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Core and slicing cultivation are desirable practices to allow percolation through the profile. Aeration with **Olathe Models 88, 96, 686, 687, and 75** opens up holes and removes plugs which may be broken up and returned as topdressing. An ideal method of core cultivation is the **Olathe Model 56 Plug Pulverizer**, which lifts aeration plugs off the turf and pulverizes them into topdressing. Slicing with machines like the **Olathe Models 83/93, 37/38, and 71** develops slits that allow deeper penetration of air and water.

Many sports fields have limited prospects for improvement because of lack of irrigation water. The introduction of water-absorbing polymer into the ground with equipment like the **Olathe Model 71/831 Aerator/Polymer Planter** may provide an answer for these problems.



Model 37/38 Aero-Thatch/Seeder



Model 83/93 Aero-Thatch/Seeder



Model 71/831 Polymer Planter



Model 54HL Turf Sweeper

Where areas are thin or worn, slit seeding with units like the **Olathe Model 83/93, 37/38, and 82** should be done on a regular basis. These PTO units power a blade into the ground and place the seed into the slits where a good root system can develop for stronger turf. An additional benefit of slit seeding on established turf is to relieve surface compaction and bring topsoil to the surface.

Sports turf requires mechanical mowing and grooming for a healthy and aesthetic appeal for spectators. Turf equipment like the **Olathe Model 54HL Sweeper** removes grass clippings, thatch and other debris from sports fields and large turf areas. Specialized units like the **Olathe Model 61 Blower** and **Model 67 Blower** help remove light snow or windrow grass for later removal.

Olathe products are especially geared for the sports turf industry and are supported by nationwide sales and service centers. Don't miss the opportunity to view some of these products on your sports turf areas.

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**Kauai Lagoons**  
continued from page 20

dressing. "The silica sand has a pH of 7. By incorporating the silica sand into the local sand, we can bring its pH down slowly," he adds.

The greens were fumigated and then sprigged with Tifdwarf. Fertigation was used to help speed up the establishment of the greens, tees and green banks.

Sanders applied a new mowing technique on the undulating, Nicklaus-style greens. He placed 19-inch reels in the 22-inch frames of his Jacobsen walking greensmowers. This reduces scalping when the greens are cut daily at 9/64-inch

during the winter and 1/8-inch during the summer. Half of the greensmowers are equipped with groomers. Each week half the greens are lightly groomed while the other half are topdressed with silica sand.

Some of the tees are walk-mowed as well. "Jack likes a lot of tees," Sanders stated. "Every hole has at least four. One par three has seven! The gold tees are often too small for our tee mowers." All tees are topdressed at least once a month with sand and verticut every other week during the summer. The tees are cut at 5/16-inch year round.

One thing that bothered Sanders about the grow-in of Kiele is he didn't have time to

verticut the fairways. "I like to stay on top of thatch from the beginning," he remarked. With only four months to go before opening, he held off verticutting. To encourage density during grow-in, he cross-cut the fairways daily with lightweight mowers (Jacobsen LF-100s) at 1/2-inch. "We'll start verticutting the fairways once or twice a year," he adds.

The roughs require two different types of mowers due to their size and topography. Triplex mowers are used on the mounds while seven-gang units cover the remainder. The common bermuda is kept at 1 1/4 inch. The close rough and green banks are mowed at 3/4-inch with Jacobsen Tri-Kings.

To manage the 400-plus acres of golf turf, Sanders needed a skilled staff and an irrigation system that was flexible and convenient. He brought irrigation specialist Marty Alexander with him from Arizona. Alexander had experience with the MAXI system in Phoenix. Kelly Marvin, whom Sanders hired to construct the sand traps on Kiele, is now assistant superintendent of that course. Tim Canute from Maui is the assistant on the Lagoons course.

Carolyn O'Connell is the assistant superintendent of the extensive resort landscape. Marvin, Canute, and O'Connell each have crews of 15 or more to keep the complex in top condition. The entire team consists of nearly 100 people hand-picked by Sanders and his assistants.

Alexander's experience with the Maxi has helped Kauai Lagoons tap the full potential of the MAXI System IV. During grow-in it was imperative that the sprigs be continually moist without eroding sloped areas or flooding flat terrain. As with any new course, drainage is relatively unproven until the irrigation system and weather are fully coordinated.

