from its edible use (that is, if it's meant to hide something or be hidden), then arrange edibles among other plants as you would in any other design.

Some plants, such as artichokes, can become specimens when surrounded by lower plants. Their striking purple blooms (if the clients don't eat the artichokes first!) will definitely become conversation pieces. Others, such as thyme and other low-growing herbs, blend easily into almost any design.

One great hint: If you're going to plant smaller herbs, take a chance and buy several of them to plant in different locations. It won't take long to figure out what works best and where – and if more are needed, where to plant them for best results.

Continued on page 18

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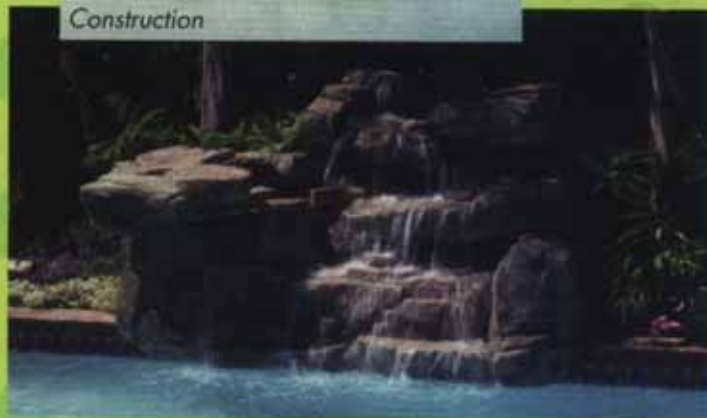
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Construction



Above: 3-Foot Ledger Long model

Below: 6-Foot Sheet Waterfall



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What to Choose Up Close

I don't have the room here to cover every type of edible plant you might use, but here is a list of some of the plants I've had success with. As always, what works will depend upon your region, so check with a local nursery for help in finding the best varieties and to get suggestions about which edibles do best in your area.

Here are my suggestions about which edibles work best in close proximity to watershapes:

❑ **Asparagus.** This is a very vertical plant. If you're an asparagus lover, you'll generally be trimming the stalks long before they have a chance to keel over into your watershape. To be on the safe side, however, plant them a mini-

mum of five feet back.

❑ **Banana.** Similar to many palms, these are good companions for watershapes. Their tropical look pairs well with many other plants that are commonly recommended for planting around pools. Since they produce few leaves, the drop is minimal and easy to remove.

❑ **Citrus.** Take your pick with the hundreds of varieties available. They all produce quite fragrant blooms, which may create a bit of debris, but they're evergreen, and the amount of leaf litter produced is quite small. Position them with the mature canopy of the tree in mind, making sure it won't jut out over the watershape to ensure that any fruit or blossom drop into the water will be kept to a minimum.

❑ **Herbs.** Most people start with herbs such as basil, chives, rosemary, sage, thyme, oregano or mint as a way to gain experience with edibles. They're the easiest category to grow and succeed with, and you'll only need small quantities of each to start. These plants generally don't produce much debris and don't require much special care. But beware: Oregano and mint should only be planted in containers! They self-sow quite easily and will overtake any garden rapidly, so cut off any blossoms as they appear to promote growth and prevent self-seeding.

❑ **Lettuce.** It's great to be able to produce a salad straight out of the garden—and it's also quite easy to do. Most nurseries sell mixed flats so you can experiment and find those varieties that appeal to your clients and grow most easily. These plants also tend to stay low and can be placed in the foreground of any border, making them easily accessible.

❑ **Strawberry.** The sweetest strawberries I ever tasted as a kid were grown by my best friend in a little strip along the side of her garage. They require full sun and are perfect for the front of a border, but their biggest problem is the pests they attract, including insects, rabbits and other small critters. Cages may be necessary (for the strawberries, not the critters).

A Few Steps Back

Here are my suggestions about which edibles work best when you back them a few extra-long strides away from your watershapes:

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❑ **Dill.** These plants self-sow easily, but they're not too invasive and can be pulled out easily. Dill is great in soups and salads. Best of all, both the leaves *and* seeds are edible. Because they tend to get tall, they are typically best in the back of a border.

❑ **Fruit Trees.** Most fruit trees, particularly stone fruits such as apricots, avocados, cherries, peaches and plums, are deciduous and have considerable fruit drop once the fruit ripens, so I recommend keeping them well away from watershapes. The same holds true for figs and nectarines and other popular types. After choosing the fruit you want, consult with your local nursery for which varieties grow best in your area.

❑ **Grapes.** Although they require lots of attention, many people enjoy growing their own grapes for eating or wine-making. Under any circumstances, they are best placed well away from watershapes because they command more care and tending than the average edible plant.

❑ **Melons and Squashes.** These are mostly trailing ground vines that should be kept at the farthest possible distance from any water. Often known to grow considerably overnight, they can take over an area quite rapidly and end up growing right into a pond or pool. But don't shy away from them completely: They are quite easy to grow and can give even our clients with the brownest of thumbs a sense of achievement.

❑ **Pomegranate.** I picked pomegranates once for a harvest festival and don't ever remember being any filthier in my life than I was when I finished. But the blossoms are striking, the fruit is one of my favorites, and I consider them well worth growing. Still, place them in the background not only because of their deciduous nature, but also because they become quite unattractive and appear almost dead through the winter months.

❑ **Raspberry.** Similar to rose bushes, this fruit producer has vicious thorns that should be avoided at all costs. This makes it unsuitable for use near swimming pools and spas in particular, because it can leave unsuspecting passers-by with horrendous scratches. Regular care is also recommended because the plants can overrun an area quickly, choking out other plants.

❑ **Tomatoes.** You might think cherry

tomato plants would be inconspicuous and stay small, but I'm here to tell you otherwise. I had one that was barely a shoot on Mother's Day but had reached a girth of 10-by-10 feet and was 5 feet high by Labor Day! There are many great varieties of tomatoes, all worth experimenting with, but keep them at a safe distance from watershapes and other prized

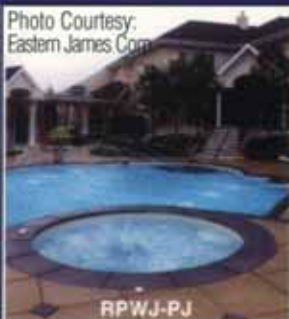
plants. Keeping them trimmed is one way to control their growth, but unfortunately it may hinder fruit production.

Here and There

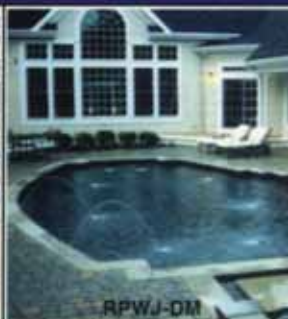
There are a number of edible plants that work well just about anywhere in a watershape garden, basically depending upon how your design comes together.

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❑ **Lemon Verbena.** Used to flavor teas, this herb gets quite leggy as it grows. You could put it anywhere, but you might want to place it behind something that grows 2 to 3 feet high to hide its bare lower branches.

❑ **Artichoke.** This is my absolute favorite among the edible plants. It can either be eaten or used for ornamental purposes because of its large, striking, thistle-like lavender flower – spectacular in cut arrangements. I would venture to guess, however, that most clients will cut

the fruit for dinner long before it gets a chance to bloom. The plant needs staking when the top-heavy fruit matures, and I recommend keeping it far enough from the water (by 3 or 4 feet) so that if it falls over, it won't land in the water.

❑ **Common Vegetables.** Depending on the style of a garden, most vegetables fit in as well as herbs do. Remember to consider the mature plant size and space veggies appropriately with surrounding plants. Some common choices include: beans, beets, broccoli, Brussels sprouts, cabbage, carrots, cauliflower, celery, corn, cucumber, peppers and radishes.

❑ **Sunflower.** Always a crowd favorite, sunflowers not only look stunning in a garden, but produce tasty snacks. I have a picture of my daughter with two sunflowers we grew, the flower heads of which were so big they barely fit into her wagon. We

feasted on those seeds for about two years after that harvest.

Obviously, there are a lot more choices than these for growing edibles in a garden. And as many of your clients will tell you, growing your own is much more enjoyable than getting into a car and heading to the market. So start suggesting edibles to your clients, particularly those who are health-conscious or have children: It will let them know you have their health and best interests in mind! **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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Stretching Out the Hand-Off

As with every other step along the path of true quality in watershape construction, a good start-up is critical – a key transitional step requiring supervision, teamwork and passion for the work.

This is the point where a watershaper's vision becomes reality, where construction becomes maintenance and where the clients' dream is finally realized. It's another important detail, and getting it right requires complete trust and wide-open lines of communication among the builder, the service technician and the homeowner.

That puts a premium on finding the best possible person in your area to take on the responsibility. In my case, I consider myself very fortunate to work with a true service professional, Kerri McCoy of Pineapple Pools in Malibu, Calif. Conscientious, thorough, dedicated and educated in the ways of high-quality construction, she's the only person I currently work with in Southern California, where I do most of my jobs.

When you build quality, the start-up technician is really part of the team.

Kerri knows all of my subcontractors.

She knows all about the materials I use, the equipment I choose, my philosophy of design and my commitment to quality.

If you haven't identified this person in your area, don't hesitate to start looking: This relationship is far too important to leave to chance.

Part of the Team

I can rely on the fact that Kerri is as committed to quality as I am. I can count on her to take care of all the details, ask the questions that need to be asked and listen to the answers. Better yet, I can count on her to return my calls – and that's important, because I talk to Kerri almost constantly, keeping her up to speed on the projects I'm doing.

The working relationship has become so close that she's been involved from the start of most of my current projects, advising me on service issues and becoming very well versed in the many details of the "wet art" I'm creating.

When you build quality, the start-up technician is really part of the team. Kerri knows all of my subcontractors. She knows all about the materials I use, the equipment I choose, my philosophy of design and my commitment to quality. As the person who will start-up and maintain my art, she is well versed in almost all aspects of its design and construction from the project's conception. She's even accompanied me to presentation meetings with clients.

More often and in more practical terms, she gets involved in my projects during construction, when she has an opportunity

to offer her input on specific issues such as equipment layout and configuration. This early acquaintance with the project also gives her time to watch and familiarize herself with the range of variables of weather, wind, plants and pets that will affect the service work she will perform later on.

By the time we're finished with construction, she's familiar with the electrical system, the control system, plumbing and hydraulics, any chemical treatment systems, visual features and all the spa specifics.

As I've said here many times, every setting is different, every client is different and every project is different. Knowing this, I'm particularly impressed by the incredible range of factors Kerri has to weigh in planning for service with respect to time, level of difficulty and pricing.

There's another thing I like about working with her: Like all of the people I work with whom I most respect, she has a genuine passion for what she does. She wants to learn, she reads and studies and she won't let anything slide. In fact, she has such a hunger for information and insight that she's even attended the Genesis 3 Design School to learn more about design and watershaping.

She's definitely not what I'd call a "pool grunt." If she hasn't found things out by herself, she'll ask me dozens of questions about my clients and the setting, the number of children, nearby trees, animals, prevailing winds and sun exposures. In time, she understands all there is to understand – and how to meet the clients' needs and desires. All of this informs the way she structures and plans her service routines.

A Clean Hand-Off

On most jobs, she's so involved (and by the time I wrap up my work, so familiar to the clients) that it's a foregone conclusion that she'll stay on as regular service technician when I'm gone. It's also a fact that, in *all* my years of building quality watershapes, my recommendation about who should take care of the pool carries a lot of weight with my clients.

It also helps that starting up a pool is an exciting time for homeowners, who, after months of anticipation, are 100% ready to see their pool filled with water and operational. Obviously, it's the point where

you as designer and builder see how well things work both technically and aesthetically. It's also a point in time where a trusted, creative, well-informed service technician on hand is extremely valuable.

It's never a casual thing for me. At least a week before we're to fill the pool with water, Kerri and I will meet on site and do a detailed walk-through of every single system, detail and piece of equipment. I hand

over all the technical data on the equipment and system configurations. I reiterate with her all relevant information I have on the clients, including things such as pager and cell-phone numbers and e-mail addresses.

At the same time, she's preparing to take over. She'll check and recheck the equipment and figure out just what it'll take to work with a given pool as part of her business (rather than as an observer). In oth-

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er words, she's taking "ownership" of the project – and with everything she does, she's building my confidence that I'm leaving things in good hands.

As we prepare for the big day, she meets with the clients and discusses service scheduling and their programming preferences for the control systems. She'll do the initial programming for them and also teach them how to use the system and

answer any questions they might have.

This is important: By involving the service technician over a period of time in a true transition, I effectively remain in control of the pool's operation. This is a key difference between my approach and that of others in the trade who leave responsibility for the start-up in the hands of the homeowners or a technician of their choosing.

Because this pool represents *my* com-

mitment to quality, I don't like even the thought of leaving homeowners on their own to destroy my work.

Down to Details

Immediately after the finish is applied (whether it's plaster, pebbles or tile), it's time to fill the pool – and this is exactly the point at which I hand control over to Kerri and step back into a supporting role.

As the pool fills, Kerri manages the chemical phase of the start-up and takes care of all the necessary brushing and cleaning. At this point, all the circuit breakers are off, and she's in charge of activating all systems. If there's any problem with any of the systems, she'll call me and we'll work things through together.

My subcontractors and I will make the necessary adjustments *immediately*. It's Kerri's game now, and I'll do all I can (and insist my subs do the same) to make certain she's in a position to satisfy homeowners who are now *her* clients.

This is another important point: A big mistake many people make in this business is that they allow certain issues to remain unresolved. This is *always* a negative from the clients' point of view, so I'm glad to have Kerri on my team to help me speed things toward real, practical, long-term solutions. And because she's so involved and familiar with the systems, we can respond almost immediately and implement changes very quickly to address any and all unforeseen problems that might arise.

As I've said before in this column, supervision and working with quality subcontractors are critical to achieving quality. I consider my service technician as being an extremely important member of that team.

What qualities should you look for in your service professionals? My advice first of all is to do everything you can to find a technician who is passionate about what they do. Just as important is finding one who understands construction and has a feel for how a project comes together. Finally, take your time: Just as it can take a while to find a good electrician, carpenter or plumber, you may have to dig a little and try out a few different technicians before you identify your start-up specialist.

I've known builders who make the mistake of putting the job out of their minds

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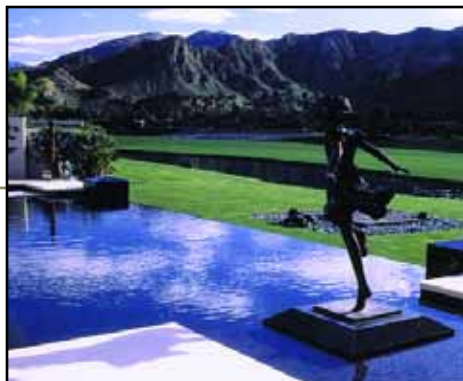
This school has a special focus on details of pond design and construction through participation of Pond Supplies of America, including principles of establishing living water systems. Open to all applicants.

February 13-17, 2002

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Genesis Level 1 School

The flagship school in the Genesis 3 program, this school focuses on design, engineering and construction of watershapes, drawing techniques and the Genesis 3 philosophy and programs. Open to qualified applicants.

