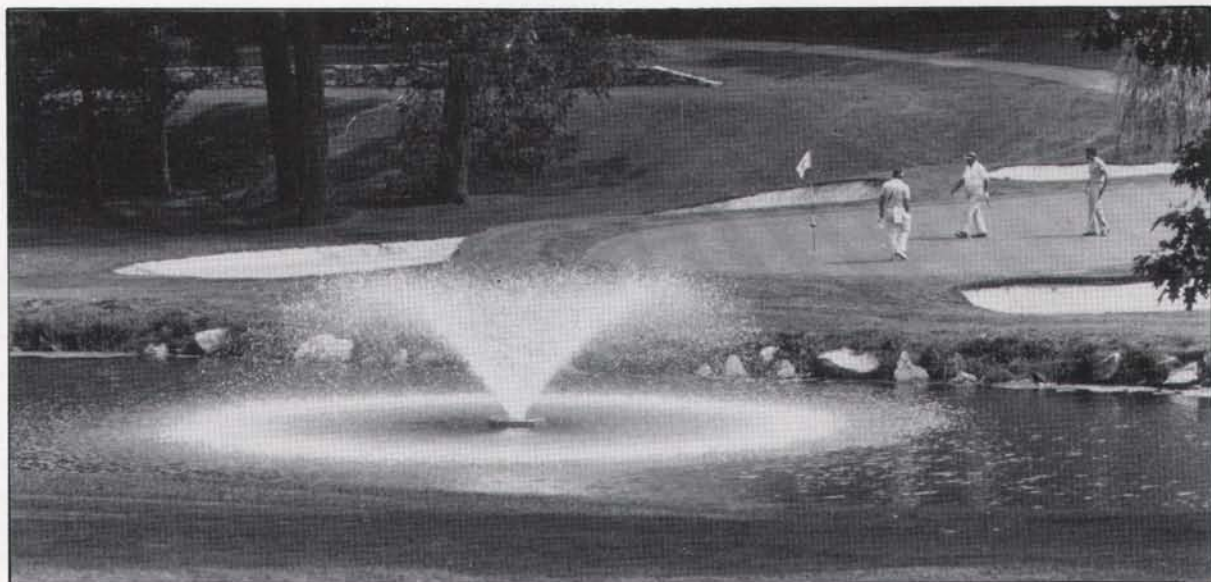


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“...The water quality and algae problem were cleaned up; so last year we purchased our second OTTERBINE Aerator”.

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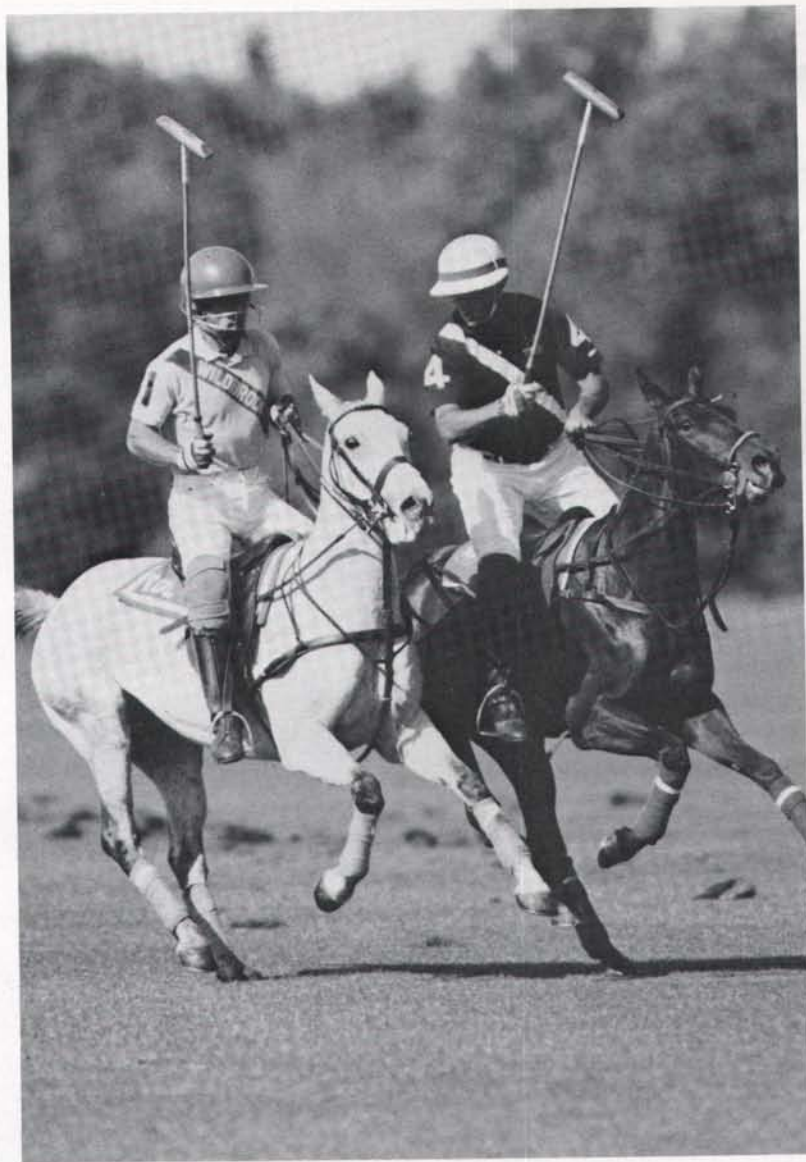