Alexander programmed irrigation schedules that provided a total of 40 to 45 minutes of flow every 24 hours. To achieve this without erosion, he called for two and three minutes of station run time every hour during daylight and two or three short cycles at night. "Without computer control, keeping the entire course continually moist would have required a lot more water and a lot more people," he reveals.

The two irrigation systems are linked in two ways, hydraulically and electronically. Each PSI pump station delivers more than 3,100 gallons per minute of water from a single reservoir. An agreement with the city of Lihue for irrigation-quality effluent provides the majority of the water needed. The water has a pH of 7.1. A well supplements the effluent when necessary. Both pump stations are linked by a 12-inch main to make sure there is no interruption in irrigation in case of a breakdown.

The electronic link is between the weather station and the computers. Weather data, including temperature, solar radiation, wind, humidity, and rainfall, is downloaded to both computers. Six addi-

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Stops auger rotation automatically when operator releases lever. The Model D-5 is now equipped with handle bar mounted engine stop switches, one for each operator. Light, rugged and portable. Model D-5 has a heavy duty gear box and ample engine power for dense soil.

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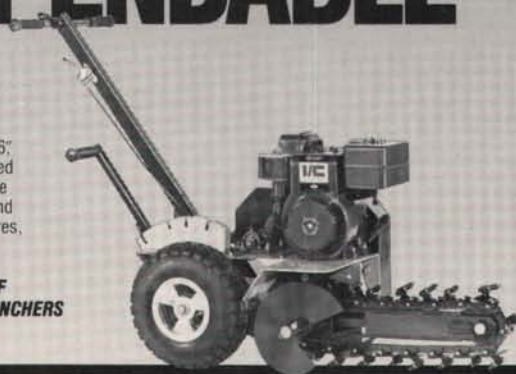
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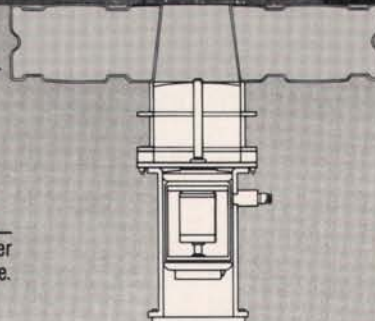


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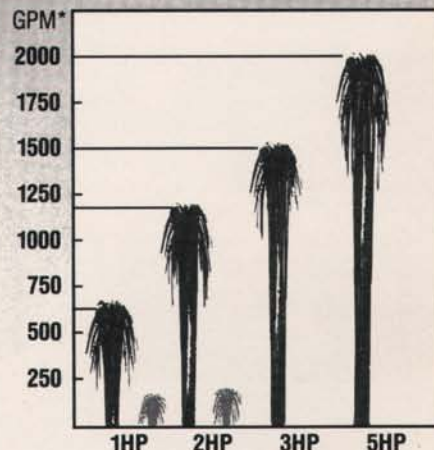
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## Kauai Lagoons

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tional rain gauges located throughout the resort monitor microclimates. All this information is used to adjust irrigation schedules on a daily or more frequent basis.

Golfers and maintenance are not the only constraints on the irrigation system. The lagoons, carriage trails, roads, and footpaths are intertwined with the golf courses. As a result, irrigation cannot begin in many areas until midnight and must be completed by 5:30 a.m., when the maintenance crew arrives. Scheduling the two huge systems to match this time frame in light of the erratic weather would be impossible without computers. Even then, balancing the flow requirements of the pump stations to control energy costs is a herculean task.

After the completion of the Kiele course and while the Lagoons course was growing in, Rain Bird introduced a more advanced version of its MAXI software. The new System IV software gave the computers the power to program irrigation schedules to maximize energy use by the pumps. It also refined the process of dividing water times up into segments which more closely matched the ability of slopes and other sensitive areas to absorb water.

Based upon ET data for the preceding day, Alexander can let the "Flo-Manager" software arrange the flow requirement of thousands of heads and valves to create a consistent demand on the pump stations. By eliminating peaks and valleys in the demand on the pumps, they can work at maximum efficiency. No longer do the pumps run above or below their designed potential. The computer groups the needs of different zones to match the optimum output of the pumps.

