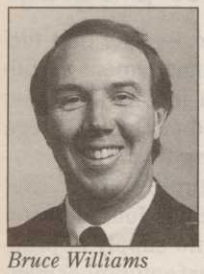
BRIEFS

PGA HONORS WILLIAMS

Golf Course Superintendents Association of America (GCSAA) President Bruce R. Williams has been recognized for his accomplishments by The Professional Golfer's Association (PGA) of America. Williams, superintendent at Bob O'Link Golf Club in Chicago, was elected PGA honorary director at the PGA's annual meeting in San Diego this winter. "Bruce has been instrumental in forging a strong relationship between the PGA and GCSAA," said PGA Honorary President Tom Addis. "He is a strong leader who has demonstrated a commitment to excellence in his profession and in service to the game of golf."



Bruce Williams

CHALIFOUR SUPER OF THE YEAR

GROTON, Conn. — The Connecticut Association of Golf Course Superintendents (CAGCS) has named Robert Chalifour the 1996 Superintendent of the Year. The superintendent at Shennecossett Golf Course here for 27 years, Chalifour was CAGCS president in 1988-89 and has served on many of its committees. A certified golf course superintendent since 1982, he was cited for his unmatched dedication to the advancement of the profession.

RUTGERS OFFERS INTRO

NEW BRUNSWICK, N.J. — Rutgers University is offering two short courses at Cook College here March 3-4 — Management Skills for Golf Course Professionals and Introduction to Golf Course Turfgrass Management. The $245 course for professionals is described as an innovative and value-adding workshop designed to provide superintendents and assistant superintendents with hands-on exercises to sharpen their skills in management. People may call Rutgers at 908-932-9271.

AUDUBON CERTIFIED AQUARINA CC

MELBOURNE, Fla. — Audubon International's Cooperative Sanctuary Program for Golf Courses has certified Aquarina Country Club here in environmental planning. Greg Plotner, staff agronomist for International Golf Management, which maintains the course, vowed that it would work get the club fully certified. Scott Campbell is the resident superintendent overseeing the programs at Aquarina.

Golf catches the new technology wave

Restoring greens for play in 24 hrs.

By MARK LESLIE

PEBBLE BEACH, Calif. — Coming soon to a golf course near you: Sand Channel Greens. The company, which promises to add drainage channels to old pushup greens and have them playable in a day, is expanding this winter into Southern California, Arizona, Las Vegas and the Northwest, according to Marketing Director David Lansdale. "And we're looking to establish a machine on the East Coast. We have two machines going full-time now, and we want to be up to five next year."

The former "Cambridge greens" process, which used a vibratory plow so disruptive it took months for turf to heal, also has a whole new life: cutter wheels. With these cutter wheels, the machine can

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The WHoleView image from a flyover shows turf health, from the less healthy browns and yellows to the more healthy greens and dark greens.

Flyovers foresee future of turf health

By MARK LESLIE

Thank you, Dr. John Schott.

Schott, of the Center of Imaging Science at Rochester (N.Y.) Institute of Technology, was an early pioneer of digital enhancement of infrared images. Today, combining that technology with Global Positioning Systems, CADD and digital mapping from LinksManager software, golf course superintendents can "see" situations developing on their turfgrass weeks before they are visible to the human eye.

"It's an exciting prospect to integrate all these technologies for the maintenance, construction and redesign of a golf course," said Bob Katula, president of Links Diagnostics, Inc. (LDI) here.

In its agronomic service, LDI flies over a property taking infrared images revealing the photosynthetic rate of the plants

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Taking irrigation into the future

By MARK LESLIE

ST. BRUNEAU, Quebec, Canada — A golf course irrigation control system that may change the industry has been installed at one of the oldest golf courses on the continent, Mont Bruneau Country Club outside Montreal, and at Widow's Walk Golf Course in Scituate, Mass., which will open in July.

"They just might revolutionize the irrigation industry," said Dr. Michael Hurdzan, a golf course architect from

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The mat: a 1-inch-square metal drag covered with a piece of artificial turf-type material.

ON THE GREEN

The drag mat beats snafus from moisture

By TERRY BUCHEN

Superintendents are very happy and fortunate to have the many new pieces of equipment now on the market. Of particular note is the fairway topdressing machine. Most of these new implements can carry 4,000 pounds of top-dressing material, usually more, making top dressing fairways almost as easy as greens.