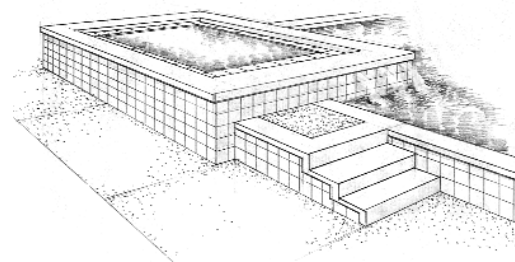


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once it's over. That's just crazy, because when you're finished as designer and/or builder, *that's* when the life of the watershape really begins. Speaking for myself, I never really consider that I'm "done" with a project: Through Kerri and my ongoing relationship with her, the watershapes I've built will be mine as long as the work exists and will always reflect my own passion for what I do.

Look at it this way: If you take what you do seriously, handing the work over to a service technician represents a massive leap of faith and trust. With so much riding on that relationship, it only makes sense to invest the time and effort needed to find the very best person you can. **VS**

David Tisherman operates David Tisherman's Visuals, a design and construction firm based in Manhattan Beach, Calif., with offices in Marlton, N.J. He is co-founder and principle instructor for Genesis 3, A Design Group, which offers education aimed at top-of-the-line performance in aquatic design and construction.

The Technician's View

To a lot of people in the service business, the term "start-up" refers only to the process of filling, brushing and managing the chemical transition from tap water to pool water. As important as handling the start-up chemistry may be, there's a lot more to it than that — and most of it has to do with keeping the client happy.

My job as a service technician who performs start-ups is to act as a sort of liaison overseeing the greater transition from the construction phase to the operation phase, and I do all I can to make sure the builder who's referred me to the client is not receiving calls about problems.

In other words, once I take over on a job, all questions, concerns and complaints go through *me*.

To play that role, you *must* be involved. As my friend David Tisherman mentions in

the accompanying column, I'm familiar with what's happening with his projects from an early stage, and I work hard to know everything I can about the pool long before it's time to fill it with water. This hands-on approach takes time, and I arrange to make several trips to the site before we turn on the tap.

As time passes, I also get directly involved with installation, beginning by installing the electronic remote-control system and working with the clients to establish filter-pump cycles and time frames for running all of the other systems that might be involved. I program the system and show the customer how to use it; I make sure the customer knows how to reactivate the system in case of a power outage (a big issue these days in California); I also get involved in installing the salt-water chlorine-generating systems David and many other builders are using these days.



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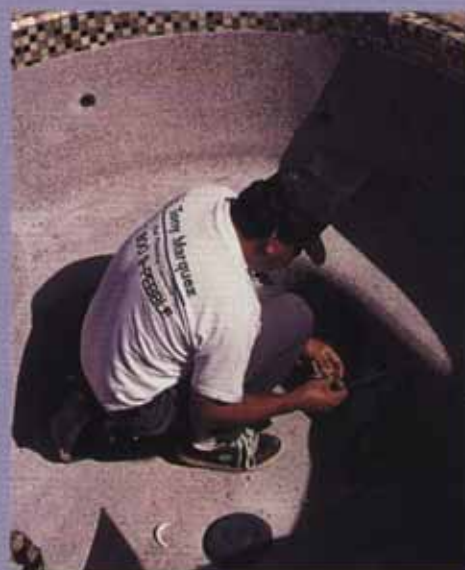
It almost always takes more than one working visit with the customers for them to gain a comfort level with the pool they've just purchased. I expect to answer the same questions more than once and build the time needed to perform service at this personal level into all of my planning.

No matter how good the builder is, there are going to be unanticipated issues that crop up on just about every job. When I start a pool, I go looking for things that might not be right and contact the builder immediately. On a recent project, for example, the gas line to the spa heater wasn't hooked up, and the builder took care of it immediately – so quickly the client never even knew there was a problem.

That's what it's all about: Good start-up technicians understand construction and work with the builder to make sure everything is up to speed and serviceable when

the time comes to take over. They also know that the first days of a pool's operation are anxious and exciting times for homeowners – a time that requires patience and attention to detail and a desire to make every go as smoothly as possible.

— Kerri McCoy



I consider myself to be a student of the construction process and take whatever opportunities my schedule allows to visit jobsites to learn what I can – in this case, about the process of applying a pebble finish to one of David Tisherman's pools.

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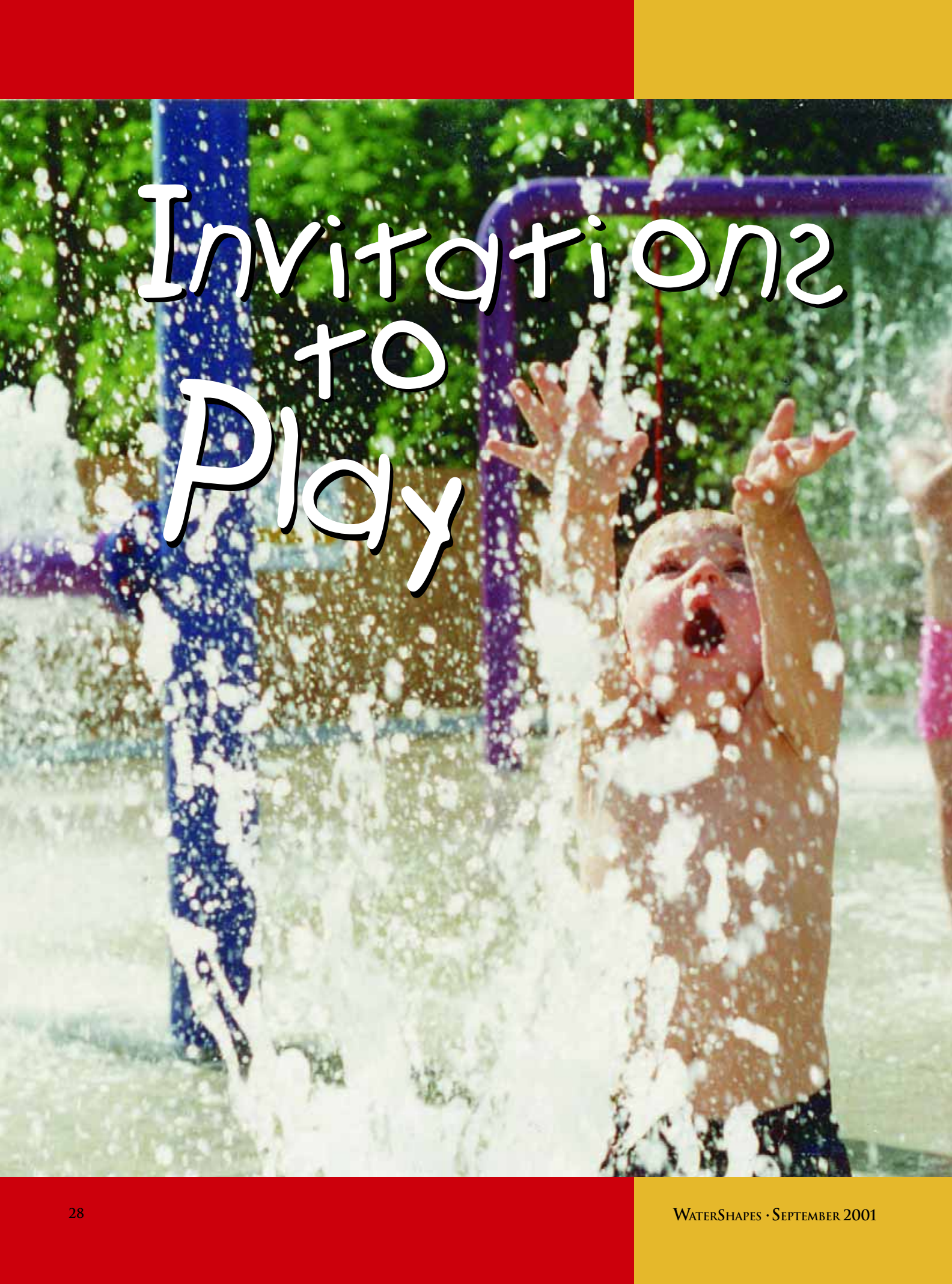
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A photograph of a young child splashing in water at a playground. The child is shirtless, with their mouth open in a joyful expression, and their arms raised. Water is splashing all around them, creating a dynamic and energetic scene. In the background, there are blue and purple playground structures and green foliage. The overall mood is playful and refreshing.

Invitations to Play



First created for use in the supercharged, hyperactive environments of aquatic theme parks, interactive water-play systems now offer the designer of public and semi-public spaces an arsenal of fun-inducing features. They work in just about any setting, says Pam Pasotti of manufacturer SCS Interactive – anywhere you think people might take up the invitation to get wet in the name of pure, unadulterated fun.

By Pam Pasotti

Interactive watershapes are all about invitations to play.

For designers, interactive watershapes provide invitations to use water and the control of flowing water to create unique play environments. For children, teenagers, parents and other adults, they are invitations to play with one another in a safe and exciting aquatic playground.

It's a form of invitation that's rapidly gaining popularity in an era when playtime for both children and adults has become excessively passive and dominated by surfing the net, playing computer games or staying glued to home-entertainment centers. As a result, many of us have essentially lost touch with how to play together.

Interactive water offers a healthy, social alternative to all that passivity. Just visit a local waterpark and you'll discover people of all ages *expecting* to interact with others as they play with water. And in the larger theme parks, patrons are paying big dollars to do it, enticed by the simple desire for hands-on fun with moving water, surprising causes and effects, "gotcha" games and creative teamwork.

When reduced to the scale of pools in housing developments or community pools, the invitations are compelling enough that more and more clients are clamoring for these effects as part of their projects – and watershape designers need to know how to achieve them.

Composite Fun

At SCS Interactive, we specialize in designing and installing waterfeatures for large waterparks, but our systems are typically compilations of basic interactive water components that can be used in smaller venues.

It's been a natural progression for us as we've encountered developers of planned communities who are exploring these smaller-scale water-play areas as a way to expand activity zones for children and families and thus create a more desirable community space. Homeowners' associations are also recognizing the need to redesign neglected common spaces and are turning to interactive water to provide central recreational magnets for their member families.

And this isn't a local phenomenon: SCS Interactive and its competitors have watched the trend across the United States as families are beginning to search for ways to socialize and play together again, and we've all been deluged with requests for products scaled down to accommodate smaller construction footprints as well as smaller budgets – and have created new product lines in the process.

With our chief objective of offering entertainment for all ages, these new, scaled-down interactive structures all feature elements that have long been winners on a larger scale and have been thoroughly "kid tested" through the years.



The Science of Joy

We at SCS Interactive spend a lot of time thinking and talking about the psychology of play, or what we've come to call "playology." It's not something you can get a degree in at a university, but examining it in the real world is essential to what we do as an organization.

Several elements of this phenomenon are discussed in the accompanying text, but there are a few more that bear mentioning.

A key factor in the psychology of play is the innate desire to belong. So often in activities that require learned skill, our natural tendency is to stand on the sidelines because we're afraid we might not do something well. Ballroom dancing, ice-skating, or skiing are examples of activities that can only be enjoyed after the participant has attained a certain level of skill.

By contrast, interactive waterfeatures are so intuitive and basic to use that they are instantly comfortable and immediately welcoming. There's no trick to it: It's just plain fun, right away, and potential participants can instantly visualize themselves at play. There is no real learning curve, only an invitation to play.

And frankly, the desire to exercise aggression is also a part of the psychology of play. There are kids who love getting their folks wet because they need to get their aggressions out (and vice versa!), and few will try to deny that there's something truly cathartic about drenching one's siblings or parents.

It tends to garner a reaction and can be quite startling – yet we all know that it is also completely harmless. The only possible repercussion? Well, you might fall victim to a drenching yourself!

–P.P.

Interactive water-play systems come in all shapes and sizes, from the re to think on the grandest scales to design this level of play into a community features are readily available for small spaces and can be combined an

This is all happening for a reason: Water is *the* perfect medium for cause-and-effect games and creative play. Using hand-wheels, levers and pull ropes (to name just a few of the more common interactive elements), participants modify the behavior of various jets, sprays and waterfalls, often in unpredictable ways.

This control is the key to interactive water. It empowers the user and creates a wide range of play possibilities. Consider deck-level pop-up jets, a common type of play feature that sends one-inch diameter streams of water jumping more than three feet in the air. These are fun in and of themselves, especially for small children, but when you add in the element of another person *controlling* those jets, a whole new dimension of play is created.

And the same principle holds for arching jets and water curtains: Turn a valve or pull a rope and watch what happens!

The Science of Playtime

Designing water structures for energetic play requires a knowledge of design, manufacturing, construction and operations, but it also calls for detailed understanding of "play psychology" – and for knowing how to balance all of these elements in our work.



...relatively simple to the highly elaborate – but you don’t necessarily have
...aquatic facility or a housing development’s recreation center. Individual
...expanded on in a virtually limitless number of ways.

But play psychology is really the key – the essential element driving the design and manufacture of interactive water-play systems. This isn’t a formal branch of behavioral science, but more of a principle of design that dictates the way we connect physically, emotionally and socially in a play environment.

The first and most essential element in creating a system with favorable play psychology is to create what is called “permission to play.”

It’s human nature to *want* to play, but in order to venture into a play environment, adults and children alike have to be able to “see” their role and visualize themselves getting in on the fun. Kids blasting parents with streams of water or turning a valve to drench an older sibling or friend – followed by the opportunity for the *other* person to get immediate payback – starts the interactivity.

If a particular interactive component isn’t being used, the simple presence of a wheel or a lever or a pull rope invites the novice to give it a try. One expects a cause-and-effect response with these devices, which makes giving it a try very hard to resist. With controlled deck jets, for instance, you may be the first to be surprised – then you get to surprise *other* people after luring them over to the jet’s location. We call this the “gotcha factor.”

From the Sideline2

A real bonus that comes with interactive water-play settings is the opportunity to watch: Parents or caregivers who don’t want to get wet can easily settle in and supervise their children from a safe (and dry) distance.

In studying these systems, we’ve observed that simply watching others play is incredibly entertaining, which makes interactive features a natural for park-like settings where benches and shade trees provide an opportunity to relax and enjoy the enjoyment of others.

– P.P.

In studying the psychology of play, we’ve watched little kids keep at it all day long, indulging in the excitement over and over again. To make it work, the designer must anticipate opportunities for surprise *and* opportunities for retaliation. This draws the willing “victim” into the playing because he or she knows there will be a chance to get others wet.

The color, theme and layout of these systems also work to offer the user permission to play. These spaces are obviously designed for fun in which getting wet is the order of the day. In a sense, their very presence provides tacit permission to join in – and drench or be drenched.

Interactive water also provides for cycle after cycle of surprise attacks and retaliations and a new adventure and a different game every time, because there will always be new participants and different reactions. So while the features themselves can be simple, the opportunities for creative play are limited only by the imaginations of those who join in the fun.

Physical Design2

Armed with this understanding of the psychology of play, designers of interactive waterfeatures need to combine a variety of individual elements to create environments that satisfy basic play needs. At that level, it’s all about putting these devices together in a way that works – combinations of features, their proximity to one another, their height, their colors and the flow and form of the water are all important in creating these systems.

When you break it down, an impressive array of interactive features can be combined in these play areas. At the designer’s disposal are bubbler or deck jets, water curtains, umbrella jets, overhead rope pulls, pipe falls, arch jets, slides, two-person reciprocating pumps, water-blasters, cannons, cascades from rooftops, tipping buckets and a range of hand-wheels and levers.