Alexander realized that in many instances he could shut down the jockey pump during the main irrigation schedule. He also discovered that the jockey pump alone was sufficient to handle fertigation, as well as drip programs for thousands of exotic plants, separately from the main schedule.

"The important factor," notes Sanders, "is



Horse-drawn carriages transport guests over eight miles of trails.

*Golfers and maintenance are not the only constraints on the irrigation systems. The lagoons, carriage trails, roads, and footpaths are intertwined with the golf courses.*

that now the pumps are running at their most efficient rates. We are able to pump an average of 662 gallons per kilowatt, compared to 570 gallons per kilowatt on the original system program. This enables us to pump approximately five to six million gallons per month for the same cost as before. And the overall watering time has been reduced from ten hours to essentially seven."

Alexander figures that the new software has reduced pump run time by 26 percent and cut electric bills by 29 percent. Projected over one year, these will amount to a savings of nearly \$40,000, he adds.

Sanders believes that the second feature of the new software, "Cycle & Soak," has improved the condition and appearance of the heavily mounded Lagoons course. "It has been a help while we work on refining our drainage system," he explained. "It takes a few years to locate and correct wet spots on any new golf course. Since we can adjust slope irrigation effectively, we can schedule drainage improvements to fit into our workload."

It took Alexander only three days to add the new software to his existing system. "Computer-controlled irrigation systems have a high initial cost," Sanders admits, "but the cost is justified when you consider the simplicity and economy of upgrading irrigation with advancing technology."

Hemmeter has plans to add a third 18-hole course to Kauai Lagoons in the coming years. Nicklaus, Coates, and Sanders are already working on the details. The planned course will be close to Lihue airport, where another unique microclimate will have to be considered. A third MAXI, a second reservoir, and possibly a second weather station may be required to meet the growing needs of the mega-resort.

"This is the largest resort in acreage in the world!" boasts Coates. "To think it is also one of the most recognized for quality is a real tribute to Chris Hemmeter, Jack Nicklaus, their staff and suppliers. You have to see it to believe it!"



Mahogany launches navigate the manmade waterways of the Westin complex.





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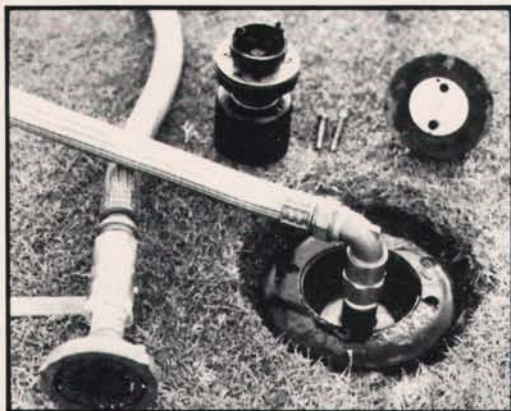
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## ASGCA OFFICERS PREDICT CONTINUED COURSE DEMAND

If interest rates remain in the "reasonable" range and golfers continue to flock to golf courses in record numbers, officers of the American Society of Golf Course Architects (ASGCA) expect new course development to accelerate rather than plateau.

Robert Trent Jones, Jr., ASGCA president, has projected that 5,000 new courses will be needed by the year 2000, but he now believes demand could be even greater in the '90s. "All segments of the golf business—juniors, young adults, middle-age males, women, and seniors—are growing dramatically, and we must build facilities to satisfy these eager golfers," he says.

"Obviously, we need more public courses, and we are gradually seeing more being built. These courses, however, will be much more challenging than those public fee courses of a generation ago. In fact, some of the new public courses are among the best designs coming on stream," Jones asserts.

The California-based architect also notes that today's golf course architect has learned to work with various governmental agencies to satisfy all the environmental concerns associated with wetlands and endangered species. He adds that many courses are being built successfully in environmentally sensitive areas.

**Focus On Playability** - Dan Maples, ASGCA vice president, who works out of Pinehurst, NC, designs many courses for resorts and developers in tourist destinations. He believes that architects designing for this ever-growing market will be concentrating on "enjoyable but not boring" courses.

"We work on making courses playable so that the golfers enjoy their round," says Maples. "Aesthetics are important to developers around the world."

Maples points out that Society members are now working throughout the world, and most clients want a "U.S. championship course, which in their mind means challenging, not intimidating, and fun to play." More ASGCA members are working internationally, especially in Europe, as the U.S. golf boom continues to roll out in every area of the world.

