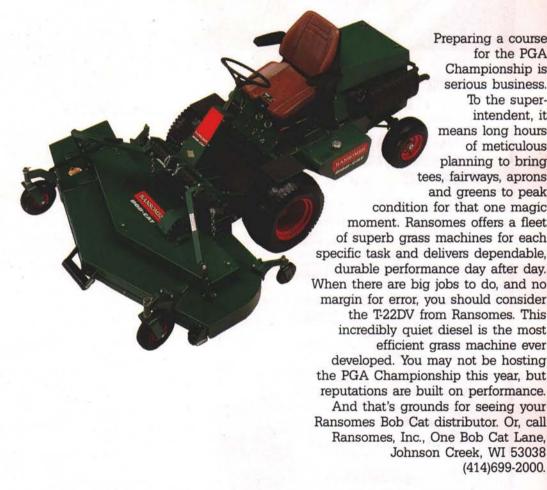


Towering pines, lush landscaping and sparkling waterways make the PGA National in Palm Beach Gardens, Florida, a perfect home for the 1987 PGA Championship.

## Grounds for Ransomes.



RANSOMES

The grass machine.



## REBOUND

## LETTERS FROM READERS

#### THE PRESSURE OF THE JOB

Dear Bruce:

Your opinion page article, *The Pressure of the Job*, is an outstanding piece of work. It's about time somebody had the guts to write about a problem that beseeches all executive under high pressure, including golf course superintendents.

Paul Voykin, superintendent

Briarwood Country Club, Deerfield, IL

Dear Bruce:

Enjoyed reading your *The Pressure of the Job* in the April issue. A lot of food for thought.

Your editorial is not too much different from my Presidential Message in our newsletter *Tee to Green*. Keep up the good work.

Patrick Lucas, president

Metropolitan Golf Course Superintendents Association, Inc., Thornwood, NY

Editor's Note: Mr. Lucas' Presidential Message in the May issue of Tee to Green, the official newsletter of the Metropolitan Golf Course Superintendents Association, is a valuable piece of advice on coping with some of the results of being under pressure. It appears below to help all of us balance our lives.

#### BALANCING

Balancing—a pretty important concept. To me, it means juggling responsibilities to attain the greatest success and happiness that this life has to offer. Three dictionary definitions fit the word balancing: A means of judgement or deciding, a mental and emotional steadiness, and to bring into harmony or proportion.

U.S. News and World Report magazine carried a feature article in its March 23rd issue entitled, "You're Fired! Starting Over: A Survival Guide." This special report covered the present belt-tightening trend of American industry to eliminate staff by firings, job reductions, early retirement, layoffs, voluntary terminations, etc. Two quotes about people who are starting over after coping with job loss stood out.

"After starting over, they seem to enjoy greater flexibility in

balancing work with family life."

"Many jobless executives—and managers who fear they may become jobless—are learning in the meantime that the best protection may be to live a more balanced life. A psychologist says executives will depend less on the corporation and seek reinforcement of their self-image through other institutions, such as the family, church and fraternal organizations."

Sometimes it takes calamity to cause us to focus on the really important things in life. To begin balancing one's life may not be easy. Nothing worthwhile ever is. It is becoming a bigger part

of my life."

#### CORRECTION

In the July 1987 issue, the story on Wembley Stadium failed to mention that the paint, stencils and other field preparation items for Wembley Stadium were selected and shipped to England for the event by Chip Toma, field preparation manager for the National Football League, and his crew (Andre and Scotty) with the Kansas City Chiefs and Royals. It was our oversight and not that of Sam Monson of the Vikings.

# Creative Work Is Demand Information Is Prerequisite



## International Trade Fair for Design, Equipping and Care of Amenity Areas

The first areal Cologne was a sensational success: 15,000 highly qualified trade visitors – Proof for the need of a comprehensive display of equipment and products concerning:

- ► Best possible, intensive use of available grounds
- Rational, economical care and maintenance of open spaces and parks. With waste removal and winter services.