The structures themselves provide part of the variety and interest as well, with stairs, bridges and assorted landings, corridors and traffic patterns. Some larger designs mount up to three levels, creating new points of vertical interaction in addition to all of the horizontal action at deck level.

While SCS Interactive and other suppliers might be tempted to do no more than pull these components and devices off the shelf, each system is much more than the sum of its parts: Every element is selected and placed to maximize in-



The elements of surprise and discovery are at work every time a child approaches an interactive waterfeature. The opportunity for 'gotchas' with playmates is irresistible, and it takes no time at all for participants to get the hang of what's going on.

teraction with all the other components and the people operating these other components. These compositions cover the spectrum from compact spaces to enormous, highly themed play environments that create worlds of fun.

All of this begins, of course, with the client. Often, they want to work within a theme – Caribbean-style pirate retreats, jungle tree houses, undersea kingdoms – and want whatever water-play features are added to work with swimming pools or other components such as slides. In some cases, however, we're called on to create a water-play area as the central element in a recreational setting.

In most cases, the bodies of water we work with aren't designed for swimming. The vessels we set up have depths ranging from zero to 18 inches – enough to play in without complete submersion.

And there is no waiting in line: These systems can be accessed from all sides at any time – just jump in and go. Even with popular individual interactives, players will move on after a while to seek fresh opportunities for fun. And with multiple levels, you can take advantage of sky space, which is appealing for facilities with limited square footage.

Scaled for Action

The size of an interactive water-play area is determined by the anticipated number of users and the available space. Obviously, the smaller the development or community, the smaller that water-play system can be. By the same token, the higher the anticipated user levels, the more elements a system will need to keep players busy and engaged.

Naturally, the number of elements desired and the available footprint dictate the size, scope and budget of these projects. In our case, we've packaged several standard units, from three-feature systems for use in spaces as small as 17 by 17

Safety Factors

Key to the success of all interactive water-play systems is safety.

As with most playground equipment, the possibility of injuries can be decreased dramatically through experience and the use of designs and physical orientations that have proved safe over time.

At our company, we take safety as a "ground-up" proposition that starts with safety surfacing. This can be the most important and potentially most expensive part of any play area, wet or dry. But in areas where there's a probability of high-speed impacts between children and the ground, a 2-1/2- to 3-inch thickness of synthetic resilient surfacing should be used in accordance with instructions from the system's supplier.

Decks and stairs of water-play structures are a consideration as well and are made of round-edged fiberglass with an integral

slip-resistant finish. Hand wheels are designed for use by small toddlers and strong teenagers alike and must ensure minimum exposure to injury during rotation. In addition, the recognition of potential catch and pinch points is critical in designing hands-on play structures.

Water depths of 18 inches are recommended for safe use of slides, tunnels and tires swings, but for interactive water-play areas, we work with many zero-depth installations. Often referred to as "spray pools," these areas offer reduced costs in construction, supervision and operation. Many are set up with motion sensors that can save water and energy when the area is not in use, and they offer advantages when it comes to ADA requirements because they are, by nature and by design, fully accessible to the physically challenged.

– P.P



Teamwork and collaboration are also part of the interactive play concept as children work together to activate water effects and produce results that both surprise and delight all participants.

feet—good for use by about a dozen participants at a time—up to systems that include 50 play elements spread across footprints as large as 85 by 40 feet and usable by hundreds of people.

The prices range from \$20,000 for smaller systems up to \$250,000 for large ones.

Installing these systems requires the participation of an experienced and competent contractor. We and other suppliers are at the ready to take care of installation ourselves or participate as necessary to make certain that systems are properly installed. We'll also help manage costs by knowing, for example, where less-expensive coated pipes can be used in place of stainless steel. And we know how to set up hydraulic and control systems to maximize efficiency and performance.

We derive a great deal of satisfaction from what we produce, but the greatest

satisfaction comes from observing the resulting family play.

While technology has developed so many solitary and passive ways of playing, the most *satisfying* play is still physical and simple—running through sprinklers, playing catch, waging squirt-gun fights, playing tag and doing “cannonballs” into a swimming pool. We therefore base our interactive design work on the basic and everyday magic of children’s play.

It’s very satisfying to provide these simple pleasures to people of all ages. The joyous mayhem that erupts in and around these features is truly infectious, and no matter how much time we spend on the business side of designing and selling these systems, we never tire or lose sight of their central purpose.

After all, we are all children at heart. Sometimes, we just need a little reminder. **WS**



This whole concept of ‘play psychology’ has powerful implications for the designers of aquatic spaces. Finding new ways to engage children in vigorous, exciting physical activity is becoming more and more important at a time when too many kids are spending their ‘play time’ sitting in front of televisions or computer screens rather than having good, clean fun.



TO HOMEOWNERS, SWIMMING POOLS HAVE ALWAYS REPRESENTED FUN AND RELAXATION. BUT THEY ALSO CAN MEAN OVERWHELMING ENERGY BILLS, ESPECIALLY WHEN HEATING COLD WATER WITH FOSSIL-FUEL HEATERS IS REQUIRED. AS ENERGY EFFICIENCY AND CONSERVATION RECLAIM PROMINENCE IN OUR NATIONAL CONSCIOUSNESS, INVENTOR AND MANUFACTURER MARK URBAN SEES A BRAVE, NEW WORLD — ONE IN WHICH POOLS BECOME A RESOURCE, NOT AN ENERGY DRAIN.

Filling the Energy Gap

By Mark Urban



Everyone is concerned these days about electricity, gasoline and natural gas and all other forms of energy. What is amazing is that, despite this surge in interest, very few people have considered ways in which swimming pools can be built to reduce the energy required to heat them – and by *substantial* amounts.

This dearth of energy consciousness has nothing to do with the manufacturers of heating equipment. It's fair to say that most heater manufacturers – whether they pursue combustion heating with fossil fuel, compression heating with heat pumps or passive heating with radiant solar, absorbent solar panels or solar covers – all have optimized their *own* products and made them remarkably energy efficient.

The same is true of recirculation systems: Pumps of all kinds are optimized to very high efficiencies, and the pool and spa industry has made positive improvements in acknowledging the necessities of hydraulic efficiency (although it's fair to say we haven't seen wholesale adoption of any and all products available to maximize the efficiency of water flow).

Despite this slow evolution, however, the entire watershaping industry has overlooked the most obvious challenge to energy efficiency of a swimming pool: This gross and egregious offender is the huge mass of cold water itself and the ways in which the pool industry has traditionally chosen to heat it. It shouldn't be this way, if only because it wastes an incomprehensible amount of clients' money.

Indeed, I believe that the watershaping trades are missing a tremendous opportunity not only to increase heating efficiency dramatically, but also to use the pool itself as a way to *save* and, in fact, *store* energy.

The Nature of Water

What are we really considering here? We have large masses of water – 20,000 gallons at a minimum to hundreds of thousands or even millions of gallons in some cases. Whatever the size of this huge mass of cold water, we know that great quantities of heat, measured in British thermal units (Btus), will be required to heat it.

Common sense recognizes that heat rises. The upstairs rooms in our homes are warmer than the downstairs rooms; the tops of our rooms are warmer than their bottoms; hot-air balloons float because hot air is lighter than cold air – it's physics at the most basic level. But this means that the conventional swimming pool is upside-down for heating with respect to the basic physical phenomenon of rising heat – that is, pool heating should be done from the bottom up and not the top down.

This has been a problem since the first pools were built.

Initially, basic recirculation involved removing water and debris from the deepest point at a main drain and eliminating floating debris at the top surface through skimmers. The water is returned near the top to create surface movement that pushes floating debris toward the skimmers. If the debris becomes saturated and sinks, it is removed through the main drain.

It's been acknowledged that good pool design should include at least two (not one) skimmers, diametrically opposed. This is the best water-flow path for cleaning and filtering pool water, and as a result this is the way pools have been built, basically and cheaply ever since.

The rub and the contradiction developed later, when the idea arose of boosting the water temperature for comfort and thus extending the season in which swimming pools could be used by additionally heating these masses of cold water:

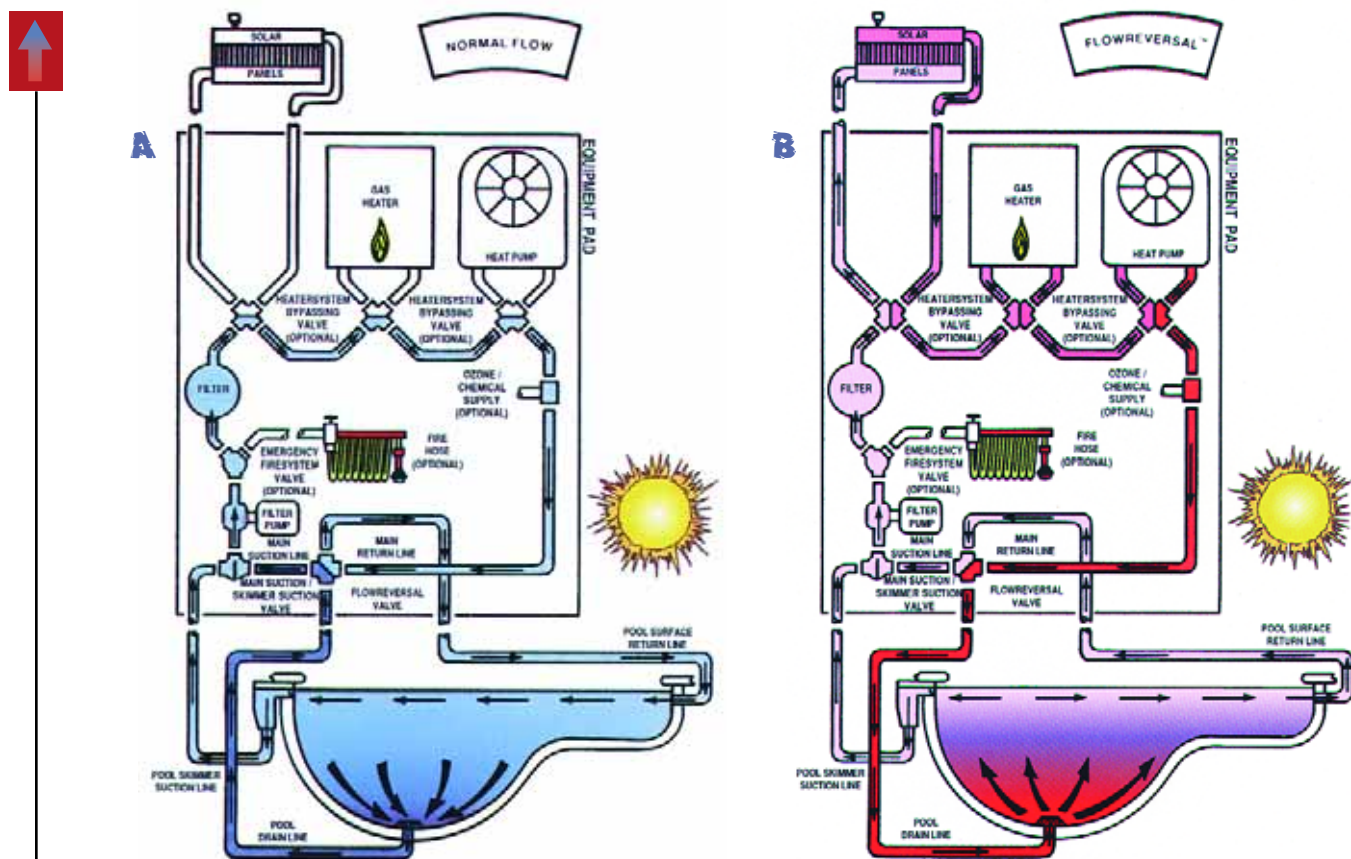


Figure 1: When a flow reversing system is set up on a new pool, the flow pattern follows the conventional pattern for optimum cleaning when the heating system isn't operating (A). When the heater starts, however, the valve alters the flow pattern to introduce warm water at the main drain to optimize heating (B).

Rather than rethink the water-flow path, builders simply placed heaters (boilers) into the traditional recirculating paths for swimming pools – an error that continues wasting energy and money.

Ultimately, what works well for recirculating the water for optimum cleaning makes absolutely no sense for heating.

Bottoms Up

This wastefulness bothered me before I became involved with the pool industry. It made no sense to me to remove the coldest water from the pool's bottom, heat it – and then compound this mistake by spreading the heated water across the large surface area at the top, where the added heat would dissipate, lost to the air above.

In terms of simple physics and laws of temperature differentials, this approach to heating the pool's coldest water leads to wasting a tremendous amount of energy. A situation is created in which these pools require enormous amounts of time (and energy) to be heated.

The waste of energy is both staggering and foolish, and the pool industry as a whole has basically ignored this inefficiency for decades – with some exceptions. When confronted by the facts, some argue falsely that it's "a good idea" to heat water at the top: They ask, "Why heat water in the deepest parts of a pool when, after all, people swim at the top?"

I've known a few builders who offer their clients deep-water heat returns instead of installing them near the top, and I applaud their efforts at increasing the energy efficiency of their pools. But even this conscientious approach has a flaw in that they're also eliminating the necessary surface-water movement toward the skimmers generated by returning water. Add the fact that somewhat more plumbing is required, and it's easy to see why this unconventional approach has never been used by more than a handful of builders.

My patented solution to this problem is the simple concept and operation of what I call "FlowReversal." This ap-

proach assumes that all the necessary plumbing and equipment to add the heated water at the bottom and remove it from the top is already in place and that the only need is to be able to reverse the water flow when the pool is being heated. Thus, the returns that normally discharge water would be pulling water in, while the main drain, which normally removes water, would be returning the heated water to the pool at the bottom where it makes the most sense.

The one fly in the ointment is the necessity that the skimmers must have a separate, dedicated line that always functions to keep the pool's surface clean, which means that the skimmers and the main drain lines must be plumbed separately back to the equipment pad. (Consider this: If plumbed together in a flow-reversed system, the water would blow the lid off of the skimmer!)

If you understand the concept, the few extra feet of plumbing involved here is insignificant compared to the tremendous efficiencies to be gained. It doesn't take a

rocket scientist to know that simply reversing the water flow within the pool will reduce the time and energy required to heat the pool initially as well as the time and energy required to maintain the selected temperature. It also has the added benefit of being a much more effective way to distribute chemicals that are added to the pool!

A Layered Approach

In refining these concepts through the years, we and others have noted that the warm water added through the main drain forms a large, heated reservoir at the bottom of the pool. It is trapped, held down by the colder water above, creating what is known as a *thermal inversion layer* (or *inverse thermocline*).

Rather than rising quickly to the large, top-surface area to dissipate, this warm layer is isolated – actually increasing heating efficiency as a result. Tests show that the mass of trapped warm water becomes hotter and hotter, enlarging as external heating continues. This heated water does not mix, but instead displaces the cold, insulating layer of water above it. When the heated mass of water finally rises to the area at the sur-

face, the entire pool is heated.

(Note as well: In a “FlowReversal” system, the upper layer of water being warmed by the sun is pulled backwards through the multiple returns *and* the skimmers and is actually *pre*-heated by free solar radiation. It is subsequently heated further and then pumped through the main drain – where it is stored as a function of thermal inversion.)