**More Variety In Nines** - Tom Clark, ASGCA secretary, of Wheaton, MD, explains that many developers are asking for 27 or even 36 holes initially, with different degrees of difficulty on each nine. With this layout, beginners can build up their confidence on the easiest nine and then progress to the others. Clark says this also helps speed up play on the tougher nines.

Clark thinks many courses will soon be seriously considering a policy that requires

new players to complete certain proficiency tests, including those on golf etiquette. If multiple courses are available, only those with lower handicaps, for instance, will be allowed to play the more difficult courses.

The majority of new courses in recent years have been built in conjunction with real estate developments, and Clark says that trend will continue. In most cases, the course is open to the public until the development is filled, at which time it becomes a private club.

"We see this same pattern becoming more popular with municipalities in the next decade," Clark adds. "The typical scenario is for the developer to give the necessary land for the golf course to the municipality in return for the right to build housing around the course."

**Television Has Impact** - Arthur Hills, ASGCA treasurer, is based in Toledo, OH, but works throughout the country. He states that "people want the championship-type courses they see on television, but they want fair and realistic courses without gimmicks."

"The bottom line is that there is a gradual return to a more traditional approach to design, with realistic placement of bunkers and greens that allow the player a fair putt without worry about severe breaks or multiple levels," says Hills.

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He believes golfers appreciate that courses serve as greenbelts in communities that need open space and oxygen. He adds that architects have worked successfully in environmentally sensitive locations, often providing additional wetland areas when wetlands are needed for the strategic playability of the golf course.

**Design For Site** - "Golf courses of the future will fit with the lay of land," says Jones. "Designers are conscious of their responsibility to the community and players to build a course that 'fits.' There is no doubt that owners and the golfers who play their courses will pay a fair price to play a well designed course. Courses built by 'amateur architects' that are poorly maintained will not be successful."

With the global concern about water conservation, many new courses will have a more natural look, Jones adds. But he suggests that this fits in with designing with the lay of land.

"U.S. design has been accepted internationally," says Jones. "But that does not mean that there is a certain style. Architects will continue to evaluate each site and produce a design that accentuates its best features and provides a layout that will be environmentally sensitive and challenging to the golfers who will be playing it for generations to come."

## C. E. ROBINSON

C. E. "Robbie" Robinson, designer of some of Canada's finest golf courses, passed away recently. He was 82.

Robinson, who served as president of the the American Society of Golf Course Architects in 1961-62 and 1971-72, also designed courses in the United States, Mexico, the Caribbean, and South America.

Robinson graduated from the University of Toronto's Agricultural College in Guelph, Ontario, in 1929. After graduation he began an apprenticeship with famed Canadian golf course architect Stanley Thompson, who landed Robinson a position as course manager and superintendent at Sunningdale Country Club in London, Ontario.

In 1936, Robinson returned to the Thompson firm and then served from 1941 to 1946 with the Royal Canadian Air Force during World War II. Following military service, he was employed for two years in site selection and housing development with the Canadian government's Central Mortgage and Housing Development.

Robinson began his golf course architect practice in 1948, and founded C. E. Robinson & Associates, Ltd., in 1961. He became recognized as an authority on turfgrass culture after additional study in soil science and agronomy at Cornell University and turf management at the University of Mas-

sachusetts, and for several years was the director of the Royal Canadian Golf Association's Green Section.

He is survived by his wife, Thelma; one brother, Gerald; and three sisters, Nina Shanette, Ivy Bobb, and Ruby Robinson. Donations in his memory can be made to the Canadian Cancer Society.

## SUPERINTENDENTS TO FOCUS ON ENVIRONMENTAL IMPACT

The environmental impact of golf courses will be addressed at the 61st International Golf Course Conference and Show on February 19-26 in Orlando, FL. More than 15,000 professional turf managers and other industry leaders are expected to attend the event, which is sponsored by the Golf Course Superintendents Association of America (GCSAA).

Some of the environmental topics slated for discussion are: water quality and conservation, integrated pest management, hazard communication, underground petroleum tanks, and storage, disposal, and recycling of chemicals. Expert presentations on these and other topics will be made during the Friday, February 23 session on "Managing Today's Environment."

