

Sharing the Vision Wichita

Text and Photos by Helen Nash
The Water Garden Society of Kansas shares visions of water in the garden.

Dave and Claudia Peebler met me at the airport on a sweltering summer day, Claudia having recently learned it is no longer safe to leave Dave alone for even a couple days. Away at a teachers' conference, she had unsuspectingly left him alone to mull over where he could fit in just one more pond. It's not like they had only a small tub garden. Lushly planted koi and water garden ponds fill their backyard with inviting decks allowing up close and personal enjoyment. As near as we can figure, Claudia couldn't have been as far away as the corner when the construction crew showed up. Upon her return, she drove right by her house, not recognizing it! Dave had surprised her with a good-sized, fully mulched and landscaped pond tucked among the trees immediately in front of the house...and he even included a bench to support his shocked wife.

Those of you who have already sampled the joys of water in the garden know too well the progressive stages of ponditis — *digging the hole* of commitment, advancing to passion, and finally evolving into full-blown obsession...and *digging more holes*. The members of the Water Garden Society of Kansas share their obsession with each other throughout the year, and once a year with the public. Their 4th annual tour was held June 21 and 22, 1997, with 25 gardens opened to the world. Their president,



A shallow layer of gravel on the Duncans' pond bottom naturalizes the construction.

Dave Peebler, explained in the program guide: "As you view each garden, you see that their ideas and purposes may differ, but each has a way of displaying a mood, a feeling, a space and a way of sharing with nature all things natural and beautiful — the combining of water, stone, wood, plants, and animals into something to be enjoyed. Come enjoy with each gardener the wonders of their ideas and their labors of love."

Rex and Mary Jane Duncan

In a rural setting with a large yard, Rex and Mary Jane have carved out two ponds. A small pond edged with brick and accented with a small

spouting frog is home to brightly colored comet goldfish. Flowering perennials frame the charming pond with vines trained against the house behind. Three dogs, including a ball-loving yellow lab, enjoy their own fenced area. Mary Jane's stained glass concrete stepping stones, bejeweled with dragonflies, prove enchanting surprises next to the garden path that crosses a cobbled, dry creek bed. On one side of the natural wood bridge (perfect for kitty sunbaths) is a bog garden filled with moisture loving aquatic and semi-aquatic plants. The largest pond nestles against a wooded area with a small waterfall returning the recycled water from the filter unit tucked into the shrubbery. Lazily swimming among the water lilies and other aquatics are more comet goldfish and both regular and butterfly koi. Crystal clear water allows the fullest appreciation of the fish.



Arrowhead grows in the shallow stream that emerges from the shrubbery to return water to the pond in the Duncans' garden.



Mark and Lalana Moore

Mark and Lalana Moore's extensive outlay of ponds is also known as Scenic Landscapes Nursery. A virtual woodland wonderland, the property is an Eden of meandering streams, ten ponds, and an incredible mill house and water wheel serving a large pond and stream. It is no matter of curiosity that Mark specializes in designing natural woodland gardens... complete with tranquil waters. Lalana's own special creativity emerges unexpectedly in unique 'container' gardens — a wheelbarrow and an old wringer washing machine!



Mark Moore's trademarks of design — lush woodland plantings, rocks, ground cover, and driftwood

(above) A shady stream empties by a small waterfall into a quiet pond.
below) The large mill house and giant water wheel take visitors back in time.



Bill and Joyce Heller

Bill and Joyce Heller took advantage of a sloped yard to terrace it into landscaped features incorporating a winding stream and two ponds. The larger reservoir pond is at the bottom of the stream with the water recycled up to the smaller top pond. Water enters a whiskey barrel planter filled with water clarifying plants by way of a plumbed, old-fashioned hand pump. The stream meanders around from the side of the house to the larger pond in the backyard. A small flat rock forms a stepping bridge over the stream. Overlooking the ponds and gardens, a sun room and small deck invite friends and family to enjoy the haven beneath the shady trees.



(above) The Hellers' pond receives enough sunlight during the day to allow growing water lilies.
 (immediate right) The waterfall fit naturally into the slope of the yard.
 (far right) A wagon wheel leans against the fence behind the handpump and vegetable filter outlet of the recycling pond water at the side of the Hellers' home.



Ken and Sue Hevener

Ken and Sue Hevener had their pond professionally built four years ago. Set in a corner of the small, fenced yard, the 1200 gallon pond is approximately 5 feet deep, perfect for koi and safe wintering of the pond inhabitants. Perimeter shelves allow for potted marginal aquatics. The four-foot-tall waterfall is balanced by profuse plantings between it and the fence with the flowing water audible from all parts of their yard. A year after building the pond, the Heveners installed a combination filter/skimmer to greatly reduce pond maintenance. The following year, they added a room addition with a wrap around deck so that the pond could be enjoyed year-round. Extensive landscaping with both sun and shade gardens complements the water garden.



(above) The skimmer filtration system is buried adjacent to the pond. Removing a slab rock reveals the water's entry by a weir into the system.
 (left) The four-foot-high waterfall allows the peaceful sound of water to be heard throughout the yard. Ground covers and specimen plantings accent and soften the pond's edge.

Ron and Terry Butts

Ron and Terry Butts must enjoy waterside living! Their 6500 gallon, 12 x 30 foot koi pond is immediately accessible from the house by a railed deck, perfect for leaning onto and enjoying the koi. What had been a flat backyard acquired a con-

siderable mound of topsoil from the excavation — perfect for creating a raised planting area. Water recycles from the large pond into an upper bowl from where it diverts into two streams naturally landscaped in the higher ground. A blue spruce pois-

es between the two streams. Two different waterfalls create aeration of the water along with the water's audible flow. Behind the elevation, railroad ties lend support and structure, and a dry, pebbled stream bed serves for runoff when necessary. Perimeter landscaped beds naturalize the setting and camouflage the fence separating their yard from their neighbors'.