Further research indicates that, because of this efficient heating pathway, it takes only one-third to one-half the time to heat a flow-reversed pool by comparison to a conventional-flow pool and that energy consumption is similarly reduced by one third to one half. The beautifully simple fact about reversed flow is that to obtain these tremendous savings, only a minor adjustment needs to be made in the way the pool is plumbed by the inclusion of separate main drain and skimmer lines back to the pad. You simply *do not connect* the main-drain line into the bottom of the skimmer, avoiding a combined, common line back to the pump.

The key to reversing the flow is the ability to change the direction of the flow when needed, and we at my company, markUrban

of Tustin, Calif., have developed and manufactured a four-port valve for this purpose. It's simple to operate with a handle (or motor actuator) that turns 90 degrees. It's easy to install on a new pool – and retrofits are simple and cost effective when a renovating or remodeling job allows for modifying pools built with just one combined, common line to the equipment pad.

To optimize a reversed-flow system, all you need to do is automate its operation so that whenever the heating system operates, the water flow is reversed.

We have talked with heater manufacturers about adding a standard, female, motor-actuator terminal-socket (costing about 2.5 cents) to their circuit boards, an addition that would make FlowReversal a ready option that would double or triple their *own* heaters' pool-heating efficiency as well as the pool's overall heating efficiency. (The term “pool heater efficiency” should not be confused with “pool heating efficiency.” The pool-heating capabilities are dependent on many variables, the greatest of which is the heating flow path found in the pool.)

Regrettably, there has been no manufacturer acceptance of this suggestion, so we offer an optional control that fits inside any

Complementary Technologies

The concept of “FlowReversal” works hand in glove with some other optional swimming pool technologies:

❑ **In-Floor Cleaning Systems:** These devices use cleaning heads permanently installed in the floor of the pool and can be used to add hot water at the bottom of the pool as well.

Because of the way these systems disperse and homogenize the water, they aren't optimal for the layered sort of flow-reversal approach described in the accompanying article. Nor do the in-floor systems work as well in these circumstances, for the simple reason that cooler water is denser than warmer water and the warmer water rises, resulting in longer and less-efficient cleaning times.

That said, adding hot water via an in-floor cleaning system *still* makes a lot more sense than adding it via the returns near the water's surface.

❑ **Solar Heating:** Reversing the flow increases the efficiency of a solar/pool combination heating system as much as it does any heating system. Solar suppliers resist making the connection, however, because using the coldest water allows those marketing the panels to talk about their most dramatic performance peaks.

We'd argue that while they might lose a small percentage of the efficiency of their solar-panel heater, there's a large gain in overall solar/pool-heating efficiency to be found in reintroducing solar-heated water through the main drain.

❑ **Solar Pool Covers:** Flow reversing works remarkably well with

the use of a solar pool cover. When the cover is used, little or no debris falls into the water, which means there's no need for a cleaning flow path. As a result, the warmed layer stays at the surface, undisturbed, becoming hotter and hotter.

Even though the cover eliminates *evaporative* heat loss, however, the overall differential temperature between the water and the air above actually leads to an increased heat loss if the cover is used without a flow-reversing system and water is trapped just below the cover. Using FlowReversal, by contrast, heated water is removed from the top and distributed at the bottom where it's colder, displacing the cold water that will rise to be heated under the cover – thereby doubling or tripling the effectiveness of the cover and the heating system.

❑ **Attic Heating:** A company called SolarAttic makes a system that removes hot air from an attic via a heat exchanger that transfers the heat to the pool water. Two efficiencies are served here: The house is cooled when the attic's heat is removed, and the pool water is basically heated at no cost.

❑ **Anti-Vortex Drain Covers:** These covers have circular, outer rings with side openings that create a suction pattern at the main drain that reduces the risk of suction entrapment. When an anti-vortex drain cover is used with reversed flow, it creates an even, lateral distribution of warm water across the hopper section of the pool, further maximizing efficiency.

–M.U.



electronic-ignition heater or heat pump that will reverse our motorized valve actuator, the valve and the flowpath when the heater is operating—and will return to normal flow when the heater is *not* operating.

For retrofits, you can cut the main drain line where it connects beneath the skimmer and add a new, separate drain line connecting it back to the pad. This can be accomplished without disturbing any architectural features of the pool and involves, before replastering, not much more than punching an access hole inside the shell beneath the skimmer to cap the main-drain port of the skimmer and add a new line for the main drain by tunneling under the deck (see the diagram on this page).

In other words, it's neither an extensive nor expensive renovation—and whatever costs are involved will quickly be recouped in energy savings.

The Shell Game

As we've spent more and more time observing the effects of reversing the flow,

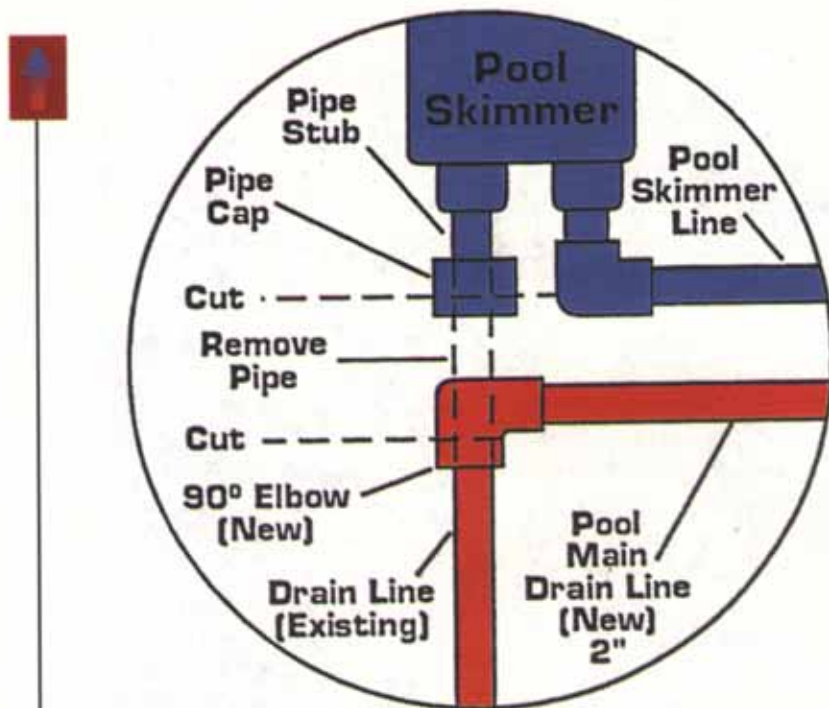


Figure 2: To retrofit a pool with a flow-reversing system, the standard line from main drain to skimmer must be cut and a new line added between the main drain and the equipment pad. This is something that can readily be accomplished when a pool is replastered.

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we've also gained a greater understanding of just how substantial the challenge of heating pool water really is. And one of the worst offenders when it comes to squandering heat in a pool system is the concrete shell itself!

I was raised and have lived in cold-weather cities – Cleveland, Pittsburgh, Chicago and St. Louis. As anyone from places like these knows, one insulates most things to prevent heat loss in cold weather, especially during winter. Houses are fully insulated, pipes are carefully wrapped, water heaters are insulated and blanketed and weather stripping is installed where there are air gaps around doors, windows and vents.

This idea of thermally insulating anything that should retain its heat is both practical and universally accepted. Why not think the same way about swimming pools? Why not insulate all of the plumbing? Why not insulate the shell itself? If we can increase heating efficiency by reversing the flow, why not maximize heat

Heat Sync

When combining "FlowReversal" with a thermally insulated pool system, there exists the capability to use the pool as an adjunct to the home's heating/cooling system and domestic hot-water production. This requires use of a type of equipment known as a water-source (or ground-source) heat pump – essentially a type of air-conditioning unit that can transfer heat energy in two directions, one way or another, between water and air.

These are very efficient units – up to seven times the efficiency of electric resistance heaters. They either *reject* heat into the ground water or *absorb* heat from the water to provide cool or warm air. (These two-way, water-to-air heat pumps replace the standard furnace/air conditioning units.)

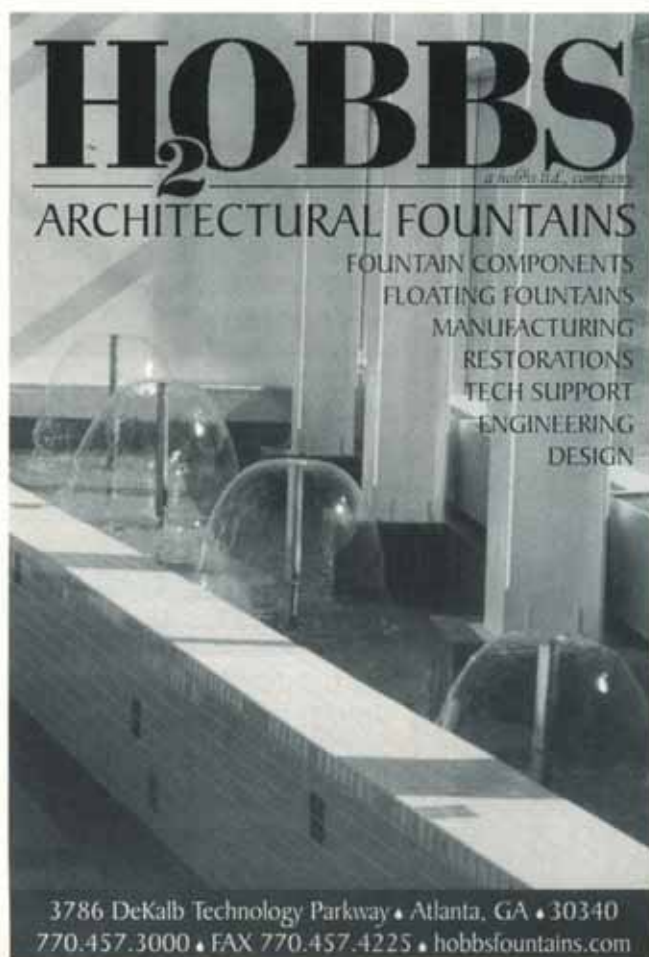
The heat pumps familiar to us in the pool industry transfer heat in only one direction, extracting heat from the air and transferring it to the pool water. They are highly efficient and are extremely effective when used in conjunction with flow-reversed systems.

But *two-way* water-source heat pumps are ideal – a perfect link between pool and home. By connecting the water side of the heat pump to the pool and the air side inside the home, we have a situation where it can remove heat from the air in the home to heat the pool, and it can alternatively remove the heat from the pool water to warm the home at almost no cost.

– M. U.

retention by noting the fact that pool construction is placing a thermally transparent barrier between the warm water and the cold surrounding ground?

Again, it's simple physics. We all know that the ground is cold, even in warm areas. We know through the laws of thermodynamics that heat will transfer only one way



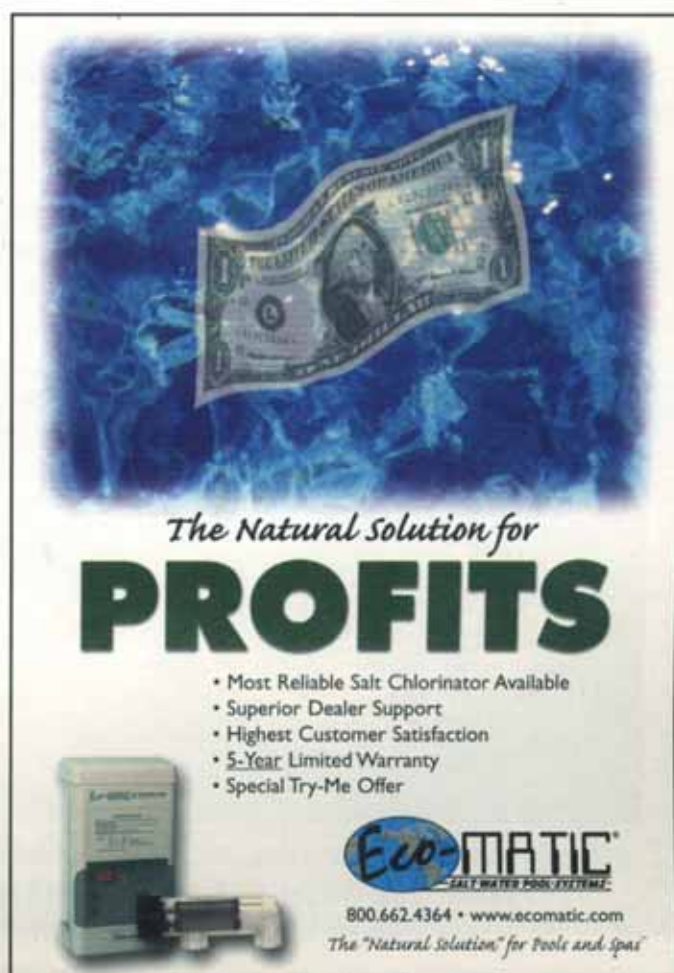
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from warm to cold until equilibrium is achieved; therefore, when pool-water temperatures are higher than those of the surrounding ground and ground water, the ground will continuously remove heat from the pool through the concrete until the water temperature has dropped to the ground temperature – unless, of course, external heat is added to compensate.

Also, what typically happens is that externally heated water is recirculated through non-insulated plumbing buried in the cold ground to and from an enormous mass of water with a great, buried surface of earth-contacting concrete – and we expect it to remain warm. No wonder swimming pools are inefficient!

Despite the realities, people tell me that the ground is a good thermal insulator and/or that concrete is a good thermal insulator. If the ground is such a good insulator, why do pipes freeze? As for concrete, it typically has a thermal resistance (or R-value) of approximately 0.075 per inch! Pink fiberglass insulation used in

homes typically has an R-value of 22 to 34. For equivalent thermal insulation, a pool's walls would have to be from 24.4 to 37.8 feet thick to provide the same level of thermal insulation found with a few inches of home insulation!

Insulation for plumbing is inexpensive and effective and should be used on any heated pool or spa as a minimum attempt at minimizing heat loss. Insulating concrete shells is a different matter, but in my opinion and experience it can (and should!) be done. We've developed techniques, methods and procedures for building a sandwich of puncture-proof waterproofing and insulating material that consists of an outer layer of waterproofing material and a layer of thermal urethane insulation. We also encapsulate the plumbing and electrical conduits and then use a second waterproofing layer to create an insulated vault, trench and shell against which the gunite or shotcrete shell is shot.

This process adds time and capital cost to the construction process, but these costs

are totally recoverable with energy savings. The amount of heat to be saved depends upon the delta T (differential temperature) between the water temperature and the ground temperature – the greater the insulated delta T, the greater the amount to be saved in the cost of energy to keep the water heated. Common sense would suggest insulating to *retain* the heat is a better idea than continuously *replacing* that heat.

The Status Quo

I have been disappointed that common-sense ideas such as reversing the flow and puncture-proof, waterproof, thermal insulation of pool systems have never gained much support among pool designers and builders, although the end user and owner might readily understand and invest (not spend!) the money required to incorporate these ideas into a purchase if the concepts were suitably explained and offered.

It's as though the collective thinking has never evolved. Isn't it ironic that pool designers, builders and owners all heat their

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domestic water from the bottom, boil the water for their pasta from the bottom and live in well-insulated houses – yet they don't apply these principles to their pools?