However, fairways are many times top dressed during the early-morning hours, making for wet, dew-type conditions which can cause a delay in "dragging-in" the top dressing. The top dressing can be wet from natural causes, as well.

One great idea to help drag in wet top dressing, especially a sandy material, is to use a 1-inch-square metal drag mat and lay a piece of artificial turf-type material over the top (attach it with a zip strip plastic-tie material every few inches on all four sides).

This idea really works in helping keep the top dressing from "balling up" and "clogging up" the drag mat, which obviously makes quite a mess and delays dragging until the top dressing is dry. This idea is also especially helpful in getting the dragging done ahead of play, which golfers obviously appreciate.

When the top dressing is wet, for whatever reason, this drag-mat concept can also work quite well when top dressing greens with straight sand, or with a 90/10, 85/15, 80/20 sand/peat moss mixture.

Niemczyk on non-traditional turf treatments

Dr. Harry Niemczyk

Q&A

Dr. Harry Niemczyk is professor emeritus and coordinator of turfgrass entomology research at The Ohio Agricultural Research and Development Center of the Ohio State University in Wooster. He received his bachelor's, master's and doctoral degrees from Michigan State University. His research on turfgrass insects and behavior and mobility of turfgrass pesticides has been widely published. Recently he has been doing extensive research on biological controls of turfgrass insects.

Golf Course News: Could you describe the progress of your work regarding biological controls for insects?

Harry Niemczyk: I've been studying the effects of entomopathogenic nematodes, parasites that destroy cutworms, grubs and other insects. Several have shown good results. They are introduced live into the soil, seek out the insects, enter their bodies and cause the insects to die.

GCN: What products are showing promise?

HN: We've had some good results on grubs with a product called Cruser by the Ecogen company. The key is getting the nematodes through the thatch and into the soil. It's hard to introduce them since they can be destroyed by desiccation and ultraviolet light.

LESCO has a product called Vector that's been pretty successful with cutworms on golf greens. It is supposed to be irrigated into the green. But that can be complicated. Vector is often mixed in a spray tank and applied along with other products, like a contact fungicide. But contact fungicides should not be watered in. So you end up applying two products together that have different requirements for post-treatment irrigation. That's a problem. Vector can be effective if it's used according to the label directions.

GCN: Are there any other biological or biological-like

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'The concept itself is almost foolproof.'
— Geoff Blind, Hillendale Country Club

Sand Channeling, a bad-drainage 'fix'

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cleanly cut the turf in 2-inch strips. Then it digs 9-inch-deep trenches and fills them with drainage pipe and sand.

In a single pass the Sand Channel equipment excavates the channels and injects sand and pipe. The channels are installed first on 16-inch centers, then in a perpendicular direction on 48-inch centers. Capillary action can then draw water through the sand layer laterally to the sand channels and down into the 1-inch pipes that empty into 2-, 3- or 4-inch collector pipes that get either "daylighted" or tied into a local storm drain.

"The concept itself is almost foolproof," said superintendent Geoff Blind, who did all 18 greens at Hillendale Country Club in Phoenix, Md., in the fall of 1992. Even with the old vibratory plow and its disruption, Blind endorsed the procedure.

His 40-year-old, bowl-shaped greens were virtual water collectors, and in 1992 hot, humid and very wet weather combined to devastate the high-population *poa annua* greens. Sand Channel Greens installed its drainage matrixes that fall.

"In the spring of 1993 the greens drained unbelievably," Blind said. "We had 62 inches of rain in 1996 and I had a little trouble in September because of a lot of play, shorter days and our aerification program. But the greens recovered quickly. It makes them so much more resilient."

Blind is trying to get superintendents in his area to commit to Sand Channel projects to get a machine there. "I have some low wet spots on my course that I want to drain," he added.

"It's an idyllic application to get water off a green and get it to perform better," said superintendent Bob Zoller of Monterey Peninsula Country Club here.

After maxtrixing two greens and two tees last spring, Zoller reported in January: "The tees were extraordinary. They were everything I would have hoped they would be. We chose very level areas that didn't drain at all, and they are now our best tees instead of quagmires.

"The greens drained quite well. They typically were unmowable for two or three days after a heavy rain. This allows them to move the water through well."

"Quite frankly," Zoller added, "it makes me think I'd like to try doing bad fairway areas. The application there would really be something."