A special government relations open forum will also be held at the conference.

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# Barry University Sets Standard For NCAA Baseball Diamonds

*"Given adequate resources, it is relatively simple to plan, design, and install a baseball field that looks outstanding upon completion. The true test of excellence, however, is how that field is cared for and maintained, and its aesthetic value, three, five, or ten years from the time of installation." Eddie Colleti, Athletic Director, Barry University.*



Buccaneers practice on university's award-winning diamond.

**B**y these or any other standards, the baseball field at Barry University in Miami Shores, FL, is a winner. What began as an adequate women's softball field was converted into a superb baseball diamond six years ago. It hosts 60 NCAA baseball games and eight months of practice every year and was recently awarded the 1989 Beam Clay Baseball Diamond of the Year Award in the College Division.

Founded in 1940, Barry is a Catholic International University with approximately 6,000 students. It was a women's college until it went coed in 1979-1980. Through the generous donation of a booster, the school's softball field was converted into a baseball diamond in 1984. The school began to participate in NCAA Division II baseball, softball, and soccer competition that year, three years before groundskeeper Jerry Brown was hired.

When the softball field was converted to a baseball diamond, automatic irrigation was installed throughout the field, with the exception of the infield and dugout areas. All the fields, baseball and soccer, were then sprigged with Bermuda 419, and the diamond's infield was excavated to a depth of approximately six inches. Sand and muck were mixed to create the soil to fill in the excavation, and then the area was resodded. The original clay, which was soft and sandy, was replaced.

Although he is reluctant to take credit for the field's continuing excellence, the man behind it is Brown. His determination, pride, and unquenchable thirst for information on turfgrass management are the foundation for the diamond's success.

"Jerry is the kind of guy who takes weekend vacations to visit other field and golf course superintendents," noted Bruce Barclay, men's baseball coach at Barry University.

Brown's "vacations" have taken him up



and down the Florida coast. He simply cannot learn enough about his profession. "I've sought information from the best groundskeepers and golf course experts in Florida," he said.

Among the experts Brown has visited in Florida are Tom Burns in Port Charlotte, Ron Timpanaro in Clearwater, Bud Koehnke of Osceola County Stadium, and Ed Miller in Fort Lauderdale. "It's a pleasure and privilege to interchange with these guys," he added. "They spur me on to do more."

Brown, 34, didn't start out to be a groundskeeper, but in one way or another he always stayed in close touch with the turf. He grew up in Garden Grove, CA, in what he describes as a "sports family," and cut lawns for pocket money as a boy.

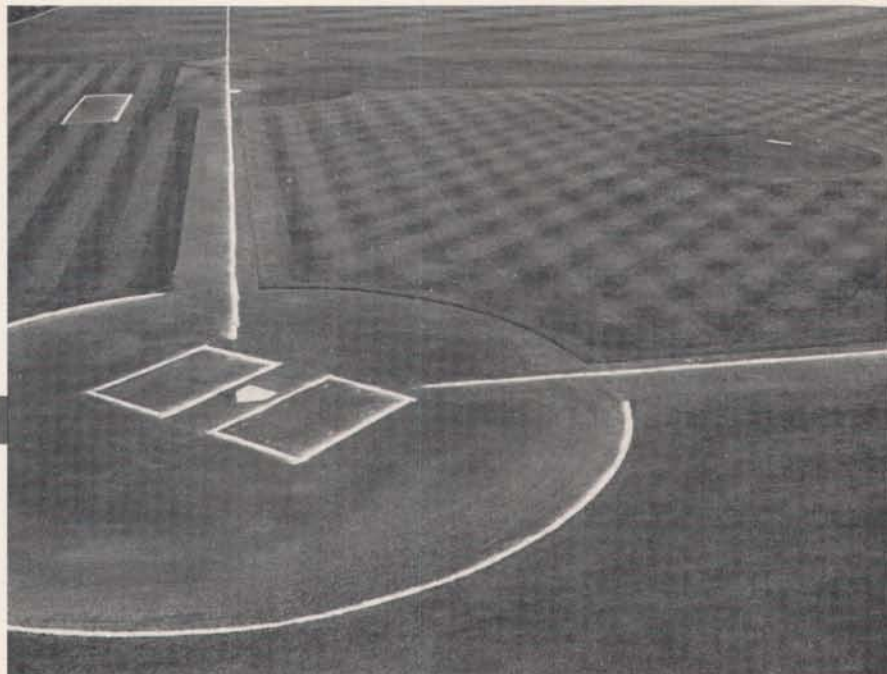
At Golden West Junior College, he played catcher on the baseball team. As a part-time job, he worked on the school's baseball field.

