

step was to assign John Grosnihan and Guy Durocher the job of improving not only Fitton Field, but all the intramural fields on campus. One by one the problems with the baseball field were corrected.

The traditional sand/clay mix was excavated from the base paths and pitcher's mound down to a depth of six inches. Stone dust was installed in place of the old mix. Immediately drainage of the skinned area improved. There was no more mud to contend with and weeds that used to grow in the old base path mix did not develop in the stone dust. Maintenance is now simply a matter of grooming with a Toro Sand-Pro, light rolling and hosing. Maintenance time of the base paths was cut from 24 man hours per week to four.

"We can have the field back in play within hours of a rain storm now," says Long. If a game is interrupted by a short shower, Grosnihan applies Diamond Dry to the base paths before letting the players back on the field.

To restore dense turf to the portions of the field compacted by fall parking and torn up by winter soccer, Long has the crew aerate heavily with a Ryan Trac-Aire. A Rogers seeder is then used to verticut and overseed both infield and outfield. Starter fertilizer is applied and the turf topdressed with screened loam.

The only missing ingredient was water. Instead of installing permanent irrigation, Long opted for a water cannon by Larchmont Engineering. Not only did the traveling sprinkler make the renovation a success, it is now used regularly throughout the season. The crew also uses the cannon to wet down the base path mix.

One of the steps toward treating the field more like high maintenance turf than utility turf, was a greatly increased fertilizer program. Now the field is fertilized six times from May through September. Preemergence herbicide is applied twice in May and a postemergence dicot weed killer is used in late June.

The difference in the field is dramatic. After the outfield is mowed with a Jacobsen Turf King reel mower and the infield with a 24-inch walk-behind rotary, Long adds a special touch of his own. He picks up the clippings and gives the turf a checkerboard pattern with a Toro Rake-O-Vac pulled by a small diesel tractor. "I don't believe in tricks," says Long, "but the vacuum comes pretty close."

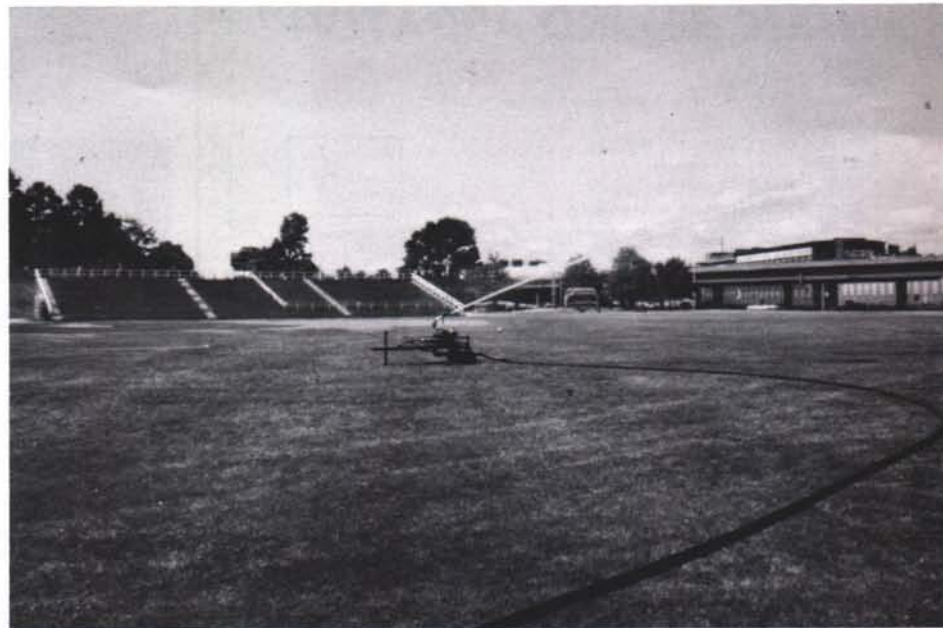
The Holy Cross crew considers some of the "tricks" as standard practice. During batting practice the mound and batting cage area are covered with green carpet to protect the dirt and markings. Lips in the turf are removed each spring. Four times a year the field is aerated to keep the surface open for drainage.