"Landing areas on fairways and tees are very attractive applications," agreed Lansdale. "We did Toronto Country Club's fairways just prior to the Gold Rush Open. On a new course things start bubbling up where no one knew it would be an issue."

Zoller pointed out that installing this matrix drainage system will not perform to the level of a rebuilt green. The surface can still have soft soil between the splits. Yet the cost differential is major.

It costs $30,000 to $40,000 to rebuild a green. Blind said it cost him a dollar a square foot to do his average 4,800-square-foot greens.

"When we do it turnkey it is roughly $7,000 per green... smaller greens with bunkers are harder to do," Lansdale said. Plus the

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A bad-drainage fix

Continued from previous page

superintendent's crew works with us, removing spoils and returning sod strips to the channels."

"The cost isn't bad," said Zoller, "not when you consider that golf courses have done serious drainage work on fairways, removing sod, taking out 6 to 8 inches of soil and capping them with sand. That can run into $200,000 a fairway. With this method, they are charging $12,000 to $15,000 an acre. You might have a couple acres on a medium-sized, par-4 fairway. It at least bears some trial before deciding against it."

"It's vast savings," said Lansdale, "plus the down time is a big, big issue with some people. We go in with our system and then recommend a diligent aerification program to address the space (that native soil) between the channels. You aerify it to get the water percolating into the channels. You can come close to a sand-based green by disturbing and working with the soil."

While the tee and fairway application is easy because the 2-inch strips of sod are not replaced (the turf is left to heal on its own), Zoller said superintendents should realize that on putting green projects, their crews are responsible for putting sod strips back in after the Sand Channels are made.

"We ended up with eight to 10 people on the green for four days straight as they were doing the work," he said. "Those people are almost all working at putting the 2-inch-wide sod strips back in the ground. The application is only as good as your sodders are. I figured there were over 3 miles of 2-inch sod strip on one green. So basically the finished product isn't going to have as much to do with them [Sand Channel Greens] as it is with your crew and their ability to do a good sodding job.

"I was real proud of my guys. It's back-breaking work and very repetitive for four days."

Each green takes four days to complete and, the fifth day, it is back in play.

• • •

Lansdale also pointed out that old golf courses wanting to maintain the character of their green designs are possible clients. "You have a classic design and don't want to disrupt it. You put in our system and end up with drainage," he said.

"In the last year we've done four Alister Mackenzie courses," Lansdale said, among them Green Hills, which did two greens, Montecino Country Club in Santa Barbara, and Pasatiempo Golf Course in Santa Cruz.

For superintendent Dean Gump at Pasatiempo the work was *deja vu*. He had 11 greens done in 1988 with the old vibratory system, then four greens in 1995 with the Sand Channel method.

"The Sand Channel method seems to be performing much better than the old system," Gump said. "We had double the rainfall this year, and those four greens were better than the others on the course."

"The beauty of our system is return customers," like Pasatiempo, Lansdale said. "We are at a 70-percent return rate."

Wisconsin GCSA elects Kienert to rule in 1997

The 250-member Wisconsin Golf Course Superintendents Association (WGCSA) has re-elected its slate of officers, headed by President Mark A. Kienert of Bull's Eye Country Club in Wisconsin Rapids.

Vice president is Scott H. Schaller of North Shore CC in Menasha, while Kristopher J. Pinkerton of Oshkosh CC is treasurer and David A. Brandenburg of Rolling Meadows GC in Fond du Lac is secretary.

Elected to two-year terms as directors were David E. Smith of Abbey Springs GC in Fontana and Gary Tanko of Sentryworld in Stevens Point.

Other current board members are Past President Mike Semler of Bishops Bay CC in Middleton, Andrew Kronwall of Lake Geneva CC and Charles Shaw of Nagawaukee GC in Pewaukee.

Intelligent sensors at the heart of Smart Rain

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Columbus, Ohio, who is having the system installed at Widow's Walk for research purposes rather than irrigation control.

Developed by engineers and computer scientists at Smart Rain Corp. here, the system is a network of "intelligent" 12-inch soil probes that can control the entire irrigation system head by head, gauging water needs by reading soil moisture, temperature and fertilization. Smart Rain sensors communicate to the central control computer through the same cables that energize the valves.

No weather station, nor controller is needed. And because the central computer is voice-activated, the superintendent can call it by walkie-talkie and command it to do what he or she wants.