While larger concrete patio areas open up from both ends of the deck, it is hard to resist leaning over the railed deck to watch and feed the koi.

(below) Water celery, *Oenanthe javanica*, grows in the water course way to provide attractive softening of the feature as well as water clarification. (bottom) The two waterfalls assure that the sound of water can be heard from either side of the yard.

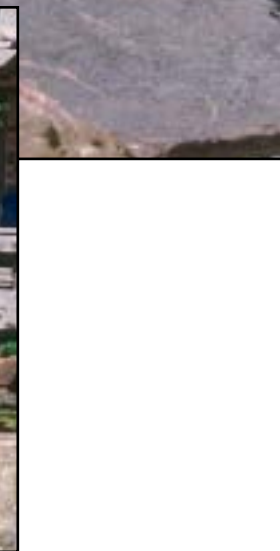


Il Sik and Debbie Hong

Il Sik offered a double treat on the pond and garden tour: his home and his nursery, Hong's Landscape. At the nursery, both small ponds and a very large earth pond offer ideas of plants, construction, and landscaping. At the Hong's home, oriental-flavored landscaping combines with the delightful color and form of perennials and specimen flowering plants. The sparkling clear koi pond sits just off a deck equipped with a glass-topped table supported by ornate metal sculpted koi. A small stream recycles water from an upper, vegetative filter pond tucked into the landscaping up ground from the pond. Within the pond, Il Sik has constructed a bottom drain and a side skimmer that work in tandem with a bio-filtration system to keep the water healthy and clear for the more than 50 koi that range from 3 inches to two feet long. Elegant sculptures used around the pond landscaping hint at a touch of humor upon closer inspection — two herons are actually involved in an altercation with a frog! Il Sik has combined specimen plantings, the year-round form and structure of evergreens, and textures of smooth, rounded black stone and wood.



(top) Note the creative use of rocks, pebbles, and plantings. (immediate right) A deck perfect for quiet entertaining overlooks the koi pond. (far right) It is easy to understand why the beauty of koi is described in terms of looking down on them.



Bill and Pat Butterworth

Bill and Pat Butterworth show how much creativity can go into one small yard. From the side of the corner lot, you enter a 'seaside garden' with small container gardens (both water and terrestrial), seashells, and netting. What could have been but a narrow path around the house to the front yard has been turned into a 'Western trail' with curios, plants, and true Western ambience. Entering the front yard from the trail, an 'Oriental' garden is highlighted with a 900 gallon pond, fully equipped with a waterfall and a bog. Sparkling water, water lilies, and colorful fish delight the eye. Behind the Oriental garden is an 'English' garden of classic perennial beds and a vining arbor. So many wonderful ideas in so little space!



(left) Pat Butterworth sits next to the pond in the Oriental themed section of their garden.
(above) Bill and Pat's pond combines all the elements of water gardening.

Bill McCabe

Bill McCabe was my personal 'tour director' of the ponds of Wichita. In spite of temperatures in the high nineties, he kept smiling as he wiped his forehead, chugged iced tea, and muttered to himself, "We'll see all 25 in one day!" Although his pond wasn't really on the tour, I did enjoy that visit, too. Bill has had his koi pond for many years — long before rubber liners were commonly available. He built his pond of wood, treating it to hold water. Although he's since 'remodeled' it, the basic structure remains with handy benches around for close-up enjoyment of the koi. The filtration system is tucked away in a matching wooden structure equipped with a sound system for playing music or frog sounds. The McCabes' yard is a gardener's delight, too. Brick-edged pathways wander around planted beds that invite birds and butterflies. Then there's that swimming pool...Bill's wife says, "No way," but Bill's eyes glaze over as he imagines the pond it could be!



(left) Bill's fish enjoy their clear and healthy water.
(above) Planting beds in the McCabe backyard are edged with uniquely sloped brick.
(right) Bill McCabe designed and built his koi pond many years before construction became easy-to-do.



Flying Dragons

in the Backyard

by Dr. Forrest Mitchell

How to attract these delightful denizens to your backyard...and keep them around.

Photo by Ron Everhart

The hard work has finally paid off. The pond is installed and full of water. The plants have been placed, the stones set, and the new fish are frantically trying to find a hiding place from which to peer out at their new home. What next? The plants will take some time to grow and fill in the pots and banks, and the fish will need a little coaxing before they swim up to take food from your hand. But nature has just found a new wetland to colonize and has already started to work. For most pond owners, attracting wildlife is one of the main reasons the pond was built. Some wild creatures will take longer than others to appear, but the insects will begin arriving the same day the pond is filled. Midges, water boatmen, water beetles, mayflies and many other types of aquatic insects will find the pond and make themselves at home. Some of these new residents are drab and difficult to see. Others, like mosquitoes, can be pesky; leave them to the fish. There

is one group of insects, however, that are quite visible and excite the attention of even the smallest child. These, of course, are the dragonflies - the air superiority fighters of the insect world.