It's a boost to Long and his crew to have the support of Edward Bennett Williams, owner of the Baltimore Orioles and chairman of the Holy Cross board. "Mr. Williams takes special interest in Fitton Field," says Long. "He likes to visit with the crew and



Heritage Park installed a Toro irrigation system when the field was constructed in 1983.

Fitton Field still does not have lights. To add lights might in some way break an important link with the past that sets the 81-year-old field apart from others.



The condition of Fitton Field has improved greatly since Long started using a water cannon.

walk the field when he's on campus for board meetings. His interest in baseball rubs off and he encourages us to make the field as good as possible." Maybe it's the thought that Ruth and Stengle once played on Fitton Field that draws Williams to field after board meetings.

Today, the field meets the same high standards as the rest of the Holy Cross campus. Fitton Field still does not have lights.

To add lights might in some way break an important link with the past that sets the 81-year-old field apart from others.

Both Heritage Park and Fitton Field are important parts of their communities. Both Liburdi and Long understand this and make the effort to preserve the quality of their fields through maintenance. That's what made them the first winners of the Baseball Diamond of the Year Award. ☺

NFL PLAYERS CONFER ON TURF CONDITIONS

Field safety was one of several key topics discussed by more than 600 members of the National Football League Players' Association (NFLPA) during its recent conference in Los Angeles, CA. Two sessions were devoted entirely to current field conditions in the NFL and their potential impact on players' careers. It was the first such conference held by the players since 1983.

"Players are justifiably concerned about anything that can shorten their careers," said John Macik, sports medicine coordinator for the players' association. "With the new contract with the owners under negotiation this year, the players want to determine what influence they can have on improving field conditions." The players are expected to include some type of field safety clause in their next contract, although Macik would not discuss what it might be.

Both the NFLPA and the National Collegiate Athletic Association (NCAA) have recently completed studies on injury rates on artificial versus natural turf fields. "After four years, we have found injury rates to be twice as high on artificial as on natural," Macik revealed. He stated that the NCAA found injuries on college fields to be 1.6 times greater on artificial than on natural turf. "To someone whose career depends upon the condition of these fields, the differ-

ence in injury rates is very important."

Dr. Kent Kurtz, executive director of the Sports Turf Managers Association, spoke to the players during both sessions about methods used by turf managers to protect fields from damage by other types of events frequently held at stadiums. "The technology exists today to make natural turf fields nearly as durable as artificial surfaces with the added benefit of fewer injuries," he told the players. Kurtz described types of field construction and maintenance available today for stadium and practice facilities so the players could discuss the subject knowledgeably with the owners.

CONGRESSMAN CONSIDERS HEARINGS ON FIELD SAFETY

Congressman Ted Weiss (D-NY), chairman of the House Subcommittee on Human Resources and Intergovernmental Relations, is exploring the possibility of holding hearings on turf-related injuries to athletes on public school and park fields. The congressman's staff has been contacting various organizations to evaluate the importance of hearings to be held this spring. No date has been set.

Support for such hearing in the turf industry is great. John Macik, sports medicine coordinator for the National Football

Players' Association, thinks the hearings should be as comprehensive as possible and include testimony of experts from around the country. George Toma, grounds superintendent for the Kansas City Chiefs and consultant to the NFL, believes hearings on field safety would benefit "the kids" more than anyone else. "It's the future generation of athletes we need to be concerned about," said Toma.

Dr. Jack Murray, a director of the National Sports Turf Council, cautioned that many hearings fall short of expectations and months go by before the testimony gets published in the *Congressional Record*. "These hearings are too important to rush through or to treat as a regional problem," said Murray. "We hope that they will be regarded with the importance they deserve."