Some 250 companies will show:

- machinery, equipment and tools for the construction of green spaces. Roads and squares
   Planting, seed and seed technology
   Biological and chemical products
- Cemetery technology
   Services

Visit at the same time with the same ticket the following two trade shows which provide the ideal supplement to areal:



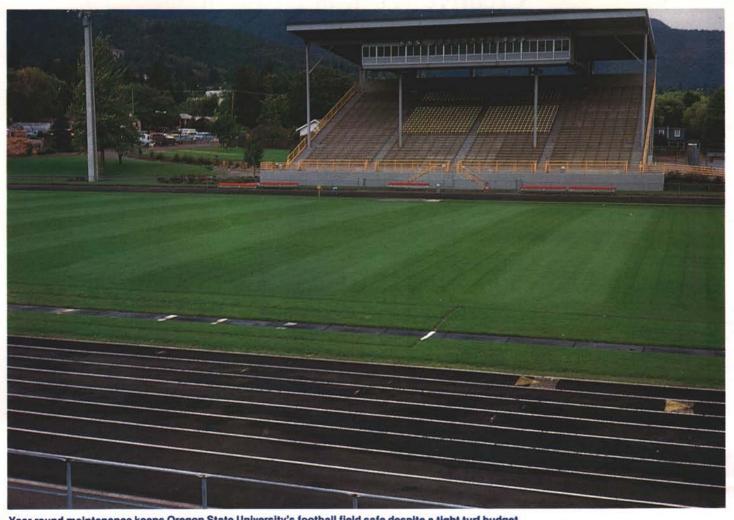
International Trade Fair for Cleaning and Maintenance



International Trade Fair for Sports, Swimming Pools and Recreational Facilities

# Cologne Wednesday to Saturday, October 28–31, 1987

		Your Airline to Fairs & Exhibitions
real IRW	□ s+b	<b>→</b> Lufthansa
State:	Zip: _	L. 44
	37/-8830, Telex 023/ eal	State:Zip:



Year-round maintenance keeps Oregon State University's football field safe despite a tight turf budget.

## FOOTBALL FIELD PREPARATION Graduating To Durable, Safe Gr

A school can't really make a commitment to a football program and not make an equal commitment to the field. One necessitates the other.



The old turf was stripped from Lamonica Stadium



Both soccer and football are played on the main field at Chatham High School.

early every red-blooded American boy has played "sandlot football" at one point in his life. He has huddled around a team-appointed quarterback to have the next play scratched out in the dirt or explained in terms such as. "Go out past the puddle, fake left, then go deep, on two." When the huddle breaks up, the receiver locates the critical wet spot in the make-shift field so he can run his assigned pattern.

As a child starts playing Pop Warner football and graduates to junior high and high school ball, the game gets more sophisticated. The map in the dirt and the geographic description of the field are replaced with sets of letters and numbers from a play book put together by the coach. The quarterback simply barks something like "P6 on 2!" This might instruct the tight end on the right to take two steps and then cut across the middle. It also tells the linemen and the backs how they should block.

The play book gives the coach the ability to control the game from the sidelines. Teams practice every play over and over again until all 11 players on defense and offense perform "by the book." After a coach has scouted his competition and selected the right plays for game day, there is one thing that can ruin all his planningsomething the sandlot quarterback can react to faster than he can-a poor field.

High school coaches assume the field will be in shape when they make up their play books, devote months to practice and spend thousands of dollars on equipment and supplies. It's an expensive assumption to make when the turf on a field fails due to overuse, cutbacks in the maintenance budget, an overworked grounds crew or a lack of sports turf management expertise. A school can't really make a commitment to a football program and not make an equal commitment to the field. One necessitates the

American public schools have been struggling with declining fields since the first baby boom. When budgets get tight, academicians tend to put a low priority on sports and grounds. Most school districts place the grounds personnel within the building maintenance or physical plant department. In many cases the grounds crew is a seasonal extension of the custodial staff. There is little motivation or authority to make significant improvements in the sports turf management program.

Furthermore, the director of physical plant is rarely someone knowledgeable about turf. His limited budget is spent where it can put out the most fires-resurfacing a parking lot, repairing roof leaks and maintaining the heating and cooling systems. The director of physical plant's main input about the condition of football and practice fields comes from the athletic director or coach, who also lack expertise in sports turf, whether or not they will admit it. What can be so difficult about growing grass? It would appear that many schools are finding out.

The purpose of this story is to report success stories in football and practice field maintenance. Sports turf managers, school officials and sports turf contractors from

dirons



ore the crown was restored.