Compared to housing, it's as though swimming pools and log cabins started being built at about the same time several generations ago: One construction technology has progressed admirably while the other has progressed little.

Home insulation today is a standard, something a prospective homeowner expects and assumes as part of the cost of

ownership. And what is the motivation? Increased comfort combined with reduced utility bills. With swimming pools, the industry is building them the way our ancestors did, as though a century of progress in building technology and understanding of the physics of heating had never been learned or adopted.

Traditionally, pool recirculation systems

heat water, pump it to and from pools through buried, non-insulated plumbing and add it near the surface of the water in a non-insulated shell. The losses in terms of wasted energy and money that come with these systems are simply horrendous – and more than a little shameful, when one considers that more efficient alternatives have been and are available. **WS**

A Safe Bet

Pool contractors have told me for years that they just don't think their clients are interested in energy efficiency, but my suspicion is that contractors are really afraid of raising the issue of pool heating because it might cause the loss of a sale.

In my view, this tragically underestimates the prospects' intelligence, knowledge and common sense. Simply assuming their lack of interest in exploring ways to ensure their pools' greater energy efficiency is short-sighted. Further, I believe that addressing this long-term-efficiency issue initially enables clients to deal with the operational cost of the pool in a positive way.

With the growing "saving not wasting" energy awareness of consumers, isn't it better that they learn about these available approaches from the designer or builder rather than from the newspaper or television news or, worse yet, from neighbors?

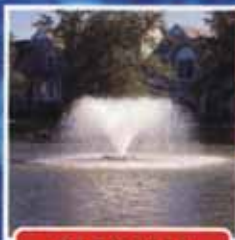
My contention is that a great many modern consumers, middle class and affluent, would be extremely interested in hearing about these simple energy-saving methods as options. Not all would make the commitment, of course, but many would – and offering the options can only reflect positively on the pool and on the watershaper who makes the suggestion. After all, it's a proposal that maximizes bather comfort, extends the nominal swimming season and represents an opportunity to save real money.

I'd say it's a safe bet that these benefits will please many clients.

—M.U.

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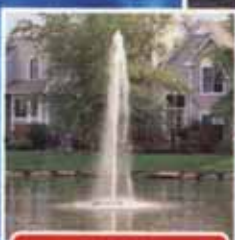
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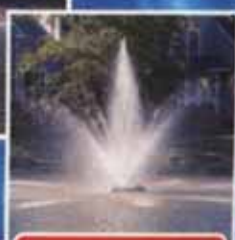
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There's more to successful watershapes than good looks, observes Greg Stoks of Commercial Aquatics Engineering. This was particularly true for the new watershape designed to mimic tropical environments: Troubles with the chain's first few locations, he says, prompted owners to call for help in curbing



cularly true of the trademark fountains of the Rainforest Cafés, a collection of elaborately themed family restaurants

ring what were becoming costly water-related headaches.

Streamlined

An important part of creating beautiful commercial watershapes is designing systems that actually work, both effectively and enduringly, within the requirements and constraints of their given settings.

This has become a real issue in the fountain business, where new demand is popping up at locations as diverse as resorts, malls, hotels, art pavilions, office buildings, convention centers, museums and even restaurants – and a few too many good-looking designs have been pulled out, significantly downsized or turned into planters because they just haven't performed as needed or promised.

This is a problem of expectations that needs solving: Architectural designers are increasingly appreciating the role fountains play in adding drama to entryways, thoroughfares, courtyards and plazas, but with this growth in the use of water has come a growing awareness that good looks just aren't enough.

So before assuming that a fountain is designed to perform as specified with minimal maintenance over the long term, it makes sense to do what we at our firm call "creative design streamlining." To illustrate what this means, let's look at the history of a well-known chain of restaurants that has sought to use watershapes to create stunning and truly unique environments.

HEARTS OF THE JUNGLE

Rainforest Café is a chain of family restaurants that offers vivid feasts of color, sound, fog and lighting to create the illusion of dining in a tropical rainforest. They've set up shop in several cities across the

for

Paradise

By Greg Stoks

Just about everywhere we looked, there were opportunities

By design, the waterfeatures for the Rainforest Cafés capture the colors, sounds and animated spirit of tropical climes. In some cases, the effects pick up outside the restaurants, pulling the public in to enjoy a unique dining experience in an amazingly rich visual and aural environment. Water is an integral part of these environments, and it was our job to make certain that the watershapes could be installed as planned, with a minimum of on-site trouble.



nation, and if you've ever been in one you know that they're physically impressive – and that the food's good, too.

As originally conceived, all of the special effects used to express the restaurants' theme must be synchronized, functioning together in intricate harmony to create the desired naturalistic effects. Therein lies a tale.

By the spring of 1997, Rainforest Café was experiencing significant growth, and its owners developed plans to open a number of new restaurants in various spots throughout the country. They knew, however, that the watershape designs they were using, although attractive and functional, were difficult to install and a devil to maintain.

The owners were savvy enough to recognize these problems as limiting factors in their growth plans – a real bottleneck they had to break. This led Carlos Parrague, vice president of construction for the company, to call in our



to find ways for the owners to save both money and time.

firm to participate in their next installation to figure out ways to reduce the complexity, time and cost of these watershape installations.

Our company, Commercial Aquatic Engineering of Shakopee, Minn., specializes in fountain design and construction. We jumped into the project with both feet and immediately set our sights on determining if the watershapes could be “creatively streamlined” to increase quality, improve performance and speed installation.

The metamorphosis in the design of the Rainforest Café system that took place in the next 12 months gave us the op-

portunity to look at several creative solutions that would ultimately put expansion of the restaurant chain back on schedule. These solutions included the use of mechanical, electrical and material technologies to create a more reliable design that was much faster to install at a far lower cost.

DEFINING THE BOTTLENECK

When we began looking at the systems at one of the existing stores, the first thing we noticed was that its various watershapes (three in this case and more in others) were all commonly linked to the same reservoir. The way they were plumbed

and the way the pumps were configured created a situation where failure of one system meant the failure of all. Another limitation of this design was that the flow rate to an individual feature could not be individually controlled.

This approach created all sorts of problems with the restaurants’ main watershapes, which included a wet entryway sign, a rain curtain and the central “Atlas Man” fountain, among some others. The potential for operational problems was considerable.

We identified one concern immediately: It is customary for the company to use local, commercial plumbers to install fountain features in new store locations. Typically, these crews were unfamiliar with commercial watershape design, and their





Not all “Atlas Men” are created equal: As can be seen by contrasting this photo with the one appearing on the opening pages of the article, each one is set up to work in its own space — a reality we had to consider in designing the water effects to be as transferable as possible from location to location.

These site-to-site distinctions add a degree of difficulty to the design and engineering processes, but the result has been development of a near-turnkey system that has reduced installation times dramatically.

traditional use of pipe bends, long piping runs and frequent joints had the potential to work against good hydraulic performance.

The complexity of these installations also contributed to confusion and considerable delays in construction. We recognized that with so many new restaurants being built at once, the situation called for a pre-fabricated pumping system that incorporated both filtration and sanitation for each fountain — all installed on semi-portable equipment skids. The skids could then be located in an equipment room, in one location, where pre-designated plumbing runs and electrical service would be set up per plan.

Not only would the results be more reliable, but also the amount of labor would be cut in half. Further, the equipment rooms were reduced in size due to the efficient, compact design of the new equipment skids.

This revised watershaping approach was presented to Rainforest Café’s management team staff for consideration: They quickly approved and asked us to make the design changes in time for their next installation.

ON CENTER STAGE

On the next project that came up, we were on site to review the watershape designs and look for additional value-engineering opportunities.

constructed in existing facilities, these tenant improvements often required that crews had to cut up existing floors and re-pour concrete to create chases for the fountain plumbing.

Just about everywhere we looked, there were opportunities to find ways for the owners to save both money and time.

The key in all of this was off-site fabrication. After an intensive, three-month research and redesign effort, we decided to use a synthetic composite material to create the basins and pedestals. This material has the structural strength required, but at a much lighter weight. Better still, the bubbler system and the other plumbing could be pre-installed in the lightweight structure and tested be-

The streamlined installation of the fountains was the key to getting the expansion plan back on track.

This approach took care of lots of problems: It streamlined installation, enhanced overall performance and improved water quality in each waterfeature — a critical consideration in a restaurant environment. Each of the new skids was equipped with an automated chemical treatment and filtration system; coupled with greater hydraulic efficiency, this indeed led to *vast* improvements in water quality.

In a more immediate sense, however, the streamlined installation of the fountains was the key to getting the expansion plan back on track. The equipment skids were to be assembled off-site, tested and shipped in one finished piece to each restaurant for installation with greatly simplified plumbing runs, simplified electrical hook-ups and a greatly reduced need for on-site supervision.

We began by focusing most of our attention on the “Atlas Man” fountain, the signature watershape at the center of all Rainforest Cafés, which consists of a large central sculpture that stands on a pedestal in the center of a circular basin. An aerated hedge of water surrounds the sculpture, while water cascades down geological rock formations to create water effects that draw all eyes to the sculpture.

At first, these fountains’ basins had been installed using poured-in-place concrete that carried all the necessary plumbing. This made for an installation process that required considerable scheduling and complexity.

Particularly challenging was the bubbler-jet system: This feature required in-floor installation, which was expensive, tricky, and subject to high maintenance. And because Rainforest Cafés are often

fore we shipped anything to the job site.

The result of this change saved between two and three weeks in time and labor costs that had been associated with installing the in-floor bubbler system and waterproofing the “Atlas Man” feature. This alone represented a substantial process improvement.

The management of Rainforest Café were excited by these changes and asked if we could re-design each of the waterfeatures to make them *completely* pre-fabricated with pumping and filtration systems that were self-contained in the feature. It was time to go back to the drawing board.

TIGHTENING THE REINS

At this point, we initiated a development project to redesign each watershape using the same turnkey approach that we



The actual construction of the watershapes is aided by the fact that much of the work is done ahead of time as part of the manufacturing process. Equipment is set up in a modular fashion and can be expanded or reduced as need arises, and the structures shipped to the jobsite are rigged and pre-plumbed to speed work on site.



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had successfully applied with the "Atlas Man" fountain.

There was a trick to this: Because of differences in facility size and configuration, we knew we wouldn't be able to come up with standard, one-size-fits-all solutions. Instead, we had to be able to customize each feature to fit each particular restaurant. With that in mind, we set about generating all of the necessary conceptual sketches, engineering drawings, functional prototypes and, finally, "the products."

Within four months, the first systems were being installed in Rainforest Café's new Macarthur Center location in Norfolk, Va. The general contractor initially expressed concern about working with new elements and the potential effect it might have on the project, but he was pleasantly surprised at how fast and easy things actually went: The new self-contained, pre-fabricated fountains arrived on site and were installed in less than ten days as opposed to the two months that had previously been required for watershape construction.

Gone was the concern about waterproofing, for example, and structural-support considerations also were minimized by virtue of the systems' self-contained, self-supporting basins. The other benefit gained from this design approach was a single-source responsibility for design integrity that had been virtually impossible to track with on-site construction.

We're proud of the creative design streamlining we did for Rainforest Café – and of the time and money our work has saved the company with every installation they've done since we first were called in. The project life cycle for a new store was compressed to just 90 days: A target that once seemed impossibly out of reach was now handily achieved on each new job.

We now have about a dozen new Rainforest Cafés under our belts, each incorporating the newly designed watershapes, and every one has come off without a hitch including a couple of special projects at the chain's so-called "icon stores" in San Francisco and at the new

Disney theme park in Anaheim, Calif.

The San Francisco restaurant – currently the largest in the chain – includes a three-story, self-contained, pre-fabricated "Atlas Man"/waterfall feature that arrived on four semi-trailers. In all, five fountains were installed in the San Francisco store, three of them custom-designed for this location. With two of our people on site with a field supervisor, the installation was completed in fewer than 30 days. For its part, the Disney location includes six waterfeatures (three of them custom), and again, installation was a matter of days rather than months.

What all this goes to show is the value of creative design streamlining in reducing system inefficiencies and maintenance costs while improving overall system quality. It also defines an opportunity that savvy people in the fountain business have to make things easier on architects and their clients – and spread a positive story about great-looking fountains far and wide! **MS**

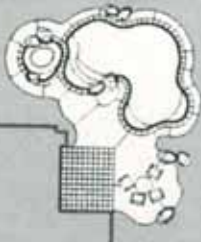
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PRACTICING NATURE'S BALANCE



By Jeff Rugg

Nature has its own set of rules, observes horticulturalist and zoologist Jeff Rugg of Pond Supplies of America. If you work in harmony with those rules, you stand a good chance of being successful in creating systems that support plant and animal life. Work against them, he says, and nature will soon show you the error of your ways. Here's a look at what it takes to make the balancing act work, from pond sizing to basic equipment and materials.

It all begins with the water.

The first thing anyone approaching the world of ponds needs to understand is that life-supporting water is quite unlike the sterile water found in swimming pools or spas or many other water-shapes. A second and related point is that *clear* water is not necessarily *healthy* water when it comes to the needs of the inhabitants of the pond.

For a pond to be healthy, its water must meet the chemical requirements of plants and fish by having an abundance of some things (such as nutrients) and the near-total lack of other things (such as pollutants). Sanitized water may be beautifully clear, but the fact that sterile systems are designed to knock out nutrients and work chemically because they are "polluted" with chlorine and algacides makes them completely unsuitable as life-supporting ecosystems.

The goal with ponds is to work *with* nature in balancing the life-sustaining features of the water – and to set things up in such a way that maintaining that balance will be something your clients can do long after you've moved along to another project.

To do so, you need to embrace the water-quality basics outlined in the last issue of *WaterShapes* (July/August 2001, page 54). You also need to know how to select a liner, size the equipment properly,



install everything in good order and teach your clients what they need to know to meet their desire for a pond that functions well, looks nice and fulfills their quest for a source of relaxation, enjoyment and entertainment.

SHAPES AND SIZES

Let's start by looking at the range of living water systems sold in today's water-gardening marketplace. Just as is the case with pools and spas, these ponds come in many sizes and shapes and from many sources, with size probably being the most important factor because it tells you what you need to know about liner and equipment selection and how much life a given body of water can reliably support.