"We have nothing to report at this time," said Pat Fleming, aide to Weiss. "We're just checking to see if they should be held."

JAMES B. MONCRIEF

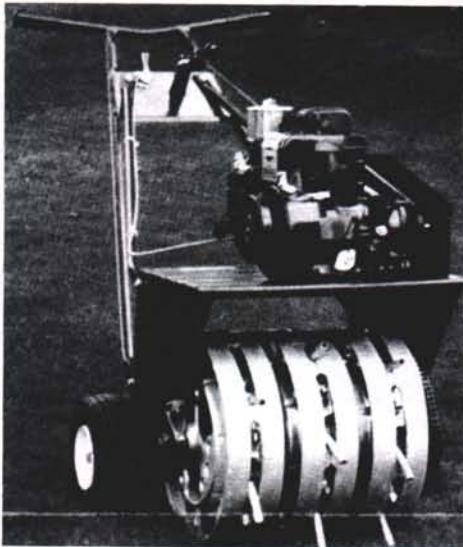
James B. "Monty" Moncrief, retired southeastern regional agronomist for the United States Golf Association Green Section died in February after playing his daily round of golf. During more than 30 years with the Green Section, Monty played a major role in the improvement of golf course maintenance in the Southeast.

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PUBLIC FIELD CARE TOPIC OF FOURTH TURF INSTITUTE

Improvement and care of public baseball and football fields were emphasized during the recent Fourth Annual Sports Turf Institute held at California Polytechnic University, Pomona. Nearly 500 turf managers attended the one-day conference and equipment display.

The main problem with public fields develops during construction said Don Hunt, park planner for Rancho Simi Valley, CA. "Engineers specify a soil density of 95 percent for all areas which is far too compacted for proper drainage of sports fields," he stated. "The main priority should be trying to achieve a percolation rate of two inches per hour to avoid wet surface conditions so fields will resist compaction."

A big factor in getting the budget you need to upgrade field drainage is the way you ask for money according to Sal Genito, grounds supervisor for the Clovis (CA) Unified School District. Clovis High School had spent a considerable amount of money on new stadium seating without considering the impact that the drainage from the seating would have to the field. Genito connected the needed field improvement to the drainage of the stands. For \$12,000, he was able to correct the drainage for the stands, install new drain lines in the field and resod. "Once your supervisor trusts your judgement and use of funds, he will approve your requests with less hassle," said Genito.

Lowell Cordas, superintendent of grounds for the University of Portland, OR, gave public field managers some hope of improving their fields without massive correction of drainage systems. "We all live with budget restrictions," said Cordas, "and we can't do everything we know we should do to make the fields their best. So, we have to improvise."

Cordas described a program of deep aeration and sand top-dressing to give a field the ability to absorb a certain amount of rainfall without getting muddy. By using a Verti-Drain machine, which penetrates the soil nearly a foot deep, and filling the holes with sand, Cordas hopes to turn silty-loam fields into sand-loam fields in a few years. Each spring Cordas repeats the process until a majority of the soil is sand.

Skinned infields for softball also need adequate drainage, especially public fields, said Bill Wrobel, vice president of AIMCOR. Wrobel described a project by Chicago White Sox Field Manager Roger Bossard in Crystal Lake, IL, where a network of ten-inch-deep trenches were cut across the infield and filled with calcined clay. These trenches fed into a main trench along the third base line containing six-inch perforated drain tubing that deposited water into a city drain. Calcined clay was then tilled into the top three inches of infield soil to provide the consistency and particle integrity needed to keep an infield playable under wet or dry conditions.

Sam Monson, grounds superintendent for the Minnesota Vikings in Eden Prairie, MN, encouraged public field managers to try ideas like pregerminated seed, regular overseeding, proper irrigation and fertilization to get fields up to par quickly. Munson also described his role in preparing Wembley Stadium in London for the 1986 NFL exhibition game.