Some basic information about dragonflies

Dragonflies are cosmopolitan in distribution and are fixtures at nearly every fresh water pond, stream, or lake. The dragonfly family (the scientific name is Odonata) is composed of two subgroups - the dragonflies proper (Anisoptera) and the damselflies (Zygoptera). In the United States, there are just over 300 species of dragonflies and about 160 species of damselflies. The two can be told apart by the way the wings are held when the insect is at rest. Dragonflies can't fold their wings over their back, whereas most of the damselflies can and do. One group of damselflies, the spread winged damselflies (family Lestidae), will open

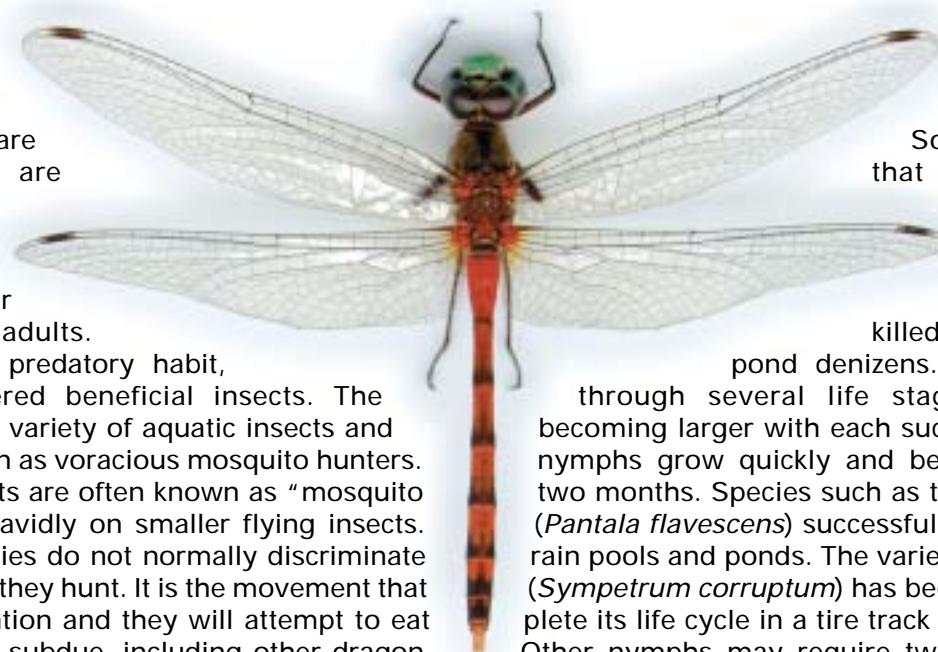
their wings up when perching. But they are seldom, if ever, held flat like a dragonfly at rest. Dragonflies also have a more rounded head with eyes that touch, or are at least close together. Damselflies have a bar shaped head with eyes covering the ends.

Another significant difference between the two groups is flight capability. Dragonflies dart, wheel, hover, and streak effortlessly through the air. In fact, it is often difficult to get a good look at a dragonfly. Damselflies are weaker flyers and spend much of their time at rest on a twig or leaf. They are easier to approach and unlike dragonflies will sometimes allow the amateur photographer to put a camera lens in their faces. Damselflies are excellent at hovering, skating just above the surface of the water, and patrolling through weeds. Some are so small and darkly colored as to be nearly invisible against a background of grass or other vegetation.

The life histories of dragonflies and damselflies are very similar. All are obligate predators both in the immature stage, called a nymph or naiad, and as adults.

Because of their predatory habit, they are considered beneficial insects. The nymphs feed on a variety of aquatic insects and have the reputation as voracious mosquito hunters. Similarly, the adults are often known as "mosquito hawks" and feed avidly on smaller flying insects. However, dragonflies do not normally discriminate in the type of prey they hunt. It is the movement that attracts their attention and they will attempt to eat anything they can subdue, including other dragonflies. The visual acuity of the Odonata, especially the dragonflies, is well known to anyone who has spent time watching them. The compound eyes of some species, such as the darners (family Aeshnidae) cover most of the head. The compound eyes are aggregates of simple eyes, each facet being called an ommatidium. Some of the ommatidia are smaller and more dense in certain regions of the eye, usually on top, allowing for a more refined field of view. This is important in the 360° world of the flying insect where both death and prey can come from any direction. A better view from the top of the head ostensibly would allow for a better chance of avoiding predators such as martins and fly-catchers swooping down from above.

All of the Odonata are egg layers. The skimmer family of dragonflies (family Libellulidae) lay eggs by dipping the abdomen into the pond and releasing clusters of eggs. This can be done while hovering or while racing across the surface of the pond. The darners normally cut a slit in a plant stem, such as a cattail, and embed the eggs in the plant tissue for protection. This seldom hurts the plant, but there are instances reported where plants have been damaged by an excess of ovipositing dragonflies. This is an uncommon circumstance in nature and likely to be even more rare in the home pond. Damselflies usually oviposit in a similar manner as the dragonflies, although some may fully submerge themselves to reach an oviposition site. The nymph that hatch-



es from the egg is nearly invisible. Some are so small that they will prey on protozoa. These small nymphs are very vulnerable and many are killed or eaten by other

pond denizens. The nymphs pass through several life stages called instars, becoming larger with each successive molt. Some nymphs grow quickly and become adults within two months. Species such as the wandering glider (*Pantala flavescens*) successfully exploit temporary rain pools and ponds. The variegated meadowhawk (*Sympetrum corruptum*) has been observed to complete its life cycle in a tire track full of muddy water. Other nymphs may require two or more years to reach the adult stage. Most if not all adults die within the year they emerge. The aerial antics they perform along with mid-air collisions with other insects and pursuing predators are hard on their wings and they soon begin to tatter. It is not unusual to see dragonflies with partial wings or only three wings toward the end of the year.

When the nymph has reached the final instar, it must molt into an adult. This is another very vulnerable period for the dragonfly or damselfly. The nymph must crawl out of the water to molt. This is most often done on a plant stem or a twig projecting out of the water, although some species will crawl up on the bank. It is also a nocturnal or early morning event.

Photo by Ron Everhart



"Creating Backyard Havens"

The dragonfly is completely helpless as the adult breaks through the skin of its nymphal casing. The wings are curled and useless, having been folded inside the skin of the nymph. But once free they begin to expand. This is a critical process. If the wings do not expand quickly enough or there is not enough moisture to keep them soft, they begin to dry before fully expanding and the dragonfly is lost to the first predator that happens upon it. If the water quality in which the nymph grew was poor, or if its diet was deficient, the dragonfly will not develop properly and often dies during this transitional stage of its life.