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Photo — Lehigh Country Club



Polo ponies at Greenwich Polo Club make divots in the low-cut turf maintained by Clark Tolles.

POLO: The Ultimate Challenge In Turf Management

Picture a rectangle of low-cut turf the size of ten football fields. On it, imagine ten 1,200-pound thoroughbreds galloping at up to 40 miles per hour, pounding the turf with their hooves, cutting right and left, or skidding to a halt. Finally, visualize the state of the surface after 45 minutes of all out play. The number of divots is so great, spectators traditionally help replace them after matches.

More than 250 groundskeepers in the U.S. live with such nightmarish field damage every day as they maintain polo clubs for America's amateur and professional players. "Polo, in my mind, represents the ultimate challenge in turf management," states Bill Triller, superintendent at Santa Barbara Polo & Racquet Club in Carpinteria, CA. "Players expect the field to be fast and smooth despite the pounding it takes from the horses. It's the most difficult condition to work under."

Expectations of players and "patrons" have risen dramatically during the past decade, says Clark Tolles, grounds superintendent for Greenwich Polo Club in Greenwich, CT. "During the winter, all the best teams play in West Palm Beach [FL] or Palm Springs [CA]," he adds. "Those fields are sandy, bermudagrass, and fast. When the teams start playing up north in the spring, the fields are wet, a mixture of Kentucky bluegrass and ryegrass, and slower. There is pressure on northern polo clubs to keep their fields in as good a condition as southern ones."

"A club's reputation depends on the shape of its fields, no matter where it's located," explains Allen Scherer, executive director of the United States Polo Associa-



Polo is played in six periods of seven-and-one half minutes each called chukkers.



The goal posts for polo are 24 feet apart. Photo courtesy: Santa Barbara Polo & Racquet Club.

tion. "Better knowledge of turf is required to keep clubs competitive. Quite a few clubs hire consultants from the golf industry or groundskeepers with a background in turf today. Polo is a horse-related sport run largely by horsemen. They are realizing that the quality of play and the safety of their horses depends greatly on well-constructed and well-maintained fields."

Scherer points out that polo, like other horse-related activities, has experienced sizeable growth in the past few years. "The number of clubs has grown by nearly ten percent during each of the past eight years," he reveals. "Polo is not restricted to the rich. People of moderate means can participate, especially if they are good players."

Part of the growth in the number of clubs is due in part to a shortage of playing facilities. "More people are starting clubs so they can play more," adds Scherer. "The new clubs open up opportunities for amateurs who may have taken up the sport in college or on vacation." The number of professionals is also increasing, many traveling to the U.S. from other countries. Just as Americans have fueled baseball and football, the British and Argentinians are generating interest in polo in the States.

Triller was hired two years ago specifically to improve the three fields at Santa Barbara Polo & Racquet Club, just a short mile from the Pacific Coast. The best polo teams in the world, as well as a number of celebrities, play there from April through October. The club was founded in the '20s by Max Fleischmann of yeast fame. It quickly became a sports and social center for movie and other industry moguls. The

walls of the clubhouse are lined with pictures of stars, visiting royalty, and powerful businessmen.

Like other facilities, the club started with one field and added more as the amount of play increased. Over the years, sand from nearby beaches had been spread on the common bermudagrass fields along with composted manure from the stables. Eventually, heavy use, imprecise irrigation, poor fertility, and invading kikuyugrass took their toll and the fields started to decline. The conditions were obvious since many of the teams and players also played in West Palm Beach or Palm Springs during the winter. By the mid-'80s, the club decided to address the problem by looking for a groundskeeper with a background in both turf and horses.

Triller is the type of person who lets curiosity direct his career. After graduating from Cal Poly San Luis Obispo with a bachelor's in horticulture and a master's in agriculture, he explored the worlds of landscape contracting, nursery production, and orchard farming. He found himself teaching much of the time and decided to earn a teacher's credential. For five years he taught science and vocational agriculture at the high school and junior college level. As part of his job, he organized equestrian events in the suburbs south of San Francisco. On the side, he consulted owners of large estates in the community and was introduced to polo. He found polo an interesting combination of horsemanship and horticulture.

