

# Evolution of a golf hole: the effects of *Poa annua*

by Ronald W. Fream

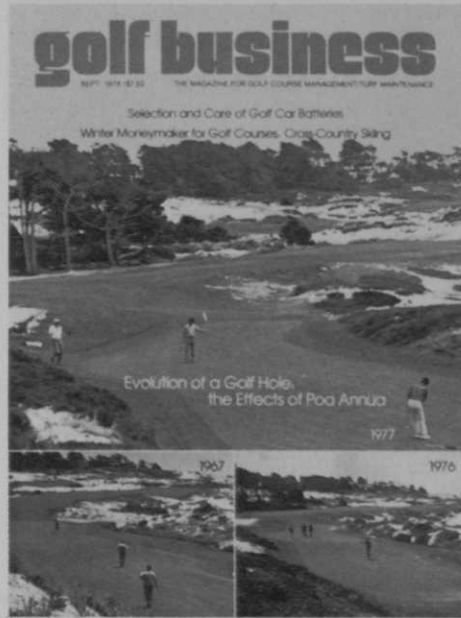
Golf courses, like people, age. The life cycle of a golf course can be rapid or long-term, partially depending upon the quality of the original construction, the amount of annual play, and the degree of maintenance received. Climate, local soil conditions, the clientele or use to which the golf course is primarily oriented also influence the rate of maturation.

The three photographs on the cover of this magazine show how a single golf hole, particularly a green, may be viewed as one example of this evolution.

All three were taken from the rear of the green and illustrate the fourth hole at Spyglass Hill Golf Course on the Monterey Peninsula at Pebble Beach, Calif. This par 4 hole, an abrupt dogleg left, (as the hole is played) was constructed among the natural sand dunes of the site. Such a true links style hole is quite a rarity to American golfers.

In photo 1, the color and appearance of the turfgrass on the green surface and the fairway area are quite typical of bentgrass on the green and a bentgrass-bluegrass mixture on the fairway. The grass at the time of this photograph, mid-June 1967, had been planted for slightly more than one year.

Photo 2 shows the same hole, photographed from approximately the same location, as the conditions existed in mid-June 1976. Nine years have



1. 2. 3.

Three photos on this month's cover show how time and annual bluegrass changed the appearance of number 4 hole at Spyglass Hill. See text for detailed explanation.

indeed left their mark. Most dramatically, the rich green colors of the bentgrass and bluegrass have been replaced by the yellow-green color typical of that all pervasive intruder, *Poa annua* or annual bluegrass. Given compaction from heavy golfer usage and cool-moist climatic conditions, *Poa annua* will overcome the more desirable bentgrasses without an extensive and expensive chemical control program. On the fog-shrouded Monterey Peninsula, *Poa annua* can usually survive the infrequent periods of hot weather and does provide a suitable playing surface. Some of the off-color appearance of the *Poa* must be attributed to an insufficient quantity of nutrient fertilizer being available through the golf course maintenance program.

Careful examination of these two photographs also will show the expansion of turf into the sand dunes. The quantity of ice plant, which acts as a sand dune stabilizing medium, has also increased.

Photo 3 demonstrates the impact of

the drought western America in general and California in particular experienced during much of last year. Taken in mid-June of 1977, a decade after photo 1, this photograph illustrates both improved nutrient fertility levels with the *Poa annua* on the putting green and the impact of no water on the *Poa annua* of the fairways. During the drought, sufficient water was allocated to the golf course to permit only modest watering of the greensites and teeing areas. No watering of the fairways was permitted.

In the period of this drought, it has been demonstrated that most golf courses can survive — and even improve turfgrass conditions — under a 20 or 25 percent reduction in watering. When restrictions eliminate fairway watering, any turfgrass, but especially *Poa annua*, undergoes severe stress. The brown and dead fairways in this picture demonstrate the rapid result of no water upon *Poa annua*. Perennial varieties of bluegrass and the various bermudagrass varieties can easily withstand drought due to deep roots and underground stems or rhizomes. *Poa Annua* has no such underground stems and very shallow roots. Adequate water and fertilizer have resulted in the healthy putting surface while drought takes its toll of the fairway. The ice plant continues to overcome the dunes.

With the onset of winter rains, an overseeding program using perennial ryegrass will once again return the fairway to acceptable conditions.

From the three photographs, it is easy to observe that golf holes can and do evolve in appearance and playability in direct response to climate, usage, and maintenance practices. Frequently, it is only through such successive photographs that the changes can be easily noted. The transition from the desirable bentgrasses and bluegrasses to *Poa annua* is a progressive and degenerative affliction which neither golfer nor superintendent desire, but few can overcome. □

Ron Fream is a partner in the international golf architectural firm of Thomson, Wolveridge, Fream & Associates. Headquartered in Los Gatos, Calif., Fream is director of services for North American and Caribbean projects and co-manager of Asian, Southeast Asian, European, and North African projects. He has a degree in ornamental horticulture and was formerly associated with Robert Muir Graves and Robert Trent Jones. An article by Fream on remodeling golf courses appeared in the October 1977 issue of GOLF BUSINESS.