If all goes well, however, the dragonfly can take wing on its first morning. It may not fly far, depending on the weather. It is not unusual to walk around a pond on a spring or summer morning and have dozens of new dragonflies and damselflies flush from the vegetation to flutter to a nearby tree or to fall back into the grass. In a day or so the

dragonfly's skin has hardened, the wings are fully dried, and it flies out to begin life as an adult.

Water gardening for dragonflies

Attracting dragonflies to your pond or water garden is not difficult. Indeed, it would be practically impossible to keep them out. However, it is always nice to have diversity and attract as many species as possible. Adult dragonflies and damselflies are very mobile insects and the probability that virtually every species in your area will come by your garden at some time during the course of a year or two is quite high. But what makes them stay? Some species will be hard to pull in no matter what you do. The river cruisers (genus *Macromia*) are seldom found anywhere except rivers as they prefer long stretches of flowing water. The broad-winged damselflies (family Calopterygidae) also prefer flowing water, but do not need long stretches. At least one

species in this family, the American rubyspot (*Hetaerina americana*), will come to small fountains. If your water garden has flowing water anywhere in addition to a still pool, it will be more attractive to a larger range of species.

Another issue to consider is shade. Many dragonflies and damselflies will prowl in the woods, but when it comes time to feed, find a mate or lay eggs, they prefer to have a sunny, open spot in which to do so. Most species will not stay at a heavily wooded pond. However, having heavy woods near the pond is beneficial, as it provides storm shelter, a hiding place for many species that fly only at dawn or dusk (many of the clubtails, family Gomphidae), or females that want to recover from ovipositing. Male dragonflies will patrol a pond and try to mate with any female they encounter. When females are near a pond, they spend much of their time either avoiding males or laying eggs, often with a male in attendance or even still attached behind their heads. Few males, however, will pursue the female away from the pond into a woods or sheltered area and lose their patrol station to a competitor. Damselflies are less picky when it comes to having a shaded area. Still, more prefer to have at least part of the pond in a sunny area.

Another attraction to dragonflies is the size of the pond. The larger the pond, the more species it is likely to hold and support. However, if

properly planted, even the smallest of ponds will maintain a dragonfly population. One feature that dragonflies seemingly respond to is vegetation in the pond. A research study in progress has so far shown that at least one species of dragonfly, the wandering glider, will lay eggs in pools as small as 2 feet square. However, more nymphs were found in ponds planted with cattail, which grew over five feet tall, than in ponds planted with a small sedge that grew no larger than one foot from the surface of the water. It appeared as though the dragonflies were keying in on the presence of the cattail as an indicator of open water. A second species, the roseate skimmer (*Orthemis ferruginea*) also laid eggs in a cattail planted pond. The nymphs of both these species are cryptic and do not climb the plant stems, preferring to crawl on the pond bottom, so it would seem unlikely that a preference for vegetation type was displayed. For nymphs of many other species, vegetation is an important consideration for both cover and hunting. Most members of the darner family prefer to have stems and perches available to climb in and on, as do many damselflies. Submerged plants, emergent plants, and floating plants all provide cover for the nymphs and oviposition sites for the parents. Emergent, border, and floating plants provide perches and territories to guard for the adults. Semi-aquatic or even partially submerged terrestrial grasses are excellent sites for oviposition by many of the damselflies. Filamentous algae even has its use as habitat for nymphs of the smaller species.

The type of bottom in the pond also determines which nymphs survive. Many species of skimmers are at home on a sandy or rocky bottom, especially in shallow water. However, most of the clubtails prefer a soft mud bottom as the nymphs remain buried for most of their life.

Coexistence with other pond dwellers
Dragonflies are an ancient group and have learned how to cope with most other pond and wetland species. The backyard water garden, however, can be an artificial habitat and there are some points of con-

sideration. Fish are probably the major predator of dragonfly and damselfly nymphs. To cope with this, the nymphs have evolved protective coloration and stealthy habits. Still, a pond full of fish will be able to eat a large number of nymphs if they are not given cover. Dense vegetation and shallow water are two sources of protection that can help. Having small fish is another. This can present its own problems though, in that the larger nymphs are perfectly capable of catching and eating small fish. Normally this will not be a problem, as it occurs only with the largest of nymphs and the smallest of fish. Newborn fry have a number of other predators that would be of more concern. Many goldfish are also incompatible with a mud bottom that would shelter the clubtails; the fish would soon suspend the bottom up in the water column and cloud the water. Adult dragonflies also have many predators. Birds, frogs, spiders, robber flies, and other dragonflies are common among these. Damselflies are more susceptible due to their weak flying habits, but enough manage to survive that this is not a worry for the pond owner.

In the United States, there are two major emergence peaks of dragonflies. The first happens in the spring, the second in the summer. There are annual fluctuations as to exactly when these occur, depending on the climate, but it can often be timed by the appearance of the cast skins on plants and twigs.