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Polo

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Throughout his career, he kept in touch with Cal Poly to satisfy his curiosity about different occupations in the green industry. When Santa Barbara Polo & Racquet Club contacted Cal Poly about their opening, Triller saw a new horizon to explore. After visiting the club, he agreed to a three-year contract to renovate the facility.

"A polo field has to provide solid, reliable footing for the horses, yet still be forgiving," points out Triller. "As many as 60 different horses may be used during a match. Each team fields four players and there are two umpires. They change horses between chukkers [there are six chukkers of seven-and-one-half-minutes per match]. These are valuable, well-trained animals ridden by skilled athletes. You simply can't tolerate field-related injuries."

At the same time, he explains, the turf has to support the small, three-inch diameter plastic ball (formerly made out of bamboo root) so it can be hit cleanly by a mallet and smooth and fast enough for the ball to travel far and straight. Divots must be replaced or repaired quickly to maintain a dense, well-knit stand of grass. High-wear areas of the field, such as the center and in front of goal mouths, must be constantly renewed.

The most pressing challenges of polo field care are controlling soil moisture, compaction, thatch, fertility, low-cut turf, and density. "You must encourage tillering but eliminate long runners," Triller adds. "A strong root system is essential. To achieve that you need excellent drainage, precise irrigation, and a complete fertilizer program. You want to mow frequently and keep an eye on thatch."

Triller quickly came to the conclusion that Santa Barbara needed a more manageable turfgrass. Kikuyu runners were spreading throughout the common bermuda. Annual bluegrass was invading bare spots in the winter. The resulting patchwork of turf also suffered from ring spot, which he suspected was caused by the previous use of manure compost.

He decided to attack the problem one field at a time, starting with the stadium field. In October of 1989, he sprayed the first field with glyphosate to kill all the existing turf. "We then removed the old turf and almost two inches of thatch with a sod cutter," Triller says. "This was followed by scraping it level with the help of a laser. You learn from experience. We lost several days using the sod cutter when we could



Two of the Greenwich fields are irrigated with Ag-Rain travelling sprinklers.



A Jacobsen HF-15 is used to mow the fields at Santa Barbara.

have scraped the turf off. Turns out we needed that extra week once we sprigged."

After working an inch of sand into the surface, Foster Turf from La Quinta, CA, sprigged the ten acres with Santa Ana, a hybrid bermudagrass developed for Southern California by Drs. Vic Youngner and Stan Spaulding. "We got good establishment and root growth, but the weather that winter was cooler than normal," Triller adds. "In March, with one month before play resumed, I was concerned about the density of the field. The Santa Ana needed a kick. We put the entire ten acres under plastic. That did the trick. In a matter of days, we had a strong root system and thick bermuda. It was a miraculous transition from the old turf."

Triller prefers using a pair of Bauer

travelling rain guns to conventional irrigation. The sprinklers generally run once a week following the Sunday match. The fields are closed to play on Monday to give them time to dry down. From Wednesday to Sunday, one or two matches a day are played. "I can get an inch of water down on Sunday night," remarks Triller. "That usually gets us through the week."

While he waters just once a week, he mows and sweeps every single day. Divots are replaced or dressed with a mixture of sand, humus, and fertilizer after each game. The reels on the club's HF-15 (Jacobsen) are set between one-half and five-eighths of an inch for the Santa Ana and an inch-and-a-half on the older turf. All the fields are marked with a white latex turf paint weekly. "I switched from chalk to paint because it

stays sharp and won't drift. We also change the configuration on two of the fields located side-by-side to distribute the wear," says Triller.

Every week one of the three fields is aerified with a drum unit with hollow tines. In the fall, he rents either a Verti-Drain, Howard Renovator or Turf Quaker to aerify down eight to ten inches. This is followed by verticutting and sand topdressing.

During the winter Triller applies calcium nitrate, Par-Ex, and extra phosphorous to promote consistent growth and bud initiation. Potassium is added during the playing season to improve wear tolerance. He keeps nitrogen levels down in the winter to discourage invasion of broadleaf weeds. A pound per 1,000 square feet is normal during the rest of the year.