After graduating from Golden West, Brown attended U.S. International University in San Diego, CA, on a baseball scholarship and work-study program. He also worked on the university's baseball field. He graduated with a degree in elementary education, eager for anything but the career for which he had studied.

Rather than jumping into teaching, Brown started working as a laborer on a golf course in San Diego. A few years later he moved to Phoenix, AZ, married, worked in landscape construction, and taught elementary school for a year-and-a-half.

Brown eventually headed back to California, settled in the San Francisco Bay Area, and sold Yellow Pages advertising. In a little more than a year his selling days were finished. He worked in landscape maintenance for the next three-and-a-half years. It appeared that he had settled on a career.

*continued on page 30*



**Detail-oriented Brown borrowed many of his techniques from Major League groundskeepers.**



**The mound at Buccaneer Field is prepared to provide a perfect slope toward the mound and a flat area behind the pitching rubber.**



Where to pursue it was another matter.

With friends who lived in the area encouraging him, Brown moved to Miami Shores, FL. One day he spied an ad in a paper for a groundskeeper to care for the baseball diamond and two soccer fields at Barry University. He applied and was hired. Brown, the quintessential body in motion, had come to rest. Yet he's never been busier.

"I have been in the [landscaping and turf maintenance] field eight out of 11 years since graduating college," said Brown. "But I never experienced the desire that I now have for baseball fields. It combines my love for baseball and field maintenance perfectly."

According to Barclay, the field was in good shape when Brown arrived three years ago, but Brown has made substantial improvements. "Jerry has done a tremendous job," commented Barclay. "He takes a lot of pride in his work. He's proof that a person who works hard can stretch a budget."

"Getting resources to improve the facility has not been easy," Brown confessed. "It is easier to maintain the status quo, not make any waves, and suffer with mediocrity. I've always had an inner drive to improve the field and get things done. For example, rather than looking at weeds and a parking lot, we purchased a windscreen for the outfield fence to close the ballpark. It took one year to get half of the screens and a second year to get the fence enclosed. The athletic department paid for it."

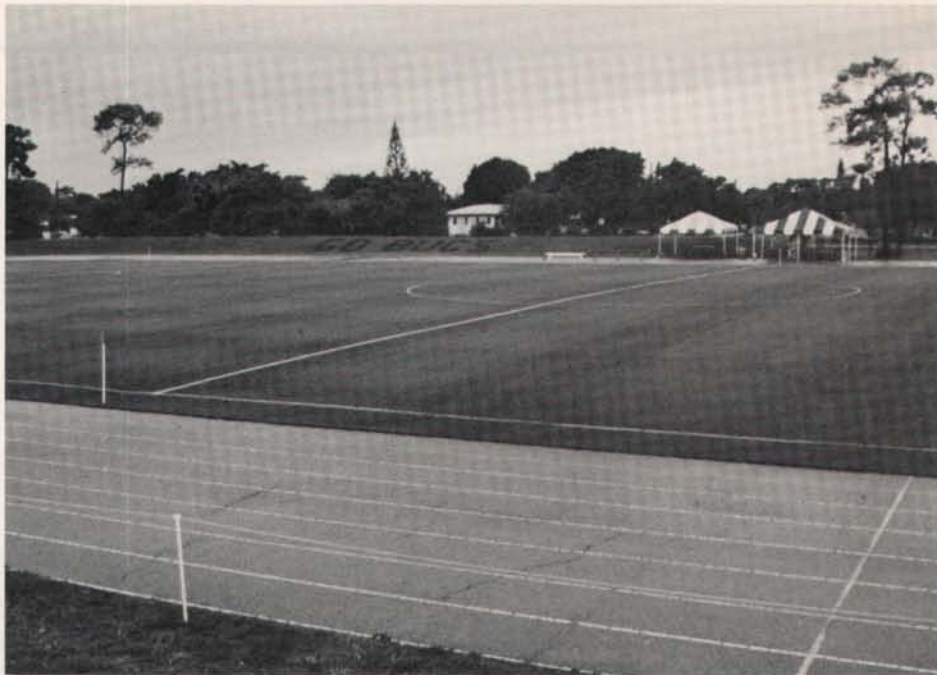
Financing the improvements has often been a cooperative effort. "We needed to completely redo the outer half of the outfield," Brown continued. "At first they were going to save the good grass, which was spotty, and then sprig the rest. But the outfield was so uneven that it would have been a mess."