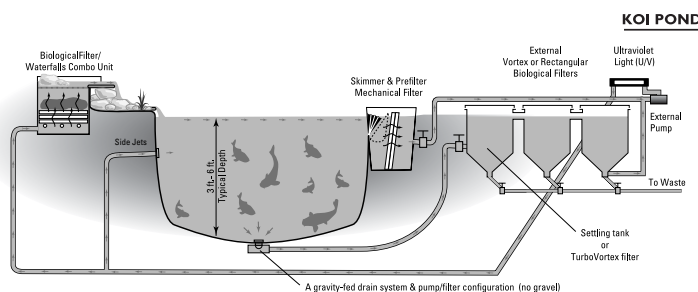
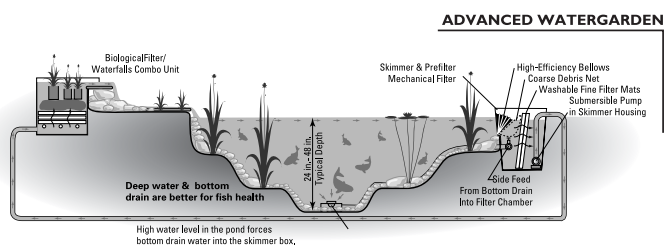
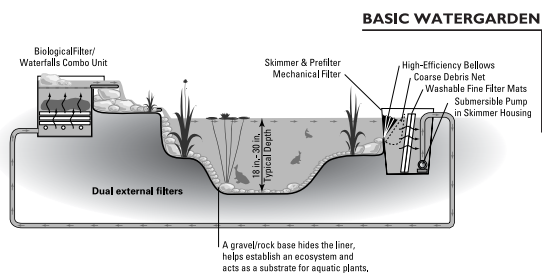
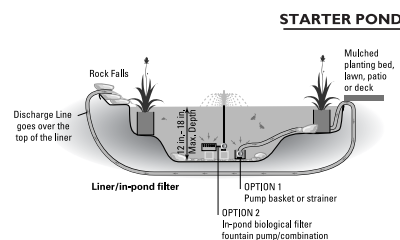
❑ Pond people typically refer to the client's smallest option as a *starter pond*. These are usually preformed plastic tubs that hold up to 200 gallons and include a pump and filter system built right into the pond. This is what you see at garden centers, discount houses and hardware stores. Ironically, starter ponds tend to be bought by people who want to keep things simple; fact is, these tiny ecosystems can be far more difficult to maintain than far larger systems.

❑ The next size up includes *basic watergardens* designed mostly for plants but with the capacity to sustain a few small fish. These usually come with a flexible rubber liner with filters designed for installation outside the pond. Typically, these ponds are under ten feet across and around two feet deep, but they can hold as much as a couple thousand gallons. As is the case with starter ponds, these tend to be do-it-yourself installations made up of components purchased at garden centers or pond-specialty retailers.

❑ Then there are *advanced watergardens* – larger (say, 20 feet across) and deeper (to four feet or more) and capable of hosting many more plants and bigger fish. These full-fledged ecosystems sometimes hold more than 10,000 gallons of water and most often are installed by professionals.

❑ Much bigger and deeper are *koi ponds*, which are designed to care for and show off large fish. These are often installed in much the same way the deep end of a swimming pool is constructed, with straight walls (often made of concrete) running down from six to ten feet deep. These ecosystems require installation of complex

These cross-sections give a general idea of the dimensional distinctions among ponds, starting with the small 'starter ponds' at the top and moving down to the large 'koi ponds' at the bottom. As a rule, the bigger a pond gets, the easier it is to maintain – and the more stable is its ecosystem.



filtration systems and are almost exclusively the province of professional installers.

As a rule, ponds at all levels should be built as large as possible, basically because larger ponds are less costly per gallon, require much less maintenance and are, most important, more stable ecologically for fish and plants. At our company, we encourage new pond clients to "build their second pond first" and to avoid starter ponds. We do so because the biggest complaint from first-time pond owners is that they wish they had gone with something bigger and easier to maintain.

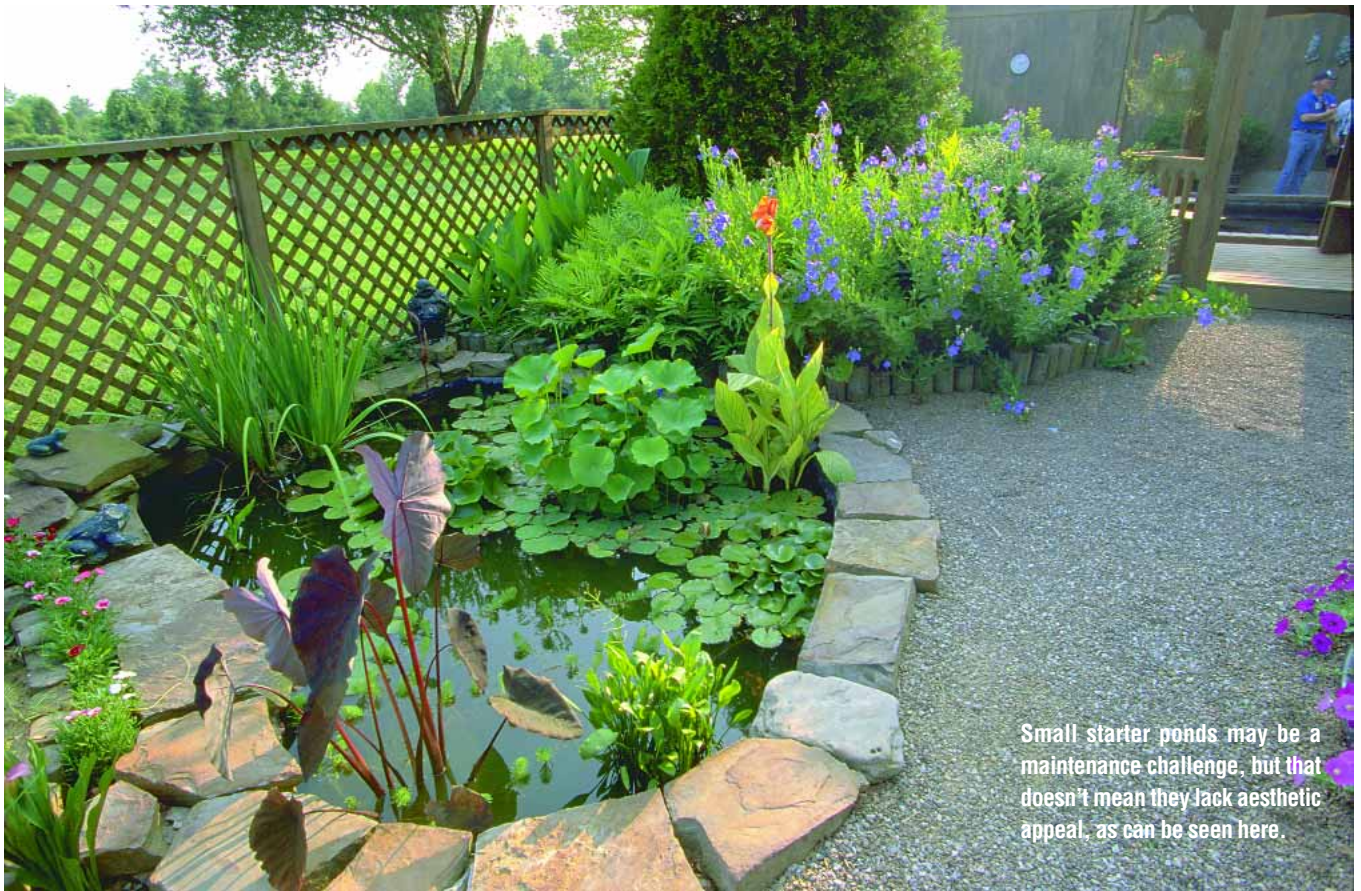
Absolutely, clients who opt for starter ponds can experience success, but in the long run, they're going to get more en-

joyment and increased success from a larger pond. The moral of the story for the designer is to think in terms of up-sizing the pond whenever possible!

PROPER CONTAINERS

Whatever the size or type, the main thing a pond needs at the most practical level is some means of permanently containing its water.

Most of the time, flexible EPDM rubber liners are used in building watergardens. Unlike pool liners, these sheets are not embedded with any anti-mildew or bactericidal chemicals. Those chemicals inhibit the beneficial growth of the microbial portion of the ecosystem and may even kill the fish.



Small starter ponds may be a maintenance challenge, but that doesn't mean they lack aesthetic appeal, as can be seen here.

Pre-formed pond liners also are available and come in a variety of sizes, depths and contours for shelves. The pre-fabricated shelves allow for some choices in placement of plant material and habitats, but flexible liners are less expensive than their pre-formed cousins and place no limits on the designer. In fact, the process

of digging the hole for a flexible liner pond is much more free form in a watergarden than it is with any swimming pool.

The main variable here is depth. Typical starter and pre-formed ponds range in depth from 18 to 24 inches, while advanced watergardens reach down three or four feet and koi ponds can reach depths of six feet

or more. As a general principle, the deeper the water and the greater the volume, the better the pond will be for fish.

Greater depths, however, might raise building-code questions, so as an installer you need to check local agencies for depth allowances and any fencing requirements. (For their part, however, small ponds tend



Advanced watergardens give the installer and homeowner a chance to let their imaginations get fully involved in the design process to produce spectacular results.



The mechanical filter on this pond is well hidden in the rocks and does an efficient job of removing floating debris before it has a chance to sink and decompose on the bottom of the pond.



to fit into a landscaping category that does not require permits or fences.)

And because small ponds tend to be shallower, they are also safer, easier to clean and friendlier to plants that need sunlight at a level you just don't get with projects of koi-pond depth and configuration. By the same token, *very* shallow ponds (with depths of 12 inches or less) tend to foster undesirably high levels of algae growth.

MECHANICAL FILTRATION

Once the pond container is selected, it's time to focus on filtration. Just as with swimming pool or spas, you must install a system that effectively removes larger dirt and debris – and the basic selection principles are accordingly similar.

As with a pool, the first stage of pond filtration involves collecting as much debris as possible before it has the opportunity

to sink to the bottom, so skimmers are a must. The second stage of filtration is designed to remove small particulate matter via some sort of filtration medium. In a pool, a third stage calls for adding chemicals to keep the water clear. In a pond, by contrast, the third stage has to do with adding bacteria and enzymes to remove invisible pollutants such as ammonia.

The point of the first-stage, mechanical filtration in a pond is to prevent the debris from breaking down into smaller components. The more debris that is left in a pond (especially through the winter), the more likely that fish will have health problems. This is so because organic material such as leaves and grass clippings release a variety of chemicals into the water as they decay. They also provide shelter and nutrients for fish parasites. Not only will this chemical soup harm fish,

but it will also promote green algae growth or turn the water brown.

In a natural ecosystem, these decay compounds would be part of the total system, but the goal in man-made ecosystems is to control the growth of some of the organisms in the ecosystem. In a lake or natural pond, green algae and fish parasites are fine, but that's just not the case in a backyard watergarden. As is true with pools, bigger filters last longer between cleanings and handle larger loads – but it is possible to go overboard, so you should always check the manufacturer's recommendations.

Skimmers are rated in terms of the pond's surface area, while biological filters are rated by its volume. Some units are designed for installation inside the pond, but using external models keeps your options open: If a bigger filter is needed, change-outs are easier and you don't end



Biological filtration in this pond is aided by extensive use of aquatic plants. These plants harbor bacteria that break down decomposing debris and help keep the water clean.

Care and Feeding

When it comes to ponds, maintenance depends on size, type and location.

Starter ponds are a challenge in this area. They're harder to keep in balance because of their smaller water volumes. There's also the fact that the filter is in the pond bottom, which means that the owner faces the unpleasant task of pulling it out for cleaning – sometimes daily, if not more often.

Larger watergardens are filtered with a skimmer and a biological filter, so they stay cleaner. If such a pond is set up right, maintenance should take no more than ten minutes or so each week (except when starting up the pond in the spring or shutting it down for winter).

As a rule, the bigger the pond, the less time the owner will spend maintaining it. And the light maintenance burden there is with larger ponds can be reduced even more by using larger or multiple skimmers – an option not generally pursuable with starter ponds.

Any pond also requires some *pre*-maintenance. Once the pond is full, the owner must know that any municipal water must be de-chlorinated before it will be safe for fish. (Well water is generally fine without treatment, but it's always a good idea to have it tested for fish-harming pollutants before fish are added.)

Beyond that, a natural ecosystem requires very little by way of chemical treatments, although flocculants are sometimes used to clump algae cells or dirt after a heavy rain and products designed specifically to keep down long strands of algae are sometimes needed, especially through the pond's first year or two. Then there the bacteria cultures and enzymes that must be added to jump-start the pond's ecosystem and avoid green water.

Once the ecosystem is up and running, however, all that's usually required is addition of fresh bacteria once or twice a month to help keep the pond clean and safer for its fish.

As for seasonal maintenance, even in the freezing climates found in the northern United States and Canada, fish and plants are best left outdoors to hibernate naturally. A two-foot-deep pond with a surface aerator or heater to keep a hole open is sufficient for most ponds up to Planting Zone 4. Just clear the water of debris before the first freeze hits so debris won't sit on the bottom.

Finally, in colder climates and with larger fish, deeper is better as the warmest water (around 40 degrees F) forms a "warm puddle" on the pond bottom. Do not disturb that bottom layer of warm water with pumps, and remember to turn off any bottom drains!

—J.R.

up using more of the pond's valuable interior space. Maintenance of external filters is also easier to manage – and it's easy to hide them in the landscaping as well.

Mechanical filters need cleaning when debris slows the flow of water to the pump. Helpfully, most pond filters have large debris nets that act as prefilters – similar to the skimmer baskets in pool systems, only larger. It only takes about five minutes to empty the pond filter's net and clean the mats, so it's not a very time-consuming job for the homeowner.

High-pressure sand filters used very effectively in pools clog almost immediately in ponds because of the larger burden of organic material in a pond. The tanks can be used in pond filtration, but only if the filter medium is replaced with larger material that offers much larger pore spaces.

Most mechanical filters used on ponds

also serve another purpose: Although they aren't designed specifically for biological filtration, they do trap some smaller particles. As a result, they require backwashing on a weekly basis.

BIOLOGICAL FILTRATION

As was just mentioned, the water-cleaning action of a pond system's mechanical filters is supplemented by a process of biological filtration in which bacteria, fungi and other tiny creatures break down all of the big stuff that comes their way.

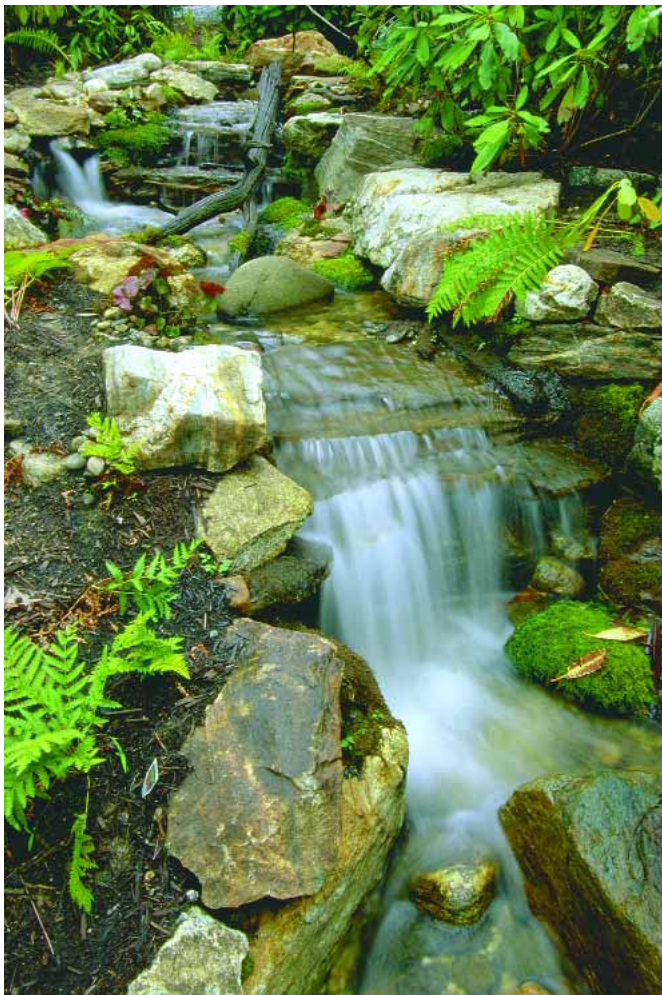
In a pond, these bacteria must be on hand to consume the waste products of the fish before those compounds build up to toxic levels. Bacteria also seem to have a limiting effect on the growth of algae. Although there's some controversy about how they do it, there is no question that the addition of a variety of bacteria cul-

tures and their enzymes serve to reduce algae populations to manageable levels.