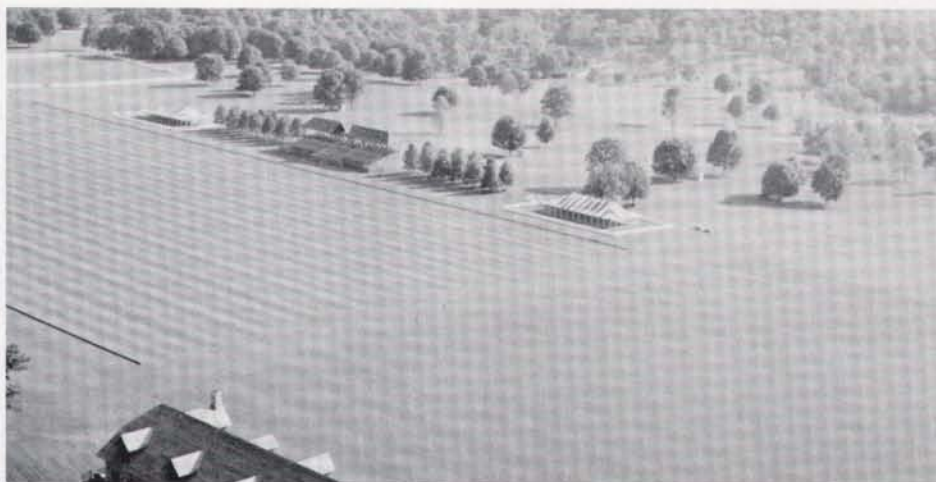
This winter Triller is in the midst of renovating the second field. "The Santa Ana has done extremely well this winter," he comments. "We won't need to cover this time. Everything looks great!

"The thing that makes me feel the best is that we didn't lose a single horse to field-related injuries this past year," boasts Triller. "The players are very pleased with the new turf and say they look forward to playing here. That helps team patrons attract the best professionals and gets sponsors interested in supporting tournaments."

In addition to the three fields, Triller maintains seven acres of stick and ball (practice) fields, a track, and warm-up area. The barns at the facility hold up to 350 horses during the season. "All horses have to be exercised every day," he remarks. "This is a busy place seven days a week. And it has to look especially nice on Sundays, when up to 3,000 spectators come to watch the match and picnic."

Nearly 3,000 miles to the east, Clark Tolles handles the massive task of keeping Greenwich Polo Club and White Birch Farms in shape. Tolles helped build the polo club which today is the centerpiece for the exclusive equestrian community just an hour's drive from New York City. Many of the residents of White Birch Farms own horses, play polo, or have teams. Some play as amateurs in West Palm Beach during the winter.

The club and community were the idea of Peter Brant, a publisher and paper company owner. In 1981, Brant purchased the 1,500-acre horse farm in Greenwich with the intent of subdividing it into 15- to 20-acre residential parcels for horse-loving executives. Ironically, part of the land



Aerial view of the stadium field at Greenwich Polo Club.

planned for the new polo fields was a golf course when he bought it. In Brant's mind, polo took priority over golf.

Tolles, who devoted five years to studying architecture, has renovated a number of polo fields during his career. Like Triller, he has been interested in horses for much of his life. As a youngster in Westchester County, NY, he used to help out at a neighborhood stable so he could ride. His interest in architecture was spawned after he helped build a barn for the stable.

His association with polo started while he was a student at the New York Institute of Technology in Muttontown, NY. The land for the school used to be part of Meadowbrook Polo Club, one of the oldest polo clubs in the country dating back to 1881. To help pay his college costs, Tolles took a job with the club working on the barns, fields, and track.

When the club was sold, Tolles was hired by Ted Siegel, general manager of Pen-Mor

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Polo

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Farms, an 80-acre horse breeding facility on Long Island. Investors from New York would buy thoroughbred colts at auctions in Kentucky and have them broken and trained at Pen-Mor for racing. The rising value of promising race horses was attracting new investors and bringing new life to area farms.

"In the early '80s, Pen-Mor suffered from years of neglect," Tolles remarks. "We had to rebuild the track and barns and construct new paddocks. It was a big job and caught the attention of a lot of horsemen."

One person's eye focused on Pen-Mor was that of Peter Brant. He had recently purchased the farm in Connecticut and needed a general manager and someone to direct construction of two new polo fields and numerous buildings for Greenwich Polo Club. Brant hired the team of Seigel and Tolles in 1983.

"When I started at Greenwich there was a track with one polo field in the center," Tolles recalls. "A lot of buildings needed to be renovated. The old-style barns were perfect for a polo setting. The pastures needed work and Mr. Brant wanted two more polo fields. On top of that, the buyers of the estates in White Birch Farm also required help to build and care for their own barns and practice fields. There is also 15 miles of roads to maintain."

"The idea was to use polo to attract buyers for the farm estates. The property owners can become members of the club. However, local ordinances limit the club to eight public matches during a three-month season. That does not restrict the number of amateur matches or team practices. Six of the club's 200 members have teams. One field was simply not enough.

A 30-acre site located in the middle of an abandoned golf course was selected for the two new fields. The top eight inches of sandy/loam topsoil were removed and screened. "I wish we had sand to cover both fields," says Tolles, "but the native soil is pretty nice. A consultant designed a drainage system for us. It consists of french drains 18 inches wide and two feet deep. The trenches are 75 feet apart in a herringbone pattern. They are filled with gravel wrapped in filter fabric. We had 15 inches of rain one August. Fortunately, the teams play at Saratoga during August and we had a week to dry the fields out."