#### **Football Field Preparation**

continued from page 15

across the country have been interviewed for the keys to their success. Not surprisingly, their advise is not all agronomic. Much of it deals with the management structure of the grounds department.

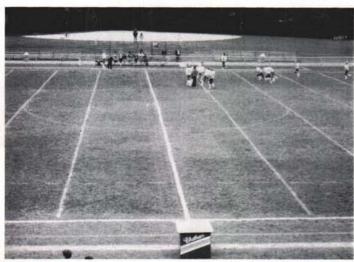
Great advances in football field care are being made simply by opening up a line of communication between the person responsible for the athletic fields and the administration. Frequently, a third party is needed to break the ice, such as the school booster club, the athletic director or a sports turf consultant. The first step is simply to admit that there is a problem with the fields, pinpoint the reasons for the problem and then make a long-term commitment to solving it.

The school fields, which were maintained by the custodial staff, were also showing signs of fatigue and were frequently criticized by the coaches. The school board, realizing it had an expertise problem of its own, decided to create one full-time exterior maintenance position for the entire district.

John Hyland, a veteran of golf course maintenance and caretaker for the United States Golf Association headquarters in Far Hills, NJ, responded to Chatham's help wanted ad. After 15 years on golf courses, Hyland was ready for a change. He took the job and a relatively small \$15,000 budget and went to work.

To show the athletic department and band he supported Hyland, the school athletic director gave him the power to cancel events if he felt they would cause serious injury nutrient deficiencies and soil pH. "Basically I needed to set the stage for an overseeding program," he recalls. "First I had to relieve compaction by intensive aeration, then correct soil deficiencies." Everything had to be ready for seeding when the spring soccer season ended in June. The seed had to germinate and get established before the team and band started practicing in August.

Hyland starts on the two practice fields and then repeats his program on the main field. The fields are overseeded twice in six weeks at a rate of 12 pounds per 1,000 square feet. He uses combinations of two perennial ryegrasses, three Kentucky bluegrasses and three turf-type tall fescues. "The ryegrasses provide quick cover and excellent protection for most of the field," Hyland explains. "But, by the end of the sea-



The center circle for soccer games is evident during football games at Chatham High School.



Soccer takes its toll on the goal area of the main field at Chatham.

There is no such thing as a quick fix. Simply resodding a field without adjusting maintenance practices or field use is not a longterm solution. Neither is reconstructing a field without installing permanent irrigation, correcting drainage and implementing a year-round maintenance program. One of the most disturbing facts about schools that do make a financial commitment to football field improvement is the rapid deterioration of fields that were improperly constructed or maintained because the school and the contractors they employed lacked the necessary expertise in soprts turf management. An experienced sports turf manager can do more with a limited school field budget than anyone else. An inexperienced person will waste more money in the learning process.

Take for example, the Chatham, NJ, public school system. The system has three football fields, 11 soccer fields and nine baseball fields. Eight years ago the city park department approached the school board about using school fields for park programs. The park fields were unable to handle all the various leagues in the area. Parents were beginning to voice their disappointment about the condition of the park fields. The park department offered to pay the school system one third of the salary of an experienced turf manager in lieu of use fees.

to athletes or the turf. "At first the coaches didn't like the idea, but they have since seen results from controlling field use," explains Hyland.

Even with control, the use of the fields is tremendous. The growing popularity of soccer has resulted in both spring and fall leagues. This puts a definite strain on the football practice fields. To make matters worse, many of the fields are used for summer sports and band camps. "It's not unusual to have 500 to 600 events per year on a field," sighs Hyland.

Hyland knew from his years as a grounds superintendent to keep in contact with the administration on a regular basis and to record important information on soil tests, field conditions and corrective measures. "It gave me a chance to act like a consulting agronomist, developing solutions and building a maintenance schedule to implement them," he notes. "I knew what had to be done, but it was important to let the school staff know my plan of attack and to keep them involved."

The first items Hyland placed on his budget request were a pull-behind aerator, a large Buckner travelling sprinkler, fertilizer and plenty of seed. He sent soil samples to a laboratory for testing and ordered the fertilizer and soil amendments to correct

son, the only turf left on the 50 yard line is Kentucky bluegrass. Mixed with turf-type tall fescues, bluegrass is tough and looks great too. The tall fescues also perform well on fields we can't irrigate regularly."