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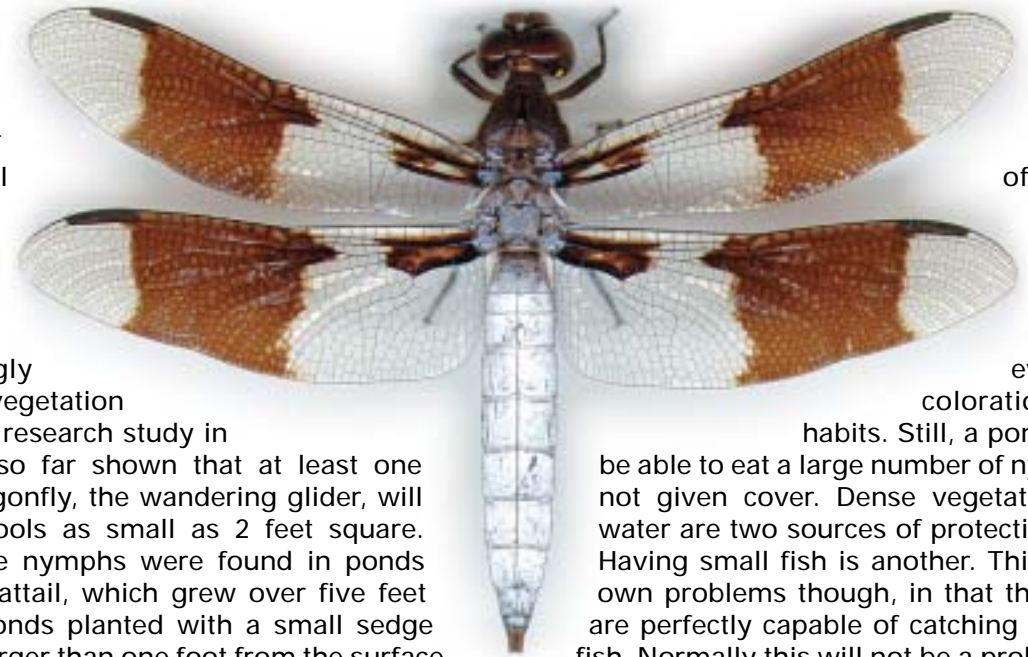


Photo by Ron Everhart



Photo by H. Nash



Photo by Ron Everhart

Many dragonflies overwinter as nymphs in the pond, so that if it is to be drained in the winter, most of the nymphs will be lost. Healthy ponds have nymphs present all year round, so that there is always some mortality during a cleaning. However, if cleanings are done in the late spring or summer, the adults quickly repopulate the pond.

Dragons in the house

Wild dragonflies do not have to be fed. Since they are such general predators, there are always enough prey species around to suffice. If for some reason the food supply disappears, the nymphs will simply sit and wait until it comes back. Adults, being mobile, can depart for better hunting. If the nymphs are caught and kept in a bottle or small aquarium, they need to be fed every day or so. As a rule they do not need aeration, and most will live quite happily in a 15 millimeter deep petri dish with a washed sand bottom and a piece of plastic aquarium plant to lurk in or under. Nymphs of the green darner (*Anax junius*) become quite tame and run to the edge of the contain-

er when they observe a person in the room. Virtually all the small invertebrates caught in the pond will make good food. So will mosquito larvae caught in flooded (or deliberately placed) containers, provided the water is shallow enough that the dragonfly nymph can pick them off the surface or can climb up to reach them. Many of the skimmers will not climb and need to be kept in shallow water to feed properly. The clubtails, being burrowers, are mostly uninteresting in captivity. If the nymphs are long lived or kept during the winter, they feed readily on the white worms, grindal worms, black worms, and daphnia from the local pet store. The largest nymphs can be maintained on newborn guppies or mosquito fish. Emergence to adult is more difficult in captivity than in the wild for a number of reasons. If a dragonfly nymph is being kept by a child who gets attached and wants to release the emerged adult, it would probably be best to start with a nearly grown nymph. The age of the nymph can usually be told by the size of the wing pads that lie along its back.

The older the nymph, the closer the pads will reach from behind the head to halfway down the body. If the nymph can crawl completely out of the water on a stick or plastic plant, it should be able to attempt emergence.

Identification

With less than 500 species of Odonata in America north of Mexico, many of these brightly colored, one would think that they would be easy to identify. Some are, but many are not. The pond damselflies (family Coenagrionidae), the clubtails, and even some of the skimmers can present problems for the amateur enthusiast. Nymphs are even more difficult to identify, with the youngest nymphs being indeterminable except by molecular means. Fortunately, the number of resources is growing. Several books are available to assist the amateur, as are some dragonfly societies. The amount of information on the world-wide web is growing daily, and several web sites are devoted to photography and images of dragonflies and damselflies that will assist in identification. A field guide to dragonflies is in preparation and should be published soon. With luck and perseverance, the water gardener should be able to put a name to the owner of those flashing wings and sublime moves.



Societies

Societas Internationalis Odonatologica. Contact Bill Mauffray, International Odonata Research Institute, c/o Division of Plant Industry, P.O. Box 147100, Gainesville FL 32614-7100

Worldwide Dragonfly Association. Contact Jill Silsby, Secretary, Worldwide Dragonfly Association, 1 Haydn Avenue, Purley Surrey CR8 4AG UK

Dragonfly Society of the Americas. Contact T. Donnelly, 2091 Partridge Lane, Binghamton NY 13093 USA

Books

Dragonflies of the Florida peninsula, Bermuda and the Bahamas, by Sidney W. Dunkle, published in 1989. ISBN# 0-945417-23-3

Damselflies of Florida, Bermuda and the Bahamas, by Sidney W. Dunkle, published in 1990. ISBN# 09-945417-85-3

Damselflies of North America, by Minter J. Westfall and Michael L. May, published in 1996. ISBN# 0-945417-93-4

Dragonflies of North America, by James G. Needham and Minter J. Westfall, published in 1954. ISBN# 0-520-02913-5

Dragonflies and Damselflies of Cape Cod by Virginia Carpenter. Published in 1991 by the Cape Cod Museum of Natural History.

The first three of these books are available from the International Odonata Research Institute. The Dragonflies of North America is out of print, but may be found at a library. Both of Dr. Dunkle's books and the book by Dr. Carpenter may be ordered from Patricia Ledlie Bookseller Inc., One Bean Road, P.O. Box 90, Buckfield, Maine, 04220 (207-336-2778).