To keep the surface open during the playing season, Tolles and his crew of 14



In addition to three fields, Bill Triller cares for a track, warm-up area, and two ball-and stick fields.

slice the fields rather than core aerify them. "We put slicer blades on our two pull-behind aerifiers in the summer and switch back to the coring tines in the fall," Tolle points out. A Verti-Drain is used for the center and goal mouths in October.

Greenwich Polo Club is constantly re-seeding. "We buy nearly 4,000 pounds of seed a year based on recommendations from Cornell University," Tolles says. "We try to pick the most disease and insect resistant varieties for our mix of 75 percent perennial ryegrass and 25 percent Kentucky bluegrass. Seed is always included in our divot mix of coarse sand and humus. We try to work sand into the field at every opportunity. I wish somebody made a topdresser large enough for polo fields so we could add sand every time we aerify."

A 110-acre lake is the reservoir for the irrigation system. The quick-coupler system for the stadium field and the Ag-Rain traveling units on the other two fields are pressured by a 60 hp pump. "The quick coupler valves are recessed four inches below the surface and covered with rubber caps and oak bark," explains Tolles. "The heads run off a clock after we snap them in place. They are divided into ten zones. The travelers run off a six-inch main."

The club uses a Jacobsen HF-15 to mow the fields and surrounding turf. Tolles has been dropping the cutting height to one inch and mowing more frequently to make the fields faster. A ten-foot-wide Brillion seeder is used each fall to remove thatch and interseed the new varieties.

Once a week the crew pulls string and paints the lines with a Smithco sprayer. "In

addition to the sidelines and center line, foul lines are marked at 30, 40, and 60 yards on both halves of the field," reveals Tolles. "It amounts to almost four miles of lines each week!"

Greenwich Polo Club today is one of the country's finest. Its president, Peter Orthwein, is the top ranked amateur player in the U.S. and owns an estate in White Birch Farm. "The best players in the world play here each year and the horses in our barns are among the best money can buy," boasts Tolles. Dan Walker, president of Santa Barbara Polo & Racquet Club, is also a highly-ranked amateur. He is the third generation of his family to play polo at the club.

James Trebbin, general manager at Santa Barbara, believes that field improvement has given the club a magnum jump in quality of play, safety, and enjoyment. "We run this club using strict business principles," he states. "The money we spent on the fields came from managing other costs, such as food service and publications. We also market our logo. We couldn't do that if our reputation wasn't as strong as it is. The fields play a big part in that reputation."

Polo has become a business. Many clubs are associated with real estate developments. Each club competes for the best teams and professionals. Proper field maintenance is essential to the future success of the sport. Professionalism must apply equally to players and groundskeepers. If you want proof, ask Jim Trebbin or Peter Orthwein. Their clubs' success depends on it. ☺

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Construction has been completed on the new Comiskey Park baseball field in Chicago, IL, home of the Chicago White Sox. Opening day is April 18, 1991.

A "Play All System" was installed in the field. Designed and constructed by Sportsfields, Inc., of Blue Island, IL, and Roger Bossard, turf superintendent for the White Sox, the system is designed to make the field playable in 30 minutes following a two-inch rain.

The first step in installing the system was laying out the field and verifying all

measurements. The site was 12 inches below the finish grade. A complete subsurface drainage system consisting of 9,300 feet of perforated drainage tile was installed. All trenches were backfilled with birds' eye gravel and sand. A high-tech automatic irrigation system, including moisture sensors, was also put in place.

Twelve inches of a special root zone blend, consisting of approximately 6,700 tons of .25mm sand, were used. Spaghnum peat moss and calcined clay were incorporated into the sand for moisture and nutri-

ent retention. A stabilizing fabric was also included within the root zone blend.

Not all of the original Comiskey Park is gone. The infield of the new facility was constructed with the infield clay from the old park because of its ideal texture. The field was completely sodded between September 8-15, 1990. Approximately 11,600 square yards of special eight-blend bluegrass were installed.

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Rutgers University received more than \$98,000 in royalty payments from Seed Research of Oregon, based on sales of SR 4000, SR 4100, and SR 4200 perennial ryegrasses, Titan tall fescue, and SR 3000 hard fescues. These were developed by Dr. Reed Funk's breeding program at the university, which is recognized as one of the finest in the world.