The success of the overseeding program was dependent upon irrigation. The travelling sprinkler provided the necessary moisture. "You basically set up the sprinkler and let it run for eight hours," he explains. "It puts down about 3/4 inch of water in a day. You have to keep an eye on it because kids are real curious about sprinklers, especially in the summer." None of the fields are fenced

Hyland has a long-term goal of installing automatic irrigation on the main field and practice fields. He estimates the cost will be about \$18,000 per field. "We need to water at night to get the maximum use out of the fields," says Hyland. "If the fields were fenced off, I could set the sprinkler up at about 8 p.m. and return at 6 a.m. to remove it. As things stand now, we have to stop irrigating when football season starts. If the school lets me install an automatic system on one field, I know they will appreciate the difference in quality before long. They have already seen the difference the portable sprinkler has made."

Once the overseeded turf is established,

Hyland irrigates once a week until the season begins. Then he depends upon natural rainfall and the players' cleats to work in three to four pounds per 1,000 square feet of overseeding mix spread every week during the season.

"We aren't trying to maintain the fields like golf greens," Hyland points out. "The idea is to keep the turf lean and green." The fields are fertilized only twice during the year for a total of one pound of nitrogen per 1,000 square feet. Broadleaf weeds are controlled with 2,4-D amine once in late April and again in mid-June. The only time he can make the applications is between 5 a.m. and 7:30 a.m. on weekends or after 4 p.m. on Sunday afternoons. He explored preemergence herbicides but found them too expensive for his tight budget.

Heavy aerification at least six times each year keeps thatch to a minimum. Hyland drags the field with a harrow to break up the cores and sometimes topdresses rough areas with sand. The football fields are mowed at two inches with a Hustler rotary mower twice each week. Hyland tried a reel mower when he first arrived at Chatham, but debris on the field kept knocking the reels out of adjustment. Now he uses the rotary at low speed and high rpm.

While his budget hasn't increased in eight years, he has been able to hire his son, John II, and Ed Curley to augment his maintenance program. His workload will increase



John Hyland can cancel events if necessary at Chatham School District.

significantly in 1988 when Chatham city schools merge with Chatham township schools. "The school district plans to combine the high schools," says Hyland. "That will double the use of the main football field and practice fields and hopefully will give us the funds to install irrigation and apply preemergence herbicides."

Hyland has been active in the New Jersey Turfgrass Association trying to organize fellow school sports turf managers in his area. "It's hard for schools to find good turf managers," he says. "Before they make a major commitment to sports field improve-

ment, they need someone who is knowledgeable and experienced in athletic field maintenance. They are beginning to learn that a mower operator is not a turf specialist. At the same time, we have to show them that we understand the budget limitations of school districts today. With skilled turf management and an ample budget, Chatham and other public school systems can have the quality fields they desperately need."

Tim Gehring, landscape maintenance coordinator for the Worthington, OH, school system, is another sports turf activist. Not only has he been a major proponent of increasing the educational sessions on sports turf at the Ohio Turf Conference, he was recently appointed to the Building and Grounds Commission of the School Study Council of Ohio. Two years ago the School Study Council created the Commission to branch out into non-academic aspects of school administration. The Commission meets once a month to tour central Ohio school facilities. Thanks to Gehring, the Commission tours the athletic fields in addition to the school buildings and maintenance garages.

The Ohio State University-trained agronomist joined the Worthington Schools in 1985 during a major restructuring of the administration to handle building and grounds matters more effectively. A grow-

continued on page 19



BLACK DIAMOND® BED DIVIDER

BLACK "GENERIC" DIAMOND®

DANDY DIAMOND® LAWN EDGING

VALLEY VIEW® PROFESSIONAL LAWN EDGING

> MINI DIAMOND® LAWN EDGING

THRIFTY DIAMOND® LAWN EDGING THE LANDSCAPER'S CHOICE!
YEAR AFTER YEAR
THERE MUST BE A REASON!

**BLACK DIAMOND®** 

DANDY DIAMOND®

ADDITIONAL HEAVY STEEL ANCHOR STAKES
ANGLE CONNECTOR ACCESSORIES, AND
KNURLED CONNECTORS ARE ALSO AVAILABLE.