John Macik, sports medicine coordinator for the National Football League Players' Association, explained the latest research on player injuries at both the professional and college level. "The courts are getting involved in injury cases today," said Macik. "Either the sports turf industry develops safety standards for fields, or the courts will do it for them. Once the courts get involved, the stakes are much higher. Now is the time for all public and private institutions to seriously consider the safety of their fields."

Stephen Cockerham, superintendent of agricultural operations for the University of California, Riverside, told the field managers that progress is being made in developing methods to judge dangerous field conditions, such as compaction and cushion of the playing surface. "The industry needs to support sports turf research to a greater degree if we are to provide the needed solutions to injury rates," stressed Cockerham.

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Superintendent Works Over For Better Turf

The golf course superintendent is stretching far beyond his own course into local athletic fields, commercial landscapes and neighboring golf courses.



The elevation of the tenth hole after reconstruction drops more than 100 feet.



All greens are manicured with walk-behind greens mowers.



Miller has rebuilt every green at Louisville Country Club since he started there 19 years ago.

The golf course superintendent is entering a new era of expanded horizons, says Louis Miller, superintendent of Louisville Country Club, Louisville, KY. His workplace is stretching far beyond his own course into local athletic fields, commercial landscapes and neighboring golf courses. "Why shouldn't the golf course superintendent diversify to make the most of his expertise?" says Miller. "The opportunity is there and our communities need our help."

For 19 years he has been superintendent of the exclusive country club founded in 1885. He has grown accustomed to working 80-hour weeks more than half the year. Other superintendents might go home and collapse after such a schedule, but Miller realized early in his career that long hours are part of the job. "Being a superintendent is a great career if you are willing to work twice as much as everybody else," Miller states. "The truth of the matter is, not many people are willing to work that hard."

The Louisville native has been working overtime since he was a teenager. During high school he worked three jobs to save money for college. He'd start his day at 4:30 a.m., milking cows for a dairy farm. A small private golf course next to the farm needed someone to mow greens. Miller and another teenager were hired to mow 19 greens in less than three hours, three times a week. On the weekends, Miller strapped on a bass guitar and played rock'n roll in a band called the Monarchs. The group sold more than 800,000 records during the '60s with a song called "Look Homeward Angel" and continues to play local dates today.

His original plan was to become a lawyer. When he wasn't studying for an English degree at a small Louisville liberal arts college, he worked for the metropolitan park district as a laborer on its golf courses. Miller enjoyed expressing his creativity while writing his way toward an English degree, but he also enjoyed working outdoors on golf courses. The attraction of a career in law started to fade.

More than once, superintendents he worked for encouraged him to study turfgrass management instead of law. "One day I looked in the Yellow Pages under lawyers

"Being a golf course superintendent is a great career if you are willing to work twice as much as everybody else."

and found eight pages full of names," he remembers. "Then I tried to find a listing for agronomists, and there wasn't one. That helped me decide to go to Penn State and study turfgrass management."

At Pennsylvania State University, Miller was fortunate to have Dr. Joe Duich as his advisor. Duich is the father of Pencross, Penneagle and Pennlinks bentgrasses and has traveled the world evaluating golf course maintenance practices. It was the luck of the draw. Miller's favorite quote comes from Lee Trevino: "The harder I work, the luckier I get." Duich taught Miller to expand his basic knowledge of turf and to constantly look for new ways to improve golf course maintenance.

Maintaining a golf course was one thing, but Miller also wanted to see how one was built. He got the chance when a large real estate company built the Hunting Creek Golf Course in Prospect, KY. Miller was hired by the developer as a landscape foreman for the summer while the course was being built by the Wadsworth Company, a golf course construction company.

He watched each phase of construction and compared it to his knowledge of turf. His close observation became valuable as the course prepared to open and adjustments were necessary. The developers rewarded Miller for his efforts by making him assistant superintendent for the next two years. The experience gave him the confidence to tear apart any golf course feature without fear of failing. It also gave him in-

sight into the fair cost of construction and rebuilding.