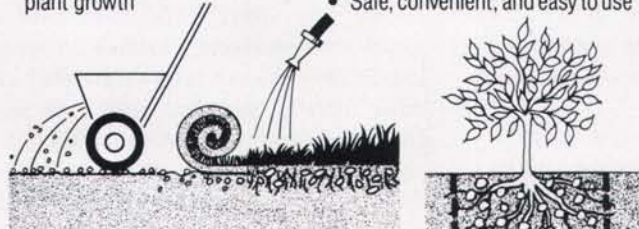
The seed company also made royalty payments in excess of \$4,000 and \$6,000 to the University of Rhode Island and Arizona State University respectively, for sales of Providence improved creeping bentgrass and SR 1020.

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THE EFFECT OF WATER QUALITY ON IRRIGATION COMPONENTS

Most groundskeepers will tell you that one inch of rain does more good for turf than one inch of irrigation. This appears true despite talk about air pollution and acid rain. How does rainfall differ from groundwater, or, in an increasing number of instances, reclaimed water?

Water quality is a growing concern in many parts of the country. Not only does it affect the condition of turf under your care, it can also increase the amount of maintenance required for irrigation system components.

There just isn't enough potable water to serve everyone's needs. Irrigation, especially for golf courses, parks, and other large areas, depends increasingly upon reclaimed or "dirty" water. While this water is not toxic to plants, it may contain chemicals, organic material, or particles that can foul or slowly degrade rubber or metal components of irrigation systems.

Whether water is obtained from treatment plants, wells, rivers, or lakes, superintendents and groundskeepers need to be aware of what is in water delivered by irrigation systems. Many problems can be solved by filtration at the pump station. Others may require greater diligence on the part of irrigation specialists to maintain proper operation of valves and sprinkler heads.

"Today the golf course superintendent has to be more than an expert on turf management," claims Efraim Donitz, president of Aqua Programs International, Inc. of North Hollywood, CA. "He has to know about water and its impact on turf and other plants. Every large turf facility should have its water tested at least once a year and, in some cases, four times during the season. Once you identify contaminants, there are ways to overcome them or learn to live with them."

Protecting pump stations against dirty water was discussed in the November 1990 issue of *Golf & sportsTURF*. This article will focus on valves, heads, and, to a limited extent, pipe.

There are two basic types of potentially dirty water used for irrigation, reclaimed and unprocessed well or surface water.

Manufacturers point out that even potable water may contain particles or chemicals that can affect irrigation system components over a period of time. Products injected into irrigation systems, such as fertilizers, can also react with metal or rubber parts.

As potable water supplies are stretched to their limits, municipal water districts are encouraging or requiring large turf facilities



Color-coded plastic valve for reclaimed water by Imperial Underground Sprinkler Co.

ties to switch to reclaimed water. Arizona, California, Florida, and Texas have initiated separate delivery systems for water processed by treatment plants. To distinguish between potable and reclaimed water, the irrigation industry has adopted the use of purple or brown pipes, valves, and sprinkler head caps as an indicator of reclaimed water carriers. The color is a warning to those who might consider using the water for drinking purposes.

"The best way to protect irrigation valves and heads is at the source," advises John Williams of Toro Irrigation. "That is why we pursued aeration. By managing irrigation reservoirs to control algae and improve aerobic decomposition of organic matter at the source, you reduce contamination problems.

"Filtration is critical if you have standard electric valves," Williams adds. "If

debris gets into the top chamber of the valve, it can disrupt operation. Some electric valves are designed with small screens that filter the water entering the bonnet. Our pressure-regulating electric valve has a different type of metering which is more tolerable of dirty water."

Williams recommends hydraulically-controlled valves for serious water problems. "The water operating the valve is from a clean, pressurized source," he says. "The chance of fouling is greatly reduced."

Early hydraulic controls were not flawless. Larry Thomas, irrigation supervisor at the University of California, Irvine, has been switching from hydraulic to electric valves over the past five years. The university has been using reclaimed water for 15 years. "Something in the water was causing a metal disk in the hydraulic controller to break down," he reveals. "It would actually crumble in your hand when you touched it. We think the culprit was chlorine reacting with the metal." Today, the disk has been replaced with plastic pilot valves to correct the problem.

Both plastic and brass valves are included among the thousands of valves on the UC campus. "We use standard electric valves from Rain Bird and Hardie," Thomas states. "The water we get from the Irvine Ranch Water District is clean. It just contains a lot of chlorine. The chlorine seems to cut the life of diaphragms in half. Instead of getting ten or more years from these parts, we receive about five years."

Thomas' crew of three has become skilled at replacing the diaphragms. "It's just something you plan for and watch closely," he states. "We make sure all valves are conveniently located for servicing. Some of the valves on the baseball and other athletic fields are buried, so we'll check them every year or two. If there is a problem, we'll change out the valve to a dirty-water type with a reinforced diaphragm."