# Winter moneymaker for golf courses: cross-country skiing

by Ron Beltz

Cross-country skiing has become North America's fastest growing sport over the last few years. Hordes of skiers now set out to brave the winds of winter every weekend instead of quietly sitting in front of a television screen. All indications show that the craze has not yet reached its peak, and with increased participation comes the inevitable problem of inadequate facilities. Where can the skier find scenic routes and well-prepared trails as well as rental equipment and refreshments? Many golf course managers have found that with a little planning and a modest investment, they can adapt their operations to serve the skier as well as they meet the needs of golfers.

The needs of the skier are simple. All he demands is a packed trail which is well-marked, and he is in business. While he prefers a trail which is "set" with parallel ruts 6 inches apart, heavy skiing will accomplish this for him. A trail system should cover at least 4 miles, although some areas offer less. Although instruction will increase his enjoyment, many skiers have a lot of fun their first time out and keep coming back for more. It is a sport one learns by doing, and a few tips about the general principles of gliding rather than walking and techniques for getting up hills are as much as many good skiers have ever had.

Since many golf courses don't offer particularly rugged terrain, they are ideally suited to novices and youngsters, for it is truly a sport the whole family can enjoy. Often a child will begin skiing at the age of 6 or 7 — far younger than most people take up golf. Since the stamina of a family group varies, skiers appreciate an area where they can rest and obtain refreshments. As in golf season, this is an important revenue source for the operator. Skiers get hungrier and

*Of himself, Ron Beltz says, "Like the process I have described, I am a golfer who has converted to skiing in the winter months. I have recently converted to free-lance writing as well, drawing on my experience as a Rocky Mountain trail guide in the summer and a ski instructor in the winter."*

*"Rules of the course" as posted below don't apply for this sport. Skiers don't take divots.*



thirstier than golfers, and are not locked into a schedule.

## What can you expect?

Brad Miller, manager of the Shanty Bay Country Club near Barrie, Ontario, has been in the ski business for 4 years. Like other golf course operators who have successfully converted to winter operations, he has experienced a terrific increase in the volume of his ski business since he began.

"When we started out," Brad says, "we were lucky if we saw over 100 skiers a week. We now count on over 1,000 skiers per week — and if we get especially good conditions, we do even better. The growth rate has been phenomenal and we anticipate even better business next year."

Other operators have experienced similar growth and, like Brad, many are now counting on skiing for 40 percent or more of their annual revenue — and they are still learning about the business. Like Shanty Bay, Golf Haven in Gilford, Ontario, has reflected this growing emphasis by changing its name to Golf-Ski Haven. Any golf course that has snow for 3 months of the year should give this serious thought.

Where does this business come from? Brian and Margaret McCann, who operate a 9-hole golf course in Allandale, Ontario, report: "Our operation caters primarily to families. Like many golf courses, we don't have particularly challenging terrain — but we do offer the novice well-prepared tracks and excellent rental equipment. We estimate that 50 percent of our skiers rent equipment from us. We



do a lot of repeat business and average 20 individual skiers per day over the week. But we do a lot of mid-week business with schools and the local YMCA. We even have occasional bookings with the Grove Park Home for the Aged."

Reaching potential customers effectively has played a large part in the growth of the business, and there is good news here for the operator. Experience has taught that word of mouth is the most effective advertising. In their first years some operators spent several hundred dollars on radio and newspaper promotion. Most now rely primarily on adequate distribution of brochures, particularly to interested groups such as schools. They wisely combine their trail maps with their advertising, since skiers are interested in the extent of a trail system. Good road signs are also an asset.

Once people have visited your golf course/ski area, you want them to be satisfied. Operators have shown considerable ingenuity and originality in making skiing as enjoyable as possible. Brad Miller takes a great deal of pride in his special services. "We look on a ski tour as an outdoor experience. We provide rest areas complete with fire circles, and route as much of our trail system through wooded areas as possible. We also maintain over 70 bird feeding stations en route."

Is this expensive? "Well, when we have school children skiing, they spend every nickle they have on french fries and hot dogs. The birds get the leftover lunches as well as bird feed."

## What investment is needed?

All operators agree that one big attraction is the availability of good rental equipment. The most common mistake they made was using wood skis (which broke) and inferior boots (which wore out) in their first years. The fiberglass ski is now universal for rentals — and extra revenue is earned



*Wooded and other rough and out-of-bounds areas for golf make good places for cross-country ski trails. Avoid tees and greens.*

## One source for cross-country skiing and track-setting equipment

Reliable Racing Supply, located in Glen Falls, N.Y., has been importing and selling track-setting equipment for cross-country skiing for 7 years. Company president Thomas Jacobs told GOLF BUSINESS, "Golf course proprietors have to understand that if they are to be successful in the cross-country ski business, they must prepare the snow for skiing just as they do grass for golf.

"The Larven equipment we sell is manufactured in Sweden and features lightness and maneuverability along with low cost. This is ideal for golf courses which have to protect their fairways and greens from heavy equipment and their operations from heavy investment in new projects such as cross-country skiing."

Larven Snow Scooters, graders, and track setters are pictured here, along with some of the cross-country ski equipment also sold by Reliable Racing Supply. For prices and further information, **circle 300** on the free information card bound into the front of this magazine.



by selling both new and old equipment. Skis made by Kahru, Fischer, and Bonna are very popular and stand up well to rough usage. Skis are waxed for the customer whenever possible, since an improperly waxed ski can make skiing very frustrating. The owner should count on roughly