Video

Common Dragonflies of the Northeast by Richard K. Walton and Richard A. Forster. ISBN# 1-888814-02-0 Order from: Natural History Services, 7 Concord Greene #8, Concord, MA 01742

Sites on the World Wide Web

The Odonata Information Network <http://www.afn.org/~iori/> This site has a vast collection of links and information on dragonflies and dragonfly societies, including a list of dragonfly specialists that may be in your area.

Ode News

<http://www.capecod.net/~bnikula/on2.htm> Ode News, an on-line newsletter concerning dragonflies of the northeast is published here. There are also links to checklists and a collection of more than 150 photos of dragonflies and damselflies. Another extensive list of links is provided.

The Digital Dragonfly Project <http://www.our-town.com/dragonfly/> <http://stephenville.tamu.edu/~fmitchel/dragonfly/> <http://stephenville.tamu.edu/~fmitchel/damselfly/>

These three sites have scanned images, photographs, and distribution maps of dragonflies and damselflies found in Texas.

The Dragonfly Biodiversity Site <http://www.ups.edu/biology/museum/UPSdragonflies.html> This site contains a wealth of information and images concerning Odonata of the Pacific Northwest.

Odonata: Dragonflies and Damselflies <http://www2.southwind.net/~royb/odonata.html> Extensive information on dragonflies, specializing in the fauna from Kansas.

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by Phil Alexander. All photos by Phil Alexander unless otherwise noted.

Like so many of you, I had always dreamed of having a pond...but actually building one myself was too full of unknowns. The vision remained a 'future project' for years. With the encouragement of friends and family, however, I finally decided to build one in the spring of 1994. My five main objectives for this pond were 1) to make it large enough so that we wouldn't want a bigger one in a year or two, 2) to have a waterfall easily seen and enjoyed from within the house, 3) to have clear pond water, 4) to have a pond of easy maintenance, and above all, 5) for it to look natural in the landscape. In April of that year, my friend, Danny Hartt, and I began designing and constructing such a pond.

As it evolved, the 'large enough' pond meant swimming pool size, in this case 37 feet long, 25 feet wide, and 3 feet deep to hold approximately 16,000 gallons. Not one to wait a couple years for the 'add-on' temptation to hit, I felt the urge during construction! A second, smaller 8 feet by 8 feet and 3 feet deep pond took form adjacent and connected to the larger one. Since our backyard is very wide on a 3/4 acre lot, we also added a



Before the pond installation, the Alexander yard was a 'lawnmower' man's dream.

Phil Alexander's dreams of a backyard pond transformed their yard.

rock garden and stream to make the water garden area even bigger by adding some 50 additional feet to the plan.

The great thing about having a large water garden

is that not only do we get to have more fish, but we're always discovering something new in a different part of the pond or garden. So far, the 'large pond design' strategy has worked because it's been four years now and we haven't been tempted to expand it yet.

The waterfall display was the most difficult and challenging aspect of the pond's construction. It proved to be a tough assignment for a novice pond builder to make the project large enough to be easily seen from inside the house over fifty feet away and for it to still look natural. After three unsuccessful attempts, I gave up and hired two well known local contractors, Harrell Alderman and Larry Leone, who specialize in water feature design and construction. They brought tons of beautiful rock into the yard and then proceeded to carefully select only those rocks

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The waterfall display was the most difficult and challenging aspect of the pond's construction. It proved to be a tough assignment for a novice pond builder to make the project large enough to be easily seen from inside the house over fifty feet away and for it to still look natural.



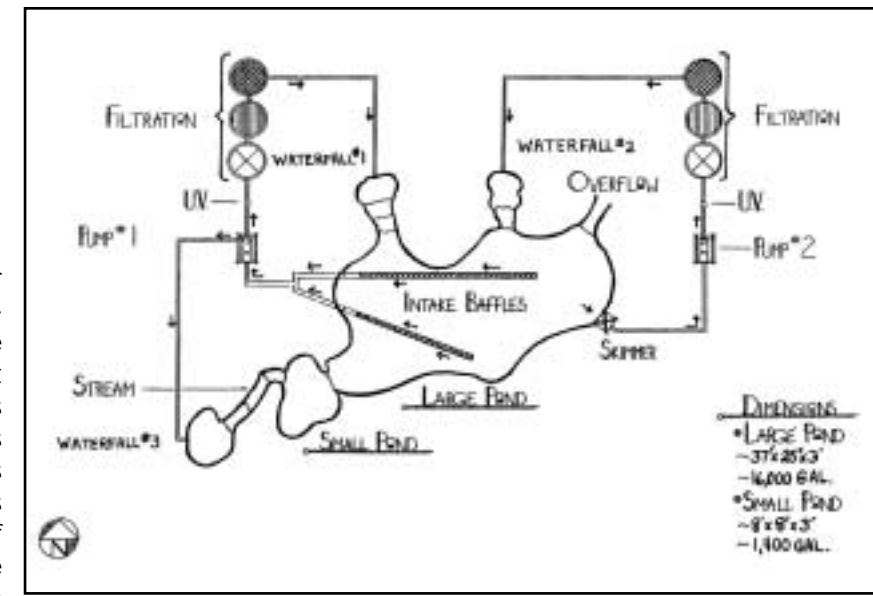
(top) The small pond in the foreground recycles water into the larger pond below. Photo courtesy of *The Dallas Morning News*.

(above) Winter pond scenes at the Alexanders' include red berries on *Nandinas*.

that best fit their design. They created a cave with large boulders so that water cascades from the cave's mouth as well as from small holes drilled in some of the upper rocks. The focal point of the entire garden, the waterfall adds sound, beauty, and movement to the landscape. Best of all, we have a panoramic view of the entire oasis from within the house.