Other precautions taken by Thomas include using Toro stream rotors for the campus and Hunter gear-drive heads with drain check valves for the athletic fields and inner park. "The buckets on our old heads used to fill up with water," he reveals. "We

try to avoid any standing water or drift since it is reclaimed water. Now, we are 90-percent electric valves and have installed a Rain Bird MaxiCom central for tight control of our irrigation program."

Thomas has not experienced any problems with the water reacting with the brass or plastic bodies of the valves. Brass is an alloy of copper and zinc. Sulfur in water can leach the zinc out of the brass. Acidic water has been reported to react with some brass or metal components. Plastic is considered chemically inert and is sometimes favored in areas with high concentrations of sulfur in water. Some early plastic valves, however, were subject to breakdown by chlorine.

"There is a great misconception that brass doesn't work well in aggressive water," says Kurt Thompson of Buckner in Fresno, CA. "High quality brass is sufficiently resistant to corrosion in most irrigation conditions. You also have to remember that there are metal components in plastic valves. If water is highly acidic, you don't solve the problem just by using plastic valves."

"The main thing to look for in valves is a design that keeps the top chamber clean in dirty water situations," says Bob Caviar, president of Imperial Underground Sprinkler Co. in Lenexa, KS. "Not all valves have the same design. Sand is not round. It can get lodged between sleeves and metering pins. Filters are important, but they have to be located so that water flow keeps them clean. Sizing of the screens is also important."

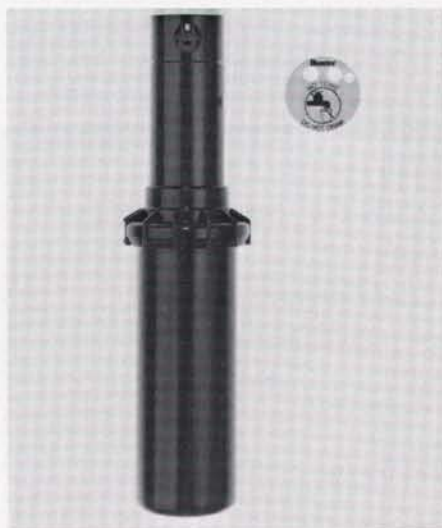
The design of the valve is important in dirty water situations, states John Thompson, Rain Bird's chief engineer for valves. "If a valve fails, you want it to fail closed. For example, if a diaphragm gets a hole in it or an electrical line is cut, the valve should close. The diaphragms on our pressure-regulating and contamination-proof valves are rubber vulcanized to nylon cloth. These valves also contain filters. Some are self-cleaning and others need to be cleaned manually. The irrigation specialist should know where the screens are located so he can service them."

One drawback to hydraulic control is that valves fail in the open position. "If a tube is cut by rodents or someone digging, these valves are open," remarks Jay Inglis, technical information manager for Hunter Industries in San Marcos, CA. "But they are better suited to dirty water situations, especially with valve-in-head sprinklers."

Even though electric valves fail in the

closed position, they can remain open if the inlet on the valve bonnet is plugged with debris, explains William Speelman with Toro Irrigation. "The choice between electric and hydraulic valves is determined by the quality of the water and the region of the country you're talking about. Hydraulic valves are very popular in Florida and Texas because of the danger of damage to electrical systems by lightning. Out West, electric valves are most common because of ground varmints damaging hydraulic lines.

"If the turf manager selects electric and the quality of the water is poor, filtration is a must," Speelman adds. "You have to check to make sure the water will match your system. Reclaimed water varies significantly. Some is crystal clear and some is



Hunter Industries makes color-coded warning caps for its sprinklers to indicate reclaimed water.

loaded with suspended organic matter. Changing from potable water to reclaimed water is not a simple matter."

Conversion also necessitates a look at sprinkler heads. Unfiltered water may contain enough suspended organic matter to plug filters or nozzles. It may also carry abrasive particles that hasten the wear of soft metal components.

Manufacturers of most gear-drive heads use Delprin plastic for nozzles and certain other parts because it resists abrasion from water-borne sand better than brass, says Inglis. A second option is stainless steel.

Algae is another threat to heads. Agricultural sprinklers in dirty water situations tend to be impact heads with large nozzles. The rotation mechanism is fairly simple, operating pressure is high, and the volume of water delivered is large. Some of this thinking has carried over into golf and park uses.

The other approach to protecting sprinklers from dirty water is the closed-case rotor, where the drive mechanism is separated from the main flow of water through the head. These heads have the flexibility of operating at lower pressure and flow rates.

"People are becoming very aware of energy costs related to pumping," Speelman reveals. "They are matching precipitation rates more closely to the infiltration rate of the soil. Lower pressure and flow save money, and in some cases, water. The amount of control desired by turf managers depends upon the amount of water required from their irrigation systems. A system in the Northeast may provide only 30 percent of the total amount of water needed by the turf. In Palm Springs, it may provide up to 98 percent of the total! As that percentage increases, so does the importance of head spacing, precipitation rate, and pressure."