"I've heard about construction companies charging \$35,000 to build a USGA green," says Miller, who has built more than 30 USGA greens. "There's no reason why a green should cost more than \$3.50 per square foot. What's more, a properly-built green shouldn't have to be rebuilt every ten years like some architects suggest. If it's built right, a green should last decades without problems." An undying interest in construction has been the backbone of his career for nearly 20 years.

Miller's aggressiveness, reputation and Penn State degree opened the doors for him at Louisville Country Club in 1968 after he returned from two years in the Marines. Seventy-five percent of the club's 575 voting members are at least third generation. They are bankers, attorneys, investors and horse breeders. "They're the greatest people on earth," Miller says. "They're so secure with themselves because they've already been where most people want to go."

The golf course was built in 1903, when Louisville Country Club merged with the Louisville Golf Club. In 1927, British Amateur Champion Walter Travis was commissioned to give the 6,200-yard course a "Scottish look." The terrain around the greens undulates like small sand dunes covered with turf. Greens are placed amidst the mounds, not raised like many greens today. There are very few spots on the course where the

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Superintendent
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golfer's feet are level with the ball. There isn't a flat green, fairway or rough on the course.

Ivy-covered mansions surround the course's 180 acres. The sprawling wooded grounds are home for so many deer and other wild animals that Miller calls it the "wild-life preserve."

During the past seven years, the course has been updated by golf course architect David Pfaff. Each year Pfaff would take one of the club's better golfers and have him shoot three holes from all angles at every pin placement. He then recommended changes to the review committee, which included Miller. "The course is very challenging," Miller points out. "So far no golfer has beat a 36-hole score of one under par. All the greens have been rebuilt and average 9½ to 10 on the Stimpmeter." That means a golf ball rolled down a precisely-inclined ramp will roll roughly ten feet before stopping. A rating of ten is nearly as fast as championship green speeds.

Miller and his crew of 12, which usually includes turf students in the summer, have done all the maintenance and construction to the course for the past 19 years. Assistant Superintendent Danny Roth has worked with Miller for the entire time. "Originally, I'd hire graduates from the top turf schools in the country to be my assistant," said Miller.



All 19 greens at Louisville Country Club can be sprayed in less than two hours with riding boom sprayers.

"After a couple of seasons, they'd get a superintendent's job at another course. This happened to me five times before I realized Danny was the best man for the job after all."

Miller has kept complete records of weather conditions and turf problems for the entire period. He can virtually predict a problem before it occurs, based upon this information. In a normal year he knows the first symptoms of brown patch will appear between June 6-10 and pythium approxi-

mately July 4-8. He starts his grub-control program in May and knows when and where the first sign of cutworms will be. When soil temperatures approach 54 degrees F he quickly starts applying preemergence herbicides.

Although it may seem easy, Miller says he's never known a superintendent from a different part of the country to keep his job very long in Louisville. "The Ohio Valley is one of the toughest places in the country to grow grass," he cautions. Louisville Country Club has more than five different species of turf on the course. Each one has unique disease and insect problems, and different fertility needs and irrigation requirements. But the toughest months for a superintendent in Louisville are July and August, when temperatures stay above 90 degrees for weeks and the humidity approaches 80 percent.

Even the native superintendents were up against the wall last year. The sultry July heat was accentuated one evening by a five-inch downpour. The next morning the sun cooked the damp golf courses as temperatures crept backed up to the mid-90s. "It was the beginning of a 100-day nightmare," says Miller.

The temperature of the soil eight inches below the surface reached an unbelievable 87 degrees. Within 48 hours the turf of entire golf courses turned orange with pythium and died. Only zoysiagrass and bermudagrass had the ability to resist the disease.