"Finally, after a lot of negotiation, the school decided to grade the whole area and put in all new sod. It was a tremendous, costly job, and the grounds budget couldn't cover it all. So Student Activities said they would pay for half the job if grounds would pay for the other. It was a team effort," said Brown.

Like the improvements to the field, equipment upgrades have been gradual because of the school's limited budget. Jack Patterson, supervisor of grounds, is responsible for these upgrades. According to Brown, some of the university's best equipment investments were a tractor and a five-gang pull-behind mower. A 200-gallon tank sprayer, a Lely fertilizer spreader, and an aerator have also been purchased.

"The fields used to be cut with a triplex mower," said Brown. "To cut all three was an all-day job. Before, it would take two hours to cut the baseball field. Now it can be done in 20 minutes. This is why the grass is perfectly manicured—it can be cut every day."

Of course, even the most high-tech, state-of-the-art mowers, aerators, and spreaders



**Soccer players get the same quality surface as the baseball team.**

won't run themselves. A top-notch field requires a top-notch daily maintenance program. It requires work and creativity.

Brown begins his duties each day by using a flat shovel to clean the clay off the grass edges of the infield. He uses a shovel rather than a broom, he revealed, because brooms tend to push the clay back onto the grass. He also cleans the grass after pre-game batting and infield practice, and tries to avoid creating lips at all cost. "I am scrupulous, almost fanatical, about keeping clay off the grass," said Brown.

After the grass edges of the infield have been cleaned, he works the clay by raking the baselines. They are four feet wide, and Brown said he prefers the relatively narrow width of these areas because they are the most difficult to keep dry. He rakes lengthwise to avoid kicking clay onto the grass, and shallowly to keep the baselines as firm as possible. He scratches the clay's surface just deeply enough to fill in any holes.

"It's best to work the clay early in the morning to take advantage of the moisture from the dew," he said. "If the clay is not the correct moisture I wet it lightly, just enough to achieve the proper consistency."

Brown uses the flat side of an aluminum landscape rake to fill in the batters' boxes and catchers' holes. Generally, holes are not a problem on practice days because the team hits and pitches on pieces of artificial turf during batting practice.

The pitcher's mound at Barry University's baseball diamond emulates that of Angel Stadium in Anaheim, CA, in the early 1970s. When Brown attended Golden West Junior College and played baseball, one of his coaches also used to pitch batting practice for the Angels. Through this coach he had learned about several techniques used by Angel Stadium groundskeepers, including

preparation of the mound. He was also able to put them into practice while working on the diamonds of Golden West and U.S. International, and in turn brought them to Barry.

The pitching rubber is 11½ inches above home plate, and the mound is completely flat behind the rubber for 36 inches. A pitcher can step from the rubber, or to the side, and remain on level ground. The area in front of the rubber is level for six inches, and the mound starts tapering down from there.

"It is an inclined ramp, level from side to side" said Brown, referring the mound. "I describe it by comparing it to a cube of butter, cut with a hot knife at a straight 45-degree angle. This summer, I took out the lip that was previously in front of the mound, so the pitcher steps down to a true 11-inch drop." A firmer clay was used in its construction. After every practice, the team covers the mound and home plate with tarps.

During the spring season, when the Miami Shores area gets little precipitation and constant, hot winds, the infield clay requires careful attention. After the morning raking is completed, Brown tire-rolls the baseline between first and second base, which experiences a good deal of wear, especially after a game.

"My biggest problem in the spring is that the clay has a tendency to become exceedingly hard, so I designed my own drag," said Brown. "I fashioned a regular nail drag and attached brooms to the back. The nails dig in for a little bit of cushion and the brooms smooth and finish out the clay."

"One of the problems I had before I created this instrument was with compaction from the tractor while dragging. Previously, I would nail drag and then come back