Because the system is operated based on soil moisture and temperature, and not on evapotranspiration, Hurdzan said, "You are getting to the heart of [the turf's requirements]. You need to measure water in the root zone, not on some arbitrary figure of what evaporated."

"You don't have the time to read 100 sensors in the field," said Smart Rain President Romain Gagnon, explaining the efficiency of his system, whose sensors are little computers connected in the network that talk to each other and the central computer. "If a course has 170 sensors, they provide 510 pieces of data to read."

To help the superintendent make manual watering decisions, the system includes a graphic Windows software program. It depicts a map of the golf course and indicates different colors for every sprinkler head according to its soil requirements. Whenever the sprinkler turns red, it means the soil in that area is too hot and needs syringing. When yellow it's too dry and needs heavier watering. Blue, it means it is over-watered. When white, it is frozen.

"At the central computer, superintendents can adjust at what level they want every individual sprinkler to change color," Gagnon said. "They can define what's too cold, too hot, too dry, and too wet, what to fertilize or not fertilize... The colors are there to quickly give them an idea of what's going on in the field. Whenever a sprinkler turns color, you can click on that sprinkler on the computer with your mouse and get precise data about it. When you water, animation shows that on the screen."

While Widow's Walk and Mont Bruneau will start up their systems in July, Smart Rain has only been in the golf industry since January 1995.

Gagnon and Sales and Marketing Vice President Jim Simonini have been marketing the product for a year, getting feedback for adjustments and additions.

"A lot of the concepts we use come from other industries," Gagnon said. "But irrigation is a low-tech business. Industrial control is my background. When I looked at how people were doing things in irrigation, I was amazed."

Soil-moisture measurement has been available for more than a decade, but the device cost $10,000, he said. Smart Rain engineers developed a much cheaper, little circuit to do the job.

"We did not contribute on the agronomic side," Gagnon said. "The machine cost so much because agronomists didn't have the technical knowledge."

There are three basic technologies in this new system:

- water-sensing technology, which Smart Rain developed;
- Windows technology; and
- Lonworks technology, which allows the sensors to communicate with the central computer. This was developed by Echelon Corp., which is partially owned by Motorola and Toshiba, according to Gagnon.

At Widow's Walk, Smart Rain is being used as "an experimental tool to help us measure soil moisture, fertility and temperature," Hurdzan said. "We're not using them for irrigation control. We're using them for research. We want to measure how quickly and how deep the root zone goes into a frost layer, and how water moves through profiles, and what the soil temperatures are. We want to use them to determine the efficacy of fertilizers and pesticides — how a fertilizer reacts at 52 degrees soil temperature versus 62 degrees..."

Each green has four sensors installed — one at 4 inches and one at 8 inches both at the front and back of the greens.

Flyover photography maps courses, sees into the future

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on the ground — something that can not be seen with the naked eye.

"It's a first line of defense to keep turf as healthy as possible," said Katula, who is working with the Space Remote Sensing Center to develop a technology for golf course use — Links-Manager. "With the information we provide, instead of spraying four times, perhaps you can spray twice or three times."

That flyover of the golf course provides layered maps depicting soil types, course layout, surface hydrology, chemical applications and irrigation network.

Paul Latshaw at Congressional Country Club here and Bob Alonzi at Winged Foot Golf Club in Mamaronek, N.Y., are among Katula's early clients for this diagnostics service.

"[Infrared technology] has been used in forestry and row-crop agriculture," said Dr. Eric Nelson of Cornell University in Rochester, N.Y. "The major breakthrough is not in the technology but that superintendents now are interested in it. They weren't before."

Nelson worked with Zeke Hurd of Pegasus Environmental, Ltd., of Rochester several years ago, intending "to match what we were seeing on the ground with their flyovers. We never got to the point that we could relate the aerials to particular diseases. We knew it was stress, but not what disease symptoms there were."

While saying he and Hurd did not find disease correlations in the flyover photographs, Nelson acknowledged it probably can be done. He added: "The information they give is valuable. You can pick up the nutrients and the water. And it is possible to pick up the diseases. If you map out a putting green, for example, so you know year after year where the disease problems are. Then you can fine-tune the infrared photography to detect some of those diseases early in the season.

"The value is building a database and seeing how stresses change with time, and what it really means when you are down on the ground."

"What we hope to do," said Katula, "is, if we get certain reflectants of fairways and greens that mean low fertility, compaction or a developing disease, we can tell the superintendent they could have one of two things. Then they can take tissue samples for those possibilities."