Water cascades into and out of a small lily pond that is fed by a stream above it.



Harrell and Larry so impressed us with their work that we also hired them to completely rebuild and naturalize an 18-foot stream that we had already built.

After studying their style and technique, I built yet another small stream and waterfall by myself. Although not up to their professional standards, we were pleased with its natural appearance.

Like most water gardeners, we wanted clear water to insure viewing the fish. In addition to using water plants as a natural control for water clarity, we also use two ultraviolet UV light systems. As you can see from the diagram of the pond's plumbing one set of UV lamps is fixed into each filtration system. Each set has three forty-watt bulbs to service the size of the ponds. The UV-fixture system maintains the 2-

inch diameter PVC plumbing. The water has been clear now for four years with no green episodes. In fact, it's so clear that you can even see baby fish three feet down! Ease of maintenance became even more important over time. We started out using two external filters that performed both mechanical and biological filtration. These original filters used a down-flow filtration design — water was pumped into the top of filter, went through a series of brushes and cartridges before entering the biological media area in the bottom of the filter, and then gravity-flowed back to the pond. Although they were very effective in filtering the waste from the water, they had to be cleaned weekly during the summer. This was both time-consuming and messy since the mechanical portion of each filter had to be broken down to do the job. Since then, I've replaced those units with two other filtration systems, each having its own out-of-pond Sequence pump and composed of three cone-shaped chambers with bottom drains for easy periodic cleaning.

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The first chamber is a vortex Above-ground filtration chambers (hidden behind the large pond) keep it clean and are very easy to maintain.



chamber that slowly rotates the water in the cone to allow the larger waste particles to settle out before continuing on to the next chamber. Unlike most vortex filtration systems, our pumps water into this chamber instead of letting the water gravity-flow into it. (I didn't know about gravity-fed vortex systems when we first built the pond. To avoid the necessary reconstruction of converting the pond's original plumbing to support a bottom-fed gravity system, we use a bottom-fed pumped system instead.) Does it work? The answer is yes, but I had to amend the design for it to be effective. I knew that since the water and the waste particles that it contains go through the pump's impeller system, the particulate matter is

chopped into smaller sizes before moving on into the vortex settlement chamber. This means that less waste settlement occurs in that first chamber as compared to a gravity-fed vortex chamber. We compensated for the pump's effect by increasing the diameter of the pipe and that of the vortex chamber itself to slow down the speed of the water. A long 4-inch diameter PVC pipe was also inserted between the pump and the Vortex chamber along with a larger, 4-foot

diameter cone for the vortex chamber to rotate the water more slowly. This allows a lot of settlement to occur in the vortex chamber before the water proceeds on to the next chambers. Cleaning this chamber is as simple as turning off the pump and opening up a bottom discharge valve to empty the chamber along with all the accumulated waste in the bottom.

The next chamber in the filtration system is also cone-shaped but is only 32 inches in diameter. Filled with a thin, narrow, ribbon-

A bullfrog patiently awaits the next lily bloom to open.

like plastic material called 'Springflo' that looks like shredded paper, it further slows down the water flow and traps smaller waste particles. A layer of reticulated open cell foam on top of the Springflo further compensates for not having a gravity fed system. This chamber is almost as easy to clean as the first one: turn off the pump, remove the reticulated foam and rinse it, barely stir the Springflo with a long stick to dislodge the waste particles which fall

to the bottom of the chamber, and open the bottom discharge valve.

The third and final chamber is identical in size and content to the second chamber, but it is used primarily as the biological filter. Any remaining waste particles are trapped in the reticulated foam at the top of this chamber before the water enters the Springflo material where the bacteria live. An air stone in the bottom of the chamber supplies additional oxygen to the bacteria living on the Springflo. An effective system, no ammonia or nitrite can be measured with my water test kits. Since we covered the pond bottom with river rock, we periodically add a natural bacteria and enzyme concentrate to minimize any sludge accumulation between the rocks.

Two 1/4 horse Sequence pumps recirculate approximately 4,000 gallons per hour. As you can see from the plumbing diagram, one of them draws water from the bottom of the pond and the other from the ponds' surface via a special pond skimmer. The skimmer has a large net inside that collects the leaves and seeds that fall into the pond from the surrounding trees and shrubs. (We had argued with those fallen leaves for several frustrating years. Operating like a swimming pool skimmer sys-



The small stream works its way through a rock garden to eventually spill into the small pond.



Phil built this small waterfall after watching the professionals! Photo courtesy of Fort Worth Star-Telegram.

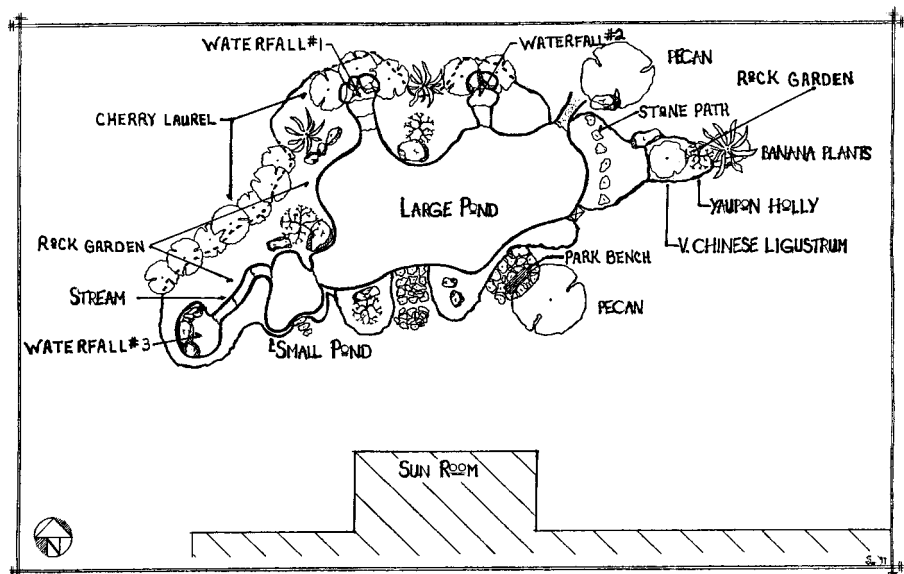
tem, the skimmer keeps the pond surface clean and alleviates build-up of sunken organic debris.) Since



Green mound junipers soften the pond's edge.