"We had 40 days in the 90s, compared to 11 two years ago," Miller says. "It's common on Louisville courses to see someone taking out a tank of ice water to cool down the grass. If a plant gets too hot, it just shuts down, regardless of how much moisture it gets."

Fortunately, Miller was better prepared than some of his fellow superintendents. The tees and greens were as protected as they could be. He'd stuck with zoysiagrass on the tees despite its long winter dormancy.

continued on page 28



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A lake was enlarged to increase the challenge of this rebuilt green. A field stone wall protects the edge of the green.



Louis Miller

Superintendent

continued from page 26

Not only does zoysia recover from divots rapidly, it is not susceptible to pythium. "You still need to be careful," he says. "Zoysia is what I call a bandwagon grass—it's popular for a while, and then you don't hear much about it." While pythium may not be a concern, rust and leaf spot can damage zoysia.

Since the greens had been rebuilt, they drained quickly. This discouraged the pythium from getting a foothold in the Penncross bentgrass. For more than 20 years the course has combined aeration with sand topdressing to maintain infiltration levels on the greens. "You can get into trouble if you topdress without incorporating the sand into the root zone by aeration," Miller points out. "Even USGA greens will end up with wet surface conditions by topdressing without aeration."

Miller does all he can to reduce the stress on the greens during the summer. Although he lightly verticuts the greens every two weeks in the spring and fall to keep thatch levels down and the putting surface as smooth as possible, he stops as the temperature and humidity creep up in June. By building up a reserve of slow-release nitro-

gen (ureaformaldehyde) over three years, he can now get by without using quick-release nitrogen fertilizers during summer stress periods. This eliminates the lush growth that pythium attacks first. Miller also keeps a close watch on potassium levels, since high levels of this nutrient help reduce the severity of turf diseases.

Miller depends largely on the recuperative ability of perennial ryegrass for the fairways. Some fairways are bermudagrass. "We can cut perennial ryegrass lower than Kentucky bluegrass and it recovers much faster," he points out. Each year Miller overseeds with a different blend of ryegrasses to reduce his dependency on any particular variety. Ryegrass also does not get thatchy like bermudagrass. The roughs are a combination of Kentucky bluegrass, ryegrass and fine fescue. Miller says summer patch is taking its toll on the bluegrass.

One area he wants more control over is irrigation. He is constantly expanding the Buckner system to accomplish this. His next goal is to link the entire system together with satellites and a central computerized controller.

"Improper irrigation is one of the biggest roadblocks when it comes to controlling diseases," Miller states. "If you don't have a good handle on the moisture conditions of the turf, pythium will wipe you out. Anything that increases the superintendent's control over irrigation and drainage gives him more control over diseases."

In addition to all the cultural practices designed to reduce the severity of diseases, Miller updates his fungicide program each year. Last summer he spent more than \$20,000 just for the month of July. He used Subdue, Banol and Ternac SP on the fairways to make sure the aggressive pythium would not develop resistance to any single fungicide. He also experimented with Aliette as a preventive control and plans to use more of the fungicide this summer. He applied Koban and Ternac SP primarily on the greens.

Try as he might, dead patches of turf were still visible to members last summer. Miller made certain to explain the problems with pythium and his efforts to prevent disaster to the membership. After 19 years, they knew he was doing everything he could to battle the disease. However, the experience is not one he would like to repeat, so he is searching even harder for answers.

Miller hopes to achieve the same control over diseases that he has for weeds and insects. After unsuccessfully battling *Poa annua* on the fairways for years, he tried a selective herbicide called Progress. With four years of treatments the drought-sensitive weed has been knocked back to the point that preemergence herbicides can take over control.

His weed control program begins in the spring when soil temperatures reach the low 50s. That is when the first of two applications of granular Presan is made to the greens. A second application is made at half-rate in the first week of June. This prevents



A dozer roughs out the perimeter of a relocated green to blend it into the "Scottish mounds" of the course.



Miller and his crew install irrigation for a reconstructed green.

germination of crabgrass into July.