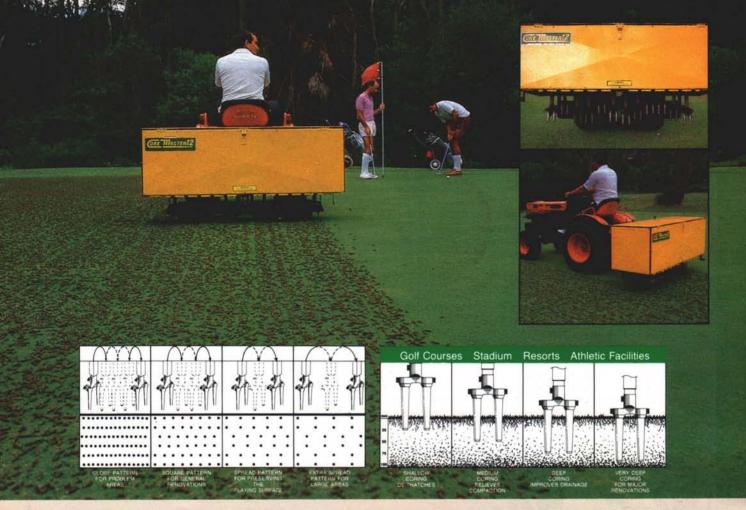


FOR YOUR NEAREST DISTRIBUTOR PHONE 1-800-323-9369
"YOUR COMPLETE EDGING SUPPLIER"

## Valley View Specialties Co.

13834 S. KOSTNER . CRESTWOOD, ILLINOIS 60445

312-597-0885 CALL FOR YOUR FREE CATALOG TOLL FREE 1-800-323-9369
Circle 128 on Postage Free Card



## CoreMaster. Your new aeration answer. Move forward (not backwards!) with CoreMaster.

Great news for golf course superintendents in charge of greens, tees and fairways, and turf managers for athletic fields (football, baseball, soccer), and sport turf grass. It's CoreMaster 12, the world's finest hollow core aeration system, backed by five years of technology, engineering and experience by the professionals at GreenCare International.

For the first time ever, CoreMaster enables your turf grass staff to improve aeration methods, speed compaction relief and thatch control with a built-in variable depth and pattern control system, and the strongest power source.

CoreMaster is the most innovative and advanced hollow core aeration system on the market today. Hard working, fast and versatile on all natural turf grass surfaces, CoreMaster aerates easily and efficiently. The result stimulates natural turf growth, insuring a healthier, safer, and more beautiful grass surface.

Put these CoreMaster advantages to work on your field and enjoy the benefits of features like these:

☐ fastest capacity ever and safest Circle 124 on Postage Free Card

- □ patented mechanical simplicity fewer moving parts
- low maintenance and great reliability - built to last!
- touch control for coring depths and patterns with several tine sizes
- new state of the art "quadra-tine" system, never before available
- ☐ highest efficiencies by rapid change, a totally flexible system
- additional attachments, verticutting, seeding, core pick up systems and more

Be the first, find out

more about CoreMaster, the best answer today to meet your turf grass aeration needs.

The World's Most Advanced Turf Aeration System



DRE	ŢĹ	AS.	TEK	
Iwa	ant to go	forward	d today:	
G	DEED C	7,112,25		

☐ Please have a Gre	Fountain Valley, CA 92708 enCare distributor cont a test here at my loca	act me about Coremaste
Name		
Title		
Course/Club/Sportsfield		
Address		
City	State	Zip

#### Football Field Preparation

continued from page 17

ing population was forcing the district to take a serious look at its physical plant needs in the coming decade. Voters passed a permanent improvement levy that included renovation of athletic fields over a period of time.

Bruce Mousa was appointed administration specialist over all non-certified staff (everyone but teachers). Mousa discovered that the custodians were frustrated by their inability to properly maintain the athletic fields. The five-man grounds crew said they needed someone with turf expertise to turn to on a regular basis. More than once the main football field had been resodded only to deteriorate after one or two seasons.

The main field and two practice fields were being renovated when Mousa took over. To avoid the mistakes of the past, he created a landscape maintenance department separate from the custodial department and started looking for an agronomist to run it. When Gehring was hired, the three fields were in the final stages of reconstruction. Buckeye Landscape Services was grading a mixture of silica sand, composted sewage sludge and peat moss over the fields before seeding with half Kentucky bluegrass and half perennial ryegrass. Perforated drain pipes crossed the fields every ten yards.