Keeping these bacteria alive is therefore an important part of keeping the entire ecosystem running smoothly. As a result, biological filters should *not* be cleaned, except when they are so blocked that water flow is diminished. (Bacteria have short lives, so they need a constant source of nutrients being washed over them – a flow that cleaning interrupts.)

In the design of a pond, there must be consideration of how and where these biological filters will be placed. They are designed to serve as hosts to colonies of microorganisms – and the more the better, so increasing the filter material size or the gravel surface area within the pond will promote more bacteria and be more beneficial to both fish and plants.

Some filter boxes are large and hard to



Waterfalls can play a major role in keeping a pond's ecosystem in balance. The aeration they impart to the water helps to keep the oxygen level up, and the agitation they lend to the system helps keep water circulating in all areas of the pond.

hide, but others can be buried in the ground and a few even have waterfalls built in, so the box can serve a double purpose. In our own designs, we often find ourselves building up any excavated soil into a pond-backing berm behind which we hide the filters. We also use the elevation change to create waterfalls and streams that flow toward the house.

This maintaining of the biological filter is one of the main differences between ponds and pools or spas. Healthy ponds and fish are completely dependent on good bacteria doing their job, and the biological filter box and circulation system must be designed to ensure a *continuous*, 24-hour-a-day flow of oxygenated, nutrient-laden water to support as large a population of bacteria as the system can sustain.

Although it is possible to go for months without adding fresh bacteria into the system, it is a good idea to add some to both pond and filter on a regular basis when the water temperature rises above 50 degrees Fahrenheit.

THE HEART OF THE SYSTEM

Keeping the water moving in a pond of any size or description means you need a pump as a system component.

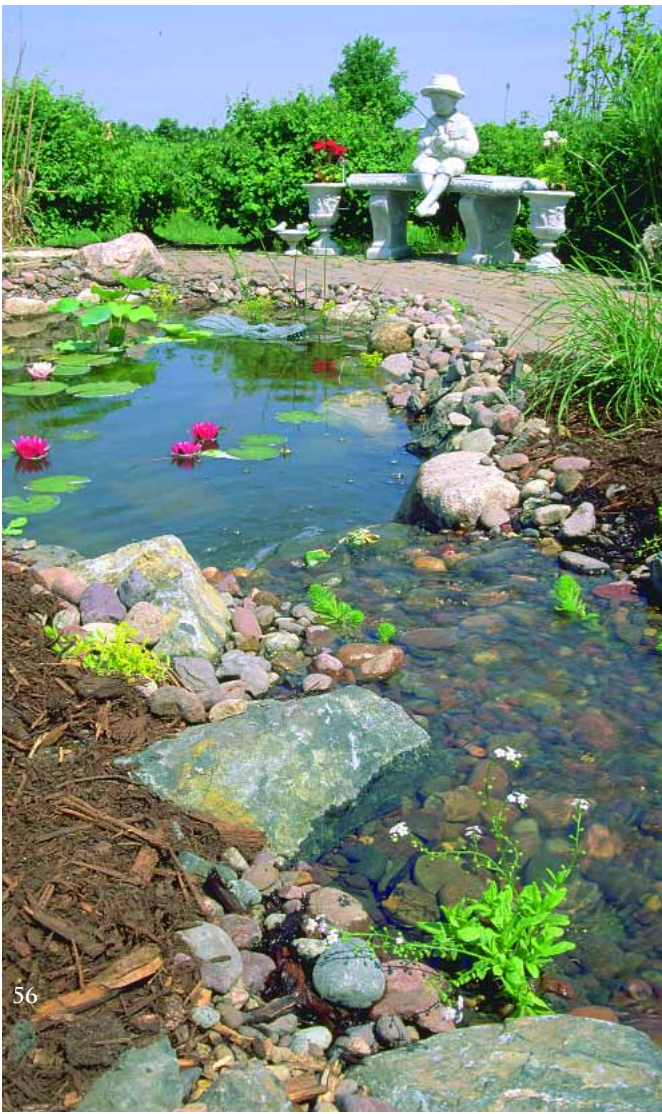
Pumps pull the water through filters and return it to fountains, waterfalls and streams – and the more splashing the better: It sounds and looks wonderful to your clients, and it also attracts birds like no other garden feature, which is why many homeowners are interested in installing ponds in the first place.

To accommodate the biological filter's need for constant flow, most watergarden ponds are built with continuous-duty submersible pumps. These are installed most often in the rear chamber of a skimmer, where they silently pull debris across the water and out of the pond.

Some larger watergardens and most koi ponds have external pumps that are gravity-fed from the skimmer, flow through the filters and return the water to the pond directly or via a waterfall or stream. Here, having all of the pumps and pipes buried in the ground is important to achieving a natural look.

No matter where or how you install either style of pump, the device must run continuously for optimum performance of both the skimmer (otherwise, debris gets a chance to sink) and the biological filter (to sustain the bacteria). And if the pond has a waterfall, stream or aerating fountain, it also should run continuously to keep the water oxygenated.

This oxygenation via a stream, fountain or waterfall is important to a healthy ecosystem and is therefore an important design consideration. The water effects that pumps create (and that people and birds love) make up for the fact that there's not much dissolved oxygen in the water available for fish – and that



The rocks and gravel used at this stream's edge help the biological filtration process as water flows downstream.

the situation gets worse in warm weather, with oxygen levels dropping as low as a fish-stressing two or three parts per million.

The splash and movement provided by any water effect at the pond's surface helps life-sustaining oxygen and other gases to move in and out of the water – the perfect intersection of aesthetics and necessity.

In fact, the entire pond-design process might start and end with aesthetics, but at some point, basic animal needs must be accommodated. Fish (and other animals) are a critical part of the total ecosystem, and their waste in turn becomes the life-sustaining food for microorganisms. They also eat mosquito larvae and other pesky insects – and some even eat algae.

CREATURE COMFORTS

Without a doubt, fish add color, character and personality to any pond – and a real and true sense that the watershape has always belonged where it has been placed.

Caring for most varieties of fish is easy, and they can even be trained to eat out of your hand. The only thing to remember is that it's easy to go too far and that you need to be careful not to add too many or let them outgrow the size of the pond or the filter system. Fish grow, but filters don't!

Typical watergardens with mechanical and biological filters can usually support one five-inch fish for every five square feet of surface area. In other words, a ten-by-ten-foot pond (100 square feet of surface area) should support about 20 five-inch

The Algae Truth

Any substantial algae bloom will require a pond owner's special attention, but the accent should always be on prevention and control.

Algae is best held at bay by having fewer fish in the water and by feeding them less, meaning fewer nutrients will be available for the algae. It also helps to have more plants in the pond to compete with the algae for sunlight and nutrients. One can also use chemicals, but only at the risk of throwing the ecosystem seriously out of balance.

The best approach is a competitive planting strategy in which plants that grow better than algae are introduced. By adding more plants from each category of the submersible and shoreline varieties, more diversity is introduced and a healthier ecosystem develops – one with little room for algae. Good pond filters and routine pond care also help to keep algae in control.

But Mother Nature will not allow nutrients to go unused, so if the pond does not have enough plants, she will add algae.

Complicating the picture is the fact that some levels and types of algae are desirable. String algae, for example, can be a pestilence in a newer pond, but it is a tireless pond worker in the long run, helping to keep the pond water clear of single-celled algae and feeding the fish. In fact, it's an important part of any thriving pond system.

If algae does take hold and reach a point where the system can't handle the burden any longer, much of it can be netted out or removed by hand, and there are mild calcium-binding additives that suppress the growth of string algae.

The goal here is to control, not eliminate. A pond ecosystem may take as long as two years before the plants become large and plentiful enough to control string algae naturally, so urge your clients to have patience and wait as the system moves naturally toward balance.

— J.R.

fish with some room for fish growth. (Because they usually have extensive additional filtration, koi ponds can usually be stocked with more and larger fish.)

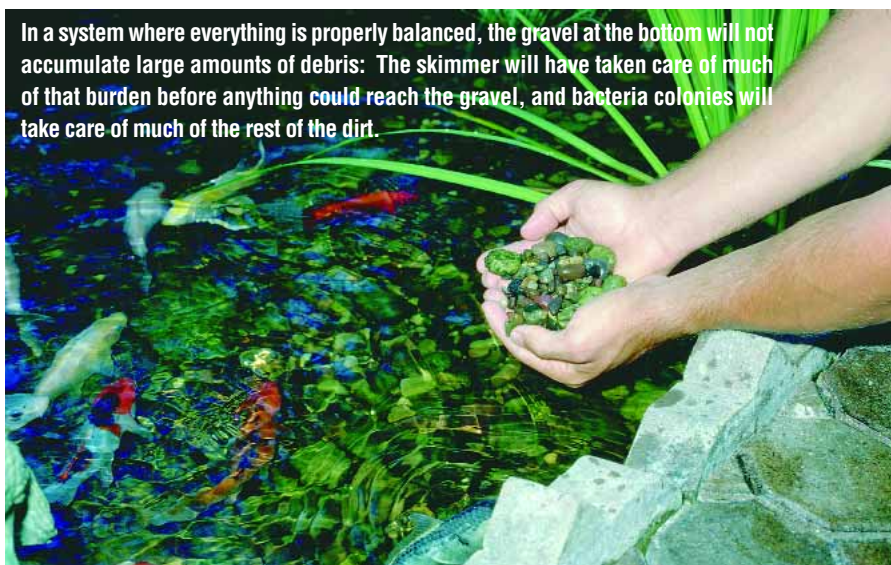
Frogs, toads, dragonflies and other animals also will find their way to a watergarden for a few weeks at a time during the year. Turtles may be added to the mix, but they usually don't stick around – and when they do, they have a regrettable tendency to feed on the fish, the plants or both.

Plants are important to the overall impression made by the pond as well, and many varieties will thrive in a well-designed system. These include mainly submersible plants, which live underwater and consume nutrients in competition with algae; and shoreline plants, which live with submerged roots with the rest of the plant out of the water. (Some shoreline plants are even tolerant of drying out a bit.)

Some plants, including the water lily and the lotus, have roots that grow deep into the muddy bottom of natural ponds – and they do just as well in the gravel of man-made watergardens. Their leaves and flowers float on or rise above the surface of the water, while floating plants such as the water hyacinth trap air in their leaves and stems for buoyancy as their long roots hang down into the water to absorb nutrients.

As in the rest of the landscape, some watergarden plants are perennials and some are annuals that die with the onset of cold weather. There are numerous colors of flowers and leaves available for any aquatic gardener to be able to have blooms all season long. These plants also tend to require little maintenance – and they can't be overwatered, as is unfortunately true of many of their land-locked cousins.

In a system where everything is properly balanced, the gravel at the bottom will not accumulate large amounts of debris: The skimmer will have taken care of much of that burden before anything could reach the gravel, and bacteria colonies will take care of much of the rest of the dirt.





Appropriate use of rocks and gravel can dog-proof the edges of a pond's liner – and give any human visitor something to hang onto in the event of a watery mishap.

Of course, not all plants in the backyard ecosystem are desirable – algae being one. Just as an empty dry-land flowerbed provides the proper growing conditions for weeds by supplying sunlight, nutrients and water, an untended watergarden will soon be overrun with the aquatic “weed” known as algae.

There are thousands of varieties of these single-celled organisms that will float in the water and eventually turn it green. Some algae grow on surfaces, while others grow as long, hair-like strands. And they grow best when they have plenty of nutrients and little competition from other plants. (For more on combating this nuisance, see the sidebar on page 57.)

ON THE BOTTOM

The final touch in proper pond design is all about the hard stuff – that is, rocks and gravel.

As insignificant as they might be out of water, small rocks and gravel are incredibly important in a pond. They provide an easy

medium for plant growth and the spread of healthy, nutrition-gathering root systems. They also serve as a huge surface area for colonization by bacteria – a true, natural filter, especially when planted with aquatic plants.

Beyond the ecosystem benefits, rocks and gravel are cheap and cost-effective. The cost-effectiveness comes in the fact that gravel cuts down the size (and cost) required of pond filters and pumps.

All it takes is a single layer of one- to three-inch stones to act as a great pond filter. Any thickness greater than that, and you run the risk of building up too many nutrients that will rob the system of oxygen and produce anaerobic conditions. (Note also that gravel and rocks are usually avoided in deeper koi ponds because they can interfere with the flow of water into their bottom drains.)

Some builders of smaller ponds leave gravel out of their systems, usually because they see it as a negative when it comes to maintenance. That may be true, but the result is a need for larger biological fil-



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ters to replace the surface area lost without the gravel – and a need to deal more directly with the layer of un-decomposed sludge that will collect on the bottom when there's no bacteria there to break the organic matter down into solution.

After adding shoreline plants, a few large stones lend a natural touch to the transition from wet to dry spaces. Large stones on the pond's vertical walls also protect the liner from the claws of animals that get into the water and need a way out – and they give people unfortunate enough to tumble into the water something substantial to hold onto as they climb back to dry land.

STRIKING A BALANCE

As you weigh all of these design considerations – pond size, liner selection, gravel, equipment choices and the biological population you'll introduce once the system's up and running – it's important to remember that all of these elements must work *together*.

In ways that just aren't true with pools

Struggling for Air

Many people are aware that plants produce oxygen during photosynthesis, but few recognize the fact that plants also *consume* oxygen 24 hours a day through the process of *respiration*. So at night when there's no sun and no photosynthesis, the plants and algae may actually remove so much oxygen from the water that the fish can be seen at the surface, gasping for air.

This is a bigger problem when the algae that creates green water so overwhelms the pond volume that oxygen is depleted in just a few minutes after sunset. This algae needs to be controlled, and quickly, before other organisms die and eventually the algae dies, too, absolutely flooding the filter system with nutrients.

At that point, even the bacteria in a biological filter suffer as well from a lack of oxygen. This is why pond systems need a skimmer to pull in oxygenated surface water. This is why also bottom drains are a good idea, because they circulate oxygen-depleted water from the bottom of the pond and give it a much-needed breather!

– J.R.

or spas or fountains, the features that make up living systems are wholly interdependent, and *all* factors go into creating balances that support the sustained presence of healthy plants and fish.

You and your clients can spend lifetimes learning more about the nuances of living aquatic systems, but it's certainly possible

to jump in and get your feet wet without years of experience. All it takes is a specific awareness of the needs of the creatures you'll be introducing to your ecosystems, and a certain level of understanding of the balancing act you've initiated.