One particularly life-shortening factor for valves, heads, and pipe is chlorine in reclaimed water. "There is no upper limit on the amount of chlorine used by treatment plants," remarks Rain Bird's Thompson. "One area may have one hundred times the amount of chlorine as another. We are always looking for materials with better resistance to chlorine."

"Eventually chlorine and bromine will be banned," says Donitz. "Some other type of biological process will take their place. Until then, we are dealing with a chemical that breaks down partly into hydrochloric acid. Sulfur is also present in a number of corrosive forms. These chemicals are in our water and in our irrigation systems. We need to be aware of their impact on irrigation hardware."

Nitrates are another group of chemicals which may be in irrigation water. They are intentionally injected into systems during fertigation. They are also common in reclaimed water and in lakes that receive runoff from fertilized watersheds.

So you can see that we are not talking about rainwater. Irrigation systems are exposed to an assortment of chemicals, organic materials, and abrasive particles. In all but extreme cases, our water delivery systems for turf and plants perform reliably. Even then, the most they require is more intensive maintenance of replaceable parts.

By learning about water and adjusting irrigation maintenance levels, reclaimed water can continue to keep millions of acres of golf and sports turf green, healthy, and in play. ☞

ASGCA TO HOLD MEETING IN ENGLAND

The American Society of Golf Course Architects will hold its annual meeting in England on April 20-30. During the ten-day meeting, North American golf course architects will visit some of England's finest courses. They will also meet with English golf course architects, greenskeepers, and historians to discuss the future of the game.

The annual Donald Ross Dinner will be held on Tuesday, April 23, at the Broughton Park Hotel in Broughton, Preston. The Donald Ross Award is presented by the ASGCA annually to an individual who has made a significant contribution to the game of golf, especially in focusing attention on the contributions golf course architecture has made to the success of the game.

ENVIRONMENTAL SPECIALIST APPOINTED

Frank S. Rossi, a Ph.D. candidate at Cornell University, has been appointed to the newly established position of environmental education specialist in turf at Michigan State University. He will be responsible for the development and teaching of material concerning safe pesticide use and application, as well as concepts of integrated pest management. He will also develop and coordinate week-long seminars dealing with environmental stewardship and turf management, in addition to teaching courses as part of the university's Lifelong Education program.

A New England native, Rossi received his bachelor's and master's degrees from the University of Rhode Island. He also attended the State University of New York

Agricultural and Technical College at Cobleskill, where he majored in turfgrass management. He is currently finishing his Ph.D. dissertation on the influence of moisture stress on fenoxaprop (Acclaim) performance.

As a graduate student at Cornell, Rossi served as a teaching assistant for weed science classes and a 4-H instructor to elementary students through the Cooperative Extension Service. He has also made presentations, at Field Days and grower meetings, on safe handling, application, and disposal of pesticides.

CAL POLY ADDS GROUNDS OPERATIONS TO SPRING INSTITUTE

California Polytechnic University in Pomona has expanded its eight-year-old spring institute and trade show to include a grounds operations conference. The Sports Turf Institute and Grounds Operations Conference will be held March 19 at Cal Poly. The conference features educational sessions in the morning, followed by lunch, a trade show, and equipment demonstrations.

This year, conference chairman Dr. Kent Kurtz has arranged a separate educational program devoted specifically to grounds operations. "The new program will offer the latest information on maintaining trees, groundcovers, and turf on tight institutional budgets," said Kurtz. "It will stress the basics, such as irrigation, fertilization, pest control, and plant selection, in addition to water conservation, planning, and pruning. We also anticipate a broader range of equipment and supplies at the trade show."

The sports turf program, one of the oldest and largest such programs in the country, will stress athletic field renovation, diagnostic tools for troubleshooting, turfgrass selection, fertilization, and irrigation. There will be a number of demonstrations by experts covering field marking, maintenance of baseball skinned areas, and soil cultivation for drainage and compaction. "We hope to shed some light on ways to manage turf in conditions of heavy play, water shortages, and restricted budgets," Kurtz explains.

The spring institute is presented by Cal Poly's Department of Horticulture. Information on registration can be obtained from the department at 3801 W. Temple Ave., Pomona, CA 91768, (714) 869-2219.

SPORTS TURF INSTITUTE AND GROUNDS OPERATIONS CONFERENCE

March 19, 1991

Expanded Educational Program

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*Trade Show & Equipment Demonstrations *Sports Turf Management Techniques
*New Grounds Operations Program

FOR MORE INFORMATION

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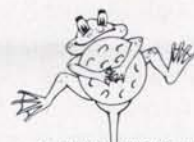
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