"The turf had two months to establish before the football season started," Gehring recalls. "My job was to make sure that nearly \$100,000 spent on the three fields was not wasted again." That fall, more than 42 games were played on the main field. "Not only did the varsity and junior varsity football teams play their games on the field, both girls and boys soccer teams did too.

To keep the fields in shape Gehring went to his bag of tricks. At mid-season, he pregerminated ryegrass seed and mixed it with the field soil mix. Using a drop spreader he applied the mixture to the area between the hash marks and in front of the goals. All divots were filled with the mix. "I'd like to get my hands on a germination blanket to cover the center of the field between games." he adds. Before the next game, the seedlings started filling in the thin areas. To protect the bench areas, he put down fabric tarps during the games. For soccer, he put both team benches on one side of the field covered with the bench tarps.

That November, Gehring used a greens aerator to core the main field. After dragging the cores he overseeded with a mix of 50 percent perennial ryegrass and 50 percent Kentucky bluegrass using an Olathe slicer/seeder. Finally, he topdressed with the silica sand that was in the field soil mix. In less than four months the field would be used for a new spring sport, lacrosse.

"At first I thought that lacrosse would be easy on the field," Gehring remembers. "I found out it was as hard as soccer on the goal areas and I ended up resodding the goal mouths and slice/seeding one more time before football season."

To help the fields recover, Gehring has



A bench tarp protects the sideline turf at Worthington High School.

added two more fertilizer applications to his six-time program. Once a month from April through November the sand-mix fields receive one pound of nitrogen per 1,000 square feet. "We try to aerate before fertilizing to get the nutrients into the rootzone quickly," says Gehring. "Still, we never have enough time to develop a good mat." The main field is mowed twice a week with a triplex reel mower at two inches.

He has instituted two spring applications of preemergence herbicide and a May insecticide treatment for grubs. Since the field is frequently overseeded, he limits postemergence herbicide applications to spot treatments and uses siduron for preemergence weed control. "We are beginning to fight problems with annual bluegrass and the black ataenius beetle," he admits. "The Poa annua likes to invade high-maintenance turf and the ataenius likes the Poa." Gehring has already taken steps to control both pests with the assistance of Ohio State University in Columbus and O. M. Scotts in Marysville.

In addition to the one main and two practice football fields, the five-man crew maintains a 15-acre soccer/lacrosse complex. two baseball diamonds, three fields at one middle school, all playground areas at the elementary schools and the grounds around each school, for a total of 200 acres. None of these areas have permanent irrigation. Gehring hires eight students during the summer to help aerify the fields with a tractordrawn open-spoon aerator, mow and trim. After the fields are aerified, they are fertilized and overseeded. One crewmember spends the majority of his time moving a Larchmont water cannon from field to field.

Every summer Gehring renovates three or four fields. "We spray the fields with Roundup to kill the existing turf," he explains. After a week a contractor regrades the fields to restore a crown and to smooth out all the bumps and depressions. The fields are then fertilized, slice/seeded with turf-type tall fescues and irrigated with the water cannon.

"This renovation is planned and budgeted way in advance," says Gehring. "It's all part of the long-term maintenance plan." Once the fields are renovated, they are put on a higher level of maintenance, including regular aeration, frequent mowing, insect control, overseeding, irrigation and additional fertilization.

The Columbus suburb prides itself on the fact that more than 60 percent of the students participate in the athletic program, explains Gehring. High participation combined with new sports and rapid growth are putting tremendous pressure on the school system to provide safe fields. "Two years ago, I was concerned that some of our fields were unsafe," admits Mousa. "I no longer have that concern. By hiring a turf specialist and putting all fields and playgrounds on a maintenance and renovation cycle, we have regained control over field safety."

The school system, area sports leagues and large industry in Worthington have formed a Community Recreational and Sports Facilities Board to plan for the future. School Superintendent John Hoeffler has asked the board to explore the feasibility of building one central multi-purpose facility to serve three neighborhood high schools. Three new elementary schools are currently under construction and a second high school is on the drawing boards. "The next few years will be extremely challenging. It won't be easy, that's why school sports turf managers need to get together with each other and with school administrators to discuss solutions.