Just get the basics down: The rest is unendingly interesting and enjoyable. **WS**

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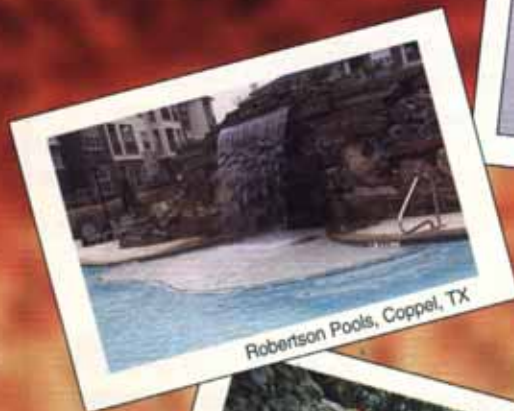
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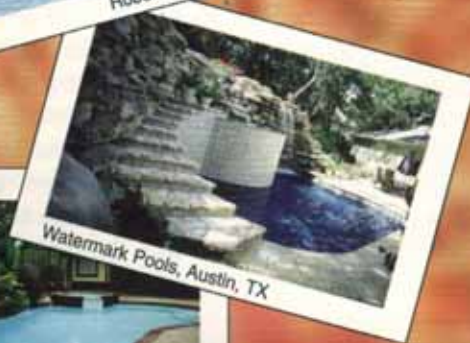
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lizer for concrete pavements and interlocking pavers. The product binds and bonds joint sand, helps resist UV color fade, stops joint-sand washout and prevents weed growth between pavements all in one step. The sealer does not whiten with rain or high humidity and is unaffected by acid rain. **Surebond**, Schaumburg, IL.

GARDEN FEATURE CATALOG

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HADDONSTONE (USA) LTD. has released new literature on its expanded range of

Arcadian Garden Features. Additions to the line include fountain pools with centerpieces ranging from ammonites and lotus flowers to spirals and obelisks; self-contained fountains from wide and shallow to tall and narrow, wall fountains and a range of pool surrounds and liners designed for fountains. **Haddonstone (USA) Ltd.**, Bellmawr, NJ.

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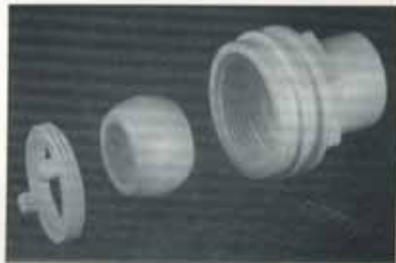
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AQUAMATIC COVER SYSTEMS offers a six-page guide to its line of safety pool covers, including the fully automatic Hydramatic model, which is available with 11 standard fabric colors, and the manually operated EZ Cover, which comes in two standard colors. Deck-

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ACRYLIC DECK SYSTEM

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FLOATING LEAF SKIMMER

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POLARIS offers the LCS leaf canister and skimmer. Designed to fit in the suction line of pool cleaners and collect debris from the surface before it sinks, the unit connects easily and increases skimming efficiency by traveling around the surface with the motion of the cleaner. A built-in flow regulator maintains optimum cleaner efficiency between filter cleanings. **Polaris**, Vista, CA.

GUNITE-MIXING RIG

Circle 112 on Reader Service Card



AIRPLACO EQUIPMENT manufactures the Model 432 gunite mixer with the C-7 rotary gunite placement gun. Designed for automatic material proportioning, variable ratio and volume control, thorough mixing, continuous-feed performance, reduced labor and low maintenance, the unit is powered by a 14-hp engine and has a maximum mixing capacity of 6 cubic yards per hour. **Airplaco Equipment**, Cincinnati, OH.

POLISHED POOL FINISH

Circle 113 on Reader Service Card



AQUAVATIONS has published a brochure on Hydrazzo, a system that combines the durability of exposed-aggregate surfaces with the silky feel of hand-polished marble. The result is a smooth, non-skid and virtually impermeable surface that resists spot etching, chemicals, stains, permanent scale and algae adhesion. The material is available in a range of colors, from a pale Gulfstream Blue to a deep Maui Midnight. **Aquavations**, Coral Gables, FL.

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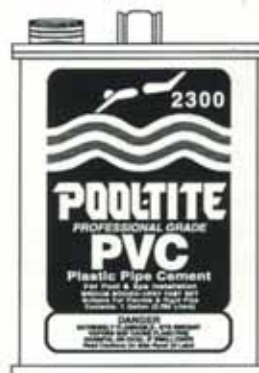
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TRANSPARENT CONCRETE STAINS

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DUCKBACK PRODUCTS offers a brochure on the Mason's Select line of transparent concrete stains. Made with 100% acrylic resins to provide a decorative, protective coating, the material is available in ten colors and takes advantage of the unique variations in color, texture and porosity of different concrete surfaces, accenting those points of distinction with the beauty found in natural stone.

Duckback Products, Chico, CA.

POOL/SPA CONTROLS

Circle 116 on Reader Service Card



INTERMATIC offers a 16-page booklet as a guide to its swimming pool and spa controls and accessories. Coverage includes a full line of mechanical and electronic time switches, a variety of enclosures, air-actuated buttons and switches, control systems with freeze protection, safety transformers, remote-control systems, panel-mounted timers and accessories such as

emergency shut-off switches. Intermatic, Spring Grove, IL.

POOL/SPA MOTOR CATALOG

Circle 115 on Reader Service Card



EMERSON MOTORS has published a 12-page catalog highlighting its motors for use on pools and spas. The catalog covers product features and benefits and includes a replacement guide, information on the company's square-flange and C-face motors, details on energy-saving models and motors for special applications — and a cross-referencing chart to simplify ordering. Emerson Motors, St. Louis, MO.

SUBTERRANEAN EQUIPMENT VAULTS

Circle 117 on Reader Service Card



WESCO FOUNTAINS manufacturers subterranean vaults designed to minimize the noise and eliminate the eyesores created by above-ground pump stations. The system consists of pre-engineered, pre-plumbed equipment sets encased in waterproof vaults made of durable marine materials. The vault itself can be hidden in any convenient spot, thereby protecting landscape and architectural designs. Wesco Fountains, Nokomis, FL.

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SYNTHETIC RUBBER SAFETY TILES

Circle 118 on Reader Service Card



Guard Surfacing, St. James, NY.

SAFE GUARD SURFACING manufactures synthetic-rubber safety tiles for use in outdoor play or fountain spaces. Made with recycled materials and available in standard black, red or green, the synthetic rubber will accept an EPDM wearing surface for a broader color palette and meets all applicable ASTM standards for impact attenuation, water permeability and slip resistance. **Safe**

RAIL-GOODS CATALOG

Circle 120 on Reader Service Card



MENGO INDUSTRIES has published a catalog on its Dotline pool and spa products. Coverage includes the company's white powder-coated stainless steel diving standards and rails – both deck-mounted and standard models. Also included are spa

rails and a variety of mounting escutcheons, steps and assorted hardware as well as information on the company's distribution network. **Mengo Industries**, Kenosha, WI.

POND/FOUNTAIN/POOL VACUUM

Circle 119 on Reader Service Card

ODYSSEY SYSTEMS has introduced Muck Vac for vacuuming ponds, fountains, small pools and spas. The hand-held device is powered by a garden hose at a minimum of 50 psi, but it causes no turbidity because muck, dirt or fish filth is vacuumed to waste outside the vessel. The system includes a power head, telescoping pole, waste hose, vac head and brush. **Odyssey Systems**, San Clemente, CA.



LIGHTING SYSTEM INDEX

Circle 121 on Reader Service Card

FII FOCUS has published a compact guide to its lines of lighting products. The six-page, fold-out brochure is color-coded and features sections on 12-volt area lights, path lights, directional spots and floods and specialty lighting (step lights and hanging or underwater fixtures) as well as details on 12- and 120-volt compact floods and a range of 120-volt products, transformers and accessories. **Fii Focus**, Lake Forest, CA.



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OF INTEREST

PATIO SPACE HEATERS

Circle 122 on Reader Service Card



NAPOLEON makes propane-fueled radiant heaters for use in patios and other outdoor spaces. The fully portable heaters take the chill out of spring and autumn nights in a 360-degree circle extending out to 20 feet. Made of cast aluminum (in green or brown) or stainless steel with weighted bases, the wind-resistant heater burns for 10 to 12 hours with a full 20-pound propane tank. **Napoleon**, Barrie, Ontario, Canada.

SEGMENTED RETAINING WALLS

Circle 124 on Reader Service Card



RISI STONE SYSTEMS manufactures Pisa2, a modular retaining wall system that offers flexibility of design and the natural look demanded by architects, contractors and homeowners. The dry-stack system features units manufactured

face-to-face from high-strength concrete. When split, the face of each unit breaks off in a different way, lending the walls their unique, natural appearance. **Risi Stone Systems**, Thornhill, Ontario, Canada.

AUTOMATIC POOL COVERS

Circle 123 on Reader Service Card

COVER-POOLS offers a full-color brochure on its Save-T Cover II automatic safety pool covers. The consumer-oriented information is designed to inform prospective cover owners about the company, its capabilities and the specific features of its automatic covers. It also provides information on power options, architecture-friendly features, fabric colors, control systems and custom orders. **Cover-Pools**, Salt Lake City, UT.



POOL/SPA REPAIR KIT

Circle 125 on Reader Service Card

AQUABOND has introduced a repair kit for pools and spas. Designed to simplify repairs on plastic or metal pipes and on filters and pumps, the kit contains a complete line of adhesives, including a UL-approved light-niche encapsulating compound, and also has materials for installing bolts in concrete and patching both horizontal and vertical concrete cracks above and below the waterline. **Aquabond**, Orange, CA.



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IONIZING SYSTEMS

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CLEARWATER ENVIRO TECHNOLOGIES makes copper/silver ionization systems to reduce chlorine use in pools, spas, fountains and lakes. A digital controller releases precise amounts of copper (to kill algae) and silver (to kill bacteria and viruses) into the water. The company offers 37 models designed for use with water volumes ranging from a few hundred up to 2.4 million gallons. **ClearWater Enviro Technologies**, Clearwater, FL.

CONCRETE PREPARATION

Circle 128 on Reader Service Card



PERMA-TECH INDUSTRIAL COATINGS has introduced SP-3000 Gel Surface Prep for cleaning and etching concrete products to promote superior bonding of coatings or paint. The high-viscosity gel adheres to vertical and horizontal surfaces and will remove rust, algae or mineral build-up from the surface. The product is removed with water and requires no neutralization. **Perma-Tech Industrial Coatings**, Cleveland, OH.

Industrial Coatings, Cleveland, OH.

LOADERS AND EXCAVATORS

Circle 127 on Reader Service Card

BOBCAT has published the Summer 2001 edition of **Worksaver**, a quarterly booklet about jobs performed by the company's skid-steer loaders, compact track loaders compact excavators and more. Highlighted in this issue is information on the manufacturing of the 500,000th Model 773 skid-steer loader, with details on its basic features and its application in a variety of tasks including landscaping. **Bobcat**, West Fargo, ND.



REMOVABLE POOL FENCES

Circle 129 on Reader Service Card

BABY GATE POOL FENCE MFG. makes removable fencing systems for pools. Available in black, white, green or beige at heights of 45 and 51 inches, the system is supported by fiberglass poles with solid rod-base reinforcement capable of withstanding more than 140 pounds without giving way. Pole-mounting hardware is corrosion resistant and made to tight tolerances to minimize pole twisting. **Baby Gate Pool Fence Mfg.**, Indian Beach, FL.



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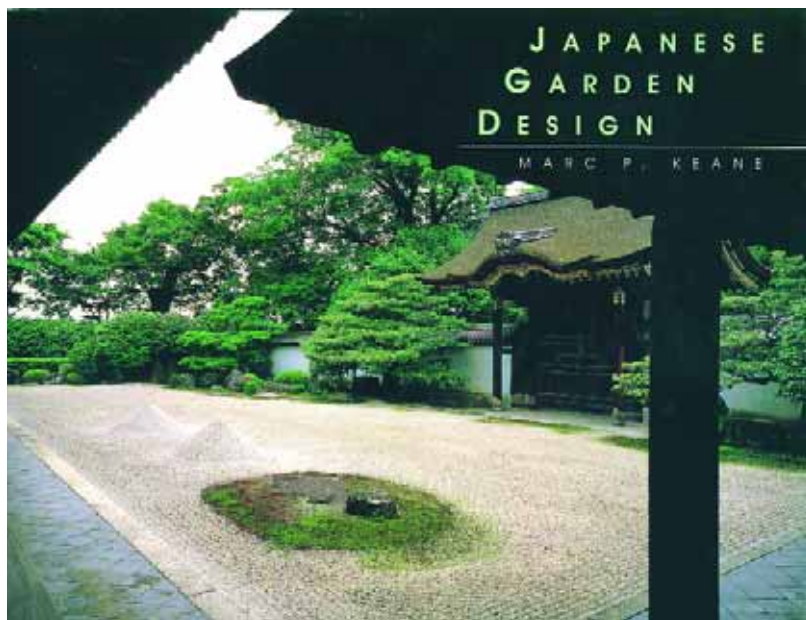
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Art from the East

If you've been looking for a well-written, beautifully illustrated book that cracks the code when it comes to the design principles of Japanese gardening and introduces the full range of styles found in this ancient art form, you can't go wrong with *Japanese Design*. Written by designer Marc P. Keane (and published by Charles E. Tuttle in 1996 but still in print), the book offers a detailed examination of this most influential of styles.

For watershapers, landscape designers and garden specialists reared strictly in Western design traditions, studying Japanese gardening provides a wealth of alternative ideas having to do with specific ways you construct, harmonize and balance a design.

As you get involved, you'll discover that Japanese gardening is about a whole lot more than lanterns, maples and bamboo. Those are just the most obvious manifestations of a style that has deeper and much more complicated roots that run through centuries of Japanese design philosophy and art history.

The book holds Japanese gardening up as a model to Western designers, but Keane recognizes practical limitations on achieving that look in the here and now in other places. That in mind, he rightly argues that designers working in most any style with stone, plants and water can create what he terms "Japanese-spirited" designs.

He guides readers in that direction using examples of famous gardens and giving us access to unique private spaces as well. Along the way, Keane explains the Japanese methods for creating balance and harmony within designs by layering views, creating surprise and interest with footpaths and bridges and, most of all, by replicating nature.

It is in this replication (as distinguished from *duplication*) of nature that

Japanese gardening is about a whole lot more than lanterns, maples and bamboo. Those are just the most obvious manifestations of a style that has deeper and much more complicated roots that run through centuries of Japanese design philosophy and art history.

Keane offers his greatest insights into the ways Japanese garden designers have used both stone and water as representations of streams, rivers and surrounding mountains so prevalent in the island nation.

All this inspiration comes with a caveat: Many of my clients want beautiful plant material and fantastic spaces, but they also want those plants and spaces to be maintenance-free, with automated irrigation and streamlined service. Japanese gardens, by contrast, are meant to be *constantly* pruned and cared for, so it represents a real change of pace in many respects for both clients *and* designers.

And as Keane explains, this ongoing care of Japanese gardens is as important in creating the "art" as is the initial installation. In this sense, he concludes, Japanese gardens really may not be for everybody.

The book also goes into great historical detail about the various styles of gardens and how they were created for use by people on different rungs of society. From the great, sprawling imperial gardens of Japanese royalty to the tiny private gardens found in the nation's teeming cities, the principles used to organize space for the purpose of viewing, meditation and relaxation offer today's watershapers an undeniably rich set of design ideas and approaches. **WS**

Mike Farley is a landscape architect with 20 years of experience and is currently a design/project manager for Leisure Living Pools of Frisco, Texas. He holds a degree in landscape architecture from Texas Tech University and has worked as a watershaper in both California and Texas.

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