LDI's flyover cameras are sensitive enough, Katula said, "to pick up a healthy reflection pattern through the green, red and near-infrared bands... When we fire the camera we get the direct reflectants off the turf. We put filters in at very specific parts of the spectrum... It's based upon research at Mississippi that shows that if you use this filter setting, you'll get two weeks warning of anything that's green like grass or crops — anything that has to do with chlorofil production. So you'll know of a problem two weeks before it's visible to the naked eye."

LDI produces standardized images, then creates enhanced versions "showing the best of the best and the worst of the worst on any one hole. Basically, you try to look at patterns between the standardized and enhanced and that's when you really know you may have some problems coming up," Katula said.

"It all works beautifully and it's all combined with mapping products so that you can literally follow small spots of stress on a golf course. Every little isolated image has little boxes (pixels) in them, and every one is 2 feet. You may have a 20-square-foot stress area. You can save it in our mapping and on the next flyover you can compare it and see if it's gotten better."

"Anything you can think of, the GPS technology can do now," Katula said.

In building a golf course, the technology can provide real-time cut and fill, volume analysis of dirt moved, and other figures, Katula said. "If you input CADD into the receiver you can com-

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Griffiths comment

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"Americanization" may eliminate many shots that are required on the traditional Scottish and English courses... shots that add to the game's challenge and finesse.

In discussions with other members of the American Society of Golf Course Architects, I find that most strive to meet these Americanized expectations. As a result, today's course architecture may best be described as a study on how to best modify terrain to create the desired golfing experience.

With sites containing more and more limitations — whether they be related to size, terrain or environment — designing to this American style of golf often involves extensive earthwork to reform the ground, especially to prevent blind shots and provide level play areas. It also requires green construction methods, irrigation system design and grass selection that have reached a level of sophistication almost beyond comprehension. All in the name of perfect playing conditions.

While meeting golfers' expectations, these designs have and will continue to drive course construction costs higher. The dramatic upswing in maintenance costs is likely to continue as well. (It is not uncommon for the average annual maintenance cost of a 25-year-old facility to exceed the original cost of construction for the same course!) All of which has lead to an overall rise in green fees.

It is my belief that the quality of a game of golf should be judged more on the integrity of the course's design than its condition. The goal of the golf course architect is to create variety, demanding that players use every club in their bag. Less-than-perfect turf conditions provide an additional variable that should not necessarily be considered a negative.

When playing older courses where the condition of the turf is determined by the most recent weather cycle, golfers are required to adjust their game to the specific conditions every time they play.

I believe we should consider changing our expectations and returning more to the original concept of the game. In this concept, the ball is played as it lies, and there is not always a reward for a perfect shot. In doing so, we will expand the opportunity for more affordable golf. We will also obtain a better appreciation of what the game has to offer.

Flyovers

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pare the design to the actual build and calculate the cut-and-fill off of that. Or when they do a rough grade of the course, you can shoot the contours then; and when it comes to moving the dirt, you can also do the cut-and-fill.

The contour mapping is extraordinarily precise. When it was receiving bids to renovate its Pinehurst No. 2 greens, Pinehurst Resort asked LDI to produce 300th to 400ths of a foot verticle mapping. Surveyors generally work in 10ths of a foot, Katula said. "We have to do special things to hit that 300th height every time."

But LDI's normal survey data shows 1/10th-of-a-foot contours on each green and 1-foot contours of fairways at any scale the superintendent requires.

"I hope to achieve two things," said Alonzi. "First, as a warning sign. Since it has the ability to see what the naked eye cannot, is perhaps give me warnings of things that may be occurring in the plant before it actually happens.

"Second, to reaffirm some of the critical areas on the golf course... from subsurface rock formations, or just poor soils, to help me to zero in on these areas and explore it. Not only to be able to go out myself, but to take a committee out on the course with evidence in hand that there is something wrong."

In the future, Alonzi said, infrared photography's use may expand. "It's new technology and they're improving it every day. Maybe we'll be able to tie it to certain pathogens from information we get from the stress areas. It could help to manage microclimate situations.

It already has come to Alonzi's rescue. The same day a club member objected to overwatered fairways, the aerial film arrived showing that the course was in jeopardy from lack of water, Alonzi said. "So it also becomes a tool to help you support some of the practices you are exercising."