I installed only one skimmer in such a large pond, supplemental surface sprays direct the bounty of floating tree leaves and seeds to the skimmer for a couple of weeks during the fall and the spring. The skimmer box also contains and hides the automatic fill-valve, fed by well water, that keeps the water level constant in the pond.

A natural looking pond was the last but most important objective for this project. First of all, we planned the pond with sweeping, natural looking curves and constructed it with rocks and large boulders, many covered with lichens or moss. With over 30 tons



The overall landscape plan for the Alexander yard.



The Alexander yard after the pond installation.

of rock in the pond and rock garden, extensive landscaping with a variety of plants was used to soften them. For example, cascading plants tumble over the rocks and the pond's edge. These include green mound junipers (*Juniperus procumbens* 'Nana'), gray lavender cotton (*Santolina chamaecyparissus incana*), and silver mound artemisia 'Powis Castle'. Evergreen plants and shrubs immediately around the pond lend year-round substance and anchor the pond within the landscape. Other evergreens hide the sides of the higher waterfalls and rock structures and also serve as screens. Compact cherry laurels and standard *Nandina* define areas as they provide necessary shade to grow mosses on some of the rocks. Dwarf yaupon hollies that spread outward and not upward and low-growing Mugho pines effect the transition from the pond and the surrounding yard while allowing an unobstructed view of the scene from within the house.

2-3-inch diameter smooth river rock hides the bottom liner. Drystacked, six to eight-inch boulders camouflage the side walls. Underwater grasses, like tape grass (*Vallisneria spiralis*), anacharis and cabomba, have rooted in the river rock along the bottom to further naturalize



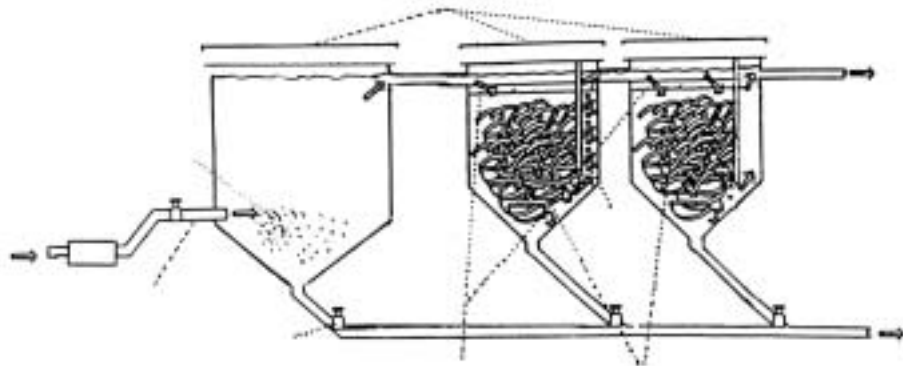
A few of the koi and goldfish in the large pond.

Fish and underwater plants growing among the loose rock bottom cover over the liner are easy to enjoy with clear water.

the pond's appearance. Also, all of the plumbing,

including the bottom 2-inch black pipe that serves as the intake

for one of the filtration systems, is hidden or camouflaged. Even the air stones that were placed in the pond because of the fish load are located at the base of the waterfalls so that their bubbles look like they are caused by the waterfall turbulence.



Installing a vortex filtration system for an existing pond

One method is to use above-ground chambers that are pump-fed. Water flow, however, must be slowed down from the pump to maximize debris settlement in the vortex chamber via a 4" diameter PVC-pipe feed and a larger (4' minimum) vortex chamber. Filter matting (above the Springflo) in the other two chambers is also helpful. While not as much settlement occurs in the vortex chamber compared to a gravity-fed system, it is still very effective for retrofitting an existing pond to take advantage of vortex filtration...without the hassle that's associated with retrofitting a pond with a gravity-flow system.



A shady park bench provides a pleasant viewing area for this portion of the pond.



A fish causes a ripple on the glassy surface.

Our pond has been featured in several articles in area newspapers and included in local garden tours over the past several years. Visitors to our backyard say that the pond looks extremely natural. We already knew our first four goals had been accomplished, but to have others affirm the achievement of our most important objective is the most gratifying. It looks natural — by design. 🦋

Phil Alexander lives in Colleyville, Texas.

What Phil would do differently:

1. He would build the pond with a bottom-fed gravity-flow filtration system. Even though his pump-fed vortex filtration system is very efficient, he feels a gravity-fed system would be even more so.

2. He would place the river rock that lines the bottom of his pond in a mortar base, as Eamonn Hughes recommends in his pond construction video, "Creating Your Own Water Gardens." River rocks embedded in a mortar base would still give the natural appearance of a rock bottom but minimize sludge buildup beneath and between the rocks.

3. He would install more than one pond skimmer since his pond is so large.

4. He would not have added the five koi since they have grown considerably larger and are now predictably beginning to damage the underwater grasses. The goldfish in the pond, including even the large 12" ones, however, don't appear to disturb the plants at all.



(above) The pond provides a tranquil place for reflection.
(inset) One view of the pond from a window in the sunroom.