Expertise and communication paved the way for major improvements of sports facilities at Clovis, CA, Unified School District. Three people cut through much of the usual school bureacracy to make it happen. Superintendent Floyd Buchanan has built the central California school system into an aggressive competitor both academically and athletically, gaining notoriety and power in the process. Fred Couch is the director continued on page 20

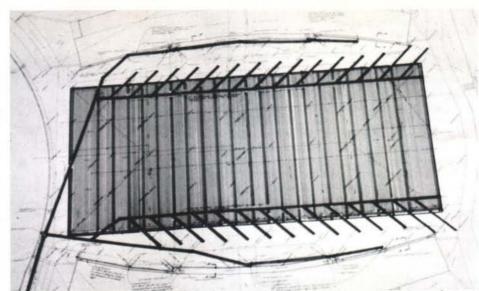
#### **Football Field Preparation** continued from page 19

of construction, maintenance and engineering for the district. Sal Genito is the school system's grounds supervisor who has degrees in both landscape horticulture and public administration and experience in college level sports turf management.

When Genito was hired three years ago, he started out by proving his skills to Couch. He renovated the practice football fields at both high schools and the baseball stadium. The common bermudagrass fields were heavily aerated, low areas were filled in and more than ten acres were overseeded with common bermudagrass seed. Genito instituted a three-application fertilization program and increased the ratio of potassium in the fertilizer for better wear tolerance.

After repairing and adjusting all irrigation heads and timers, he instructed the mowing crew to use only reel mowers on the baseball and practice fields and to cut the common bermuds at one inch. He applied Ronstar in January to control crabgrass and again in August to prevent annual bluegrass germination. MSMA was applied in the late spring to control Dallisgrass.

Positive comments about Genito's work filtered up to Buchanan. "The key is to prove yourself to the administration first," Genito points out. "Once you have a success under vour belt, people will trust vour judgement." He was ready for his first big request.



A new drainage network was installed at Lamonica Stadium to replace older, plugged up system. Note the interceptor drains at the base of the stands.

Using his public administration education, he put together a proposal on renovating the field in Lamonica Stadium. The football field suffered from poor drainage. Genito used a series of slides to illustrate the problems with the field and listed three options for correction, ranging in price from \$500,000 to less than \$20,000.

Couch, impressed by Genito's abilities, encouraged him to work directly with Buchanan on stadium matters. "Dr. Buchanan takes personal interest in the sports program at Clovis," says Genito, "His enthusiasm is contagious. It takes the emphasis off budgets and places it on performance. His staff goes the extra mile to make the most out of what it has. If there is a money problem, he finds a way to solve it quickly. It's that kind of cooperation that gets things accomplished at Clovis."

The stadium drainage problem was the result of three things: the crown in the center

## **RAIN KANNON**

By Larchmont

## The Self-Contained **Irrigation System**



The Rain Kannon Self-Irrigation System irrigates an acre with 1" of water in 3 hours @70 psi. The mobile trailer permits easy overnight storage to protect against vandalism.

### ★ Perfect for athletic fields or any large turf area ★

- ·Trailer mounted, pneumatic tires, roller bearings
- . Horizontal hose reel w/300' of 21/2" special lightweight hose
- . Hose reel can hold up to 500' of of special hose
- •@90 psi 300 ft. dia. 136 gpm
- ·Crank jack & wheel for level adjustment
- · Equipped w/quick-lock couplings
- ·Full or part-circle adjustment

#### LARCHMONT ENGINEERING & IRRIGATION, INC.

Eleven Larchmont Lane • Box 66 • Lexington, Massachusetts 02173 (617) 862-2550 • Telex: PLT 948-117

Circle 122 on Postage Free Card

## SPRINKLERS REBUILT

# 生生常性色色 WAY

SATISFACTION GUARANTEED

NO HASTLES



SEND US



WE'LL RETURN

We rebuild: Agua Dial, Buckner, Rainbird, Royal Coach, Thompson, Weathermatic, Weather-Tec, Rain-O-Mat, & much more . .

Large stock of sprinkler parts, valve parts, and a great selection of irrigation supplies. Do yourself a favor, call us today!



IRRIGATION REPAIR & SUPPLY CO., INC.

3270 Seldon Court #3 Fremont, California 94538

(415) 659-8558