Ronstar is the primary preemergence herbicide Miller uses on the fairways. A March application stops crabgrass from germinating in the spring. Later in the season, he uses the herbicide again to prevent germination of goosegrass. It's important, Miller says, to make the application in the afternoon when the turf is dry. He uses Balan and a new product called Team for preemergence weed control on tees and banks in the spring. He likes another new product for postemergence control of dandelion, clover, henbit, spurge and wild violets called Turflon D.

Miller uses a similar variety of products for insect control. His main concern on greens is up to seven broods of cutworms per year. Miller fights back by alternating applications of Proxol and Sevin WP. Cutworms along with grubs attacking the zoysiagrass tees are controlled with applications of Proxol and granular Diazinon. Grub control on the ryegrass fairways is extremely critical, since it takes healthy turf to survive the summer heat. Miller applies Oftanol in May and Mocap in August. He goes so far as to protect the fairways from infestations of grubs spreading from the roughs by treating the roughs once in August with Mocap.

Miller will be the first to tell you that the program at Louisville Country Club is really a combination of ideas he gathered from local suppliers and superintendents, turf specialists at universities and trade magazines. He enjoys the information gathering process so much that he became editor of *Kentuckiana Klippings*, a publication of the Kentucky Golf Course Association.

Last year, in the midst of the pythium plague, he was president of the Kentucky Turfgrass Council. "You can't wait for someone else to go figure out why the power is off," he claims. "You need to get the flashlight and go find out for yourself."

When his son played goalie in the Louisville parks soccer program, Miller could not bear to see him diving into mud to stop a shot. He started asking questions, reading publications and discussing athletic field maintenance with university turf specialists.

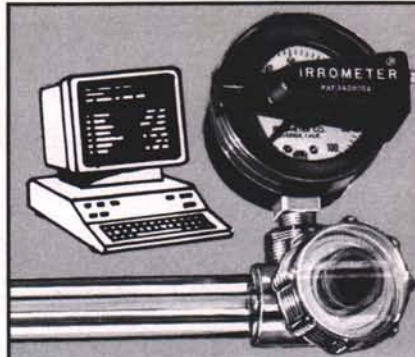
Ideas like pregerminated ryegrass seed, sand-based athletic fields and replaceable pallets of sod started to interest him. He read about a portable pitcher's mound used at Mile High Stadium and wondered why a baseball field could not be converted to a turf football field in less than 24 hours. He went so far as to build two large sod pallets for the mouth of a soccer goal which are replaced every few weeks. When the four-inch thick sod in the goal mouth starts wearing thin, a forklift removes the worn-out pallet of turf and replaces it with the pallet that was reseeded and stored near the field.

In similar fashion, when members of the Louisville Country Club came to Miller with questions about commercial and residential landscapes he was anxious to help. Even other superintendents ask Miller to help them with problems. "Once in the spring and again in the fall, a bunch of local superintendents get together and go on an aeration tour," Miller explains. "On Sunday night we gather up eight to ten aerators and 30-40 men. Before Monday afternoon is over we've aerated every green on the course and cleaned up the cores. You won't see that happen in many areas."

While most of Miller's advice and help was free at first, he soon realized there was a need for a professional consulting service to answer turf, landscape and construction questions about local industrial grounds, athletic fields and golf courses. To handle the business, he set up two corporations which are active primarily during the spring and fall.

Miller thrives on the pace. Since high school he's been running from one job to the next, never slowing down. In fact, he still plays bass for the Monarchs on weekends. The band celebrated its 25th anniversary last November at a sellout performance of rock'n roll from the '60s. The band has played in the same shows with the Beach Boys, the Four Seasons, Bo Diddley, B. J. Thomas and the Righteous Brothers. This year they will play music of the '60s with the Louisville orchestra.

"When you enjoy what you're doing, it's not work," Miller declares. "It's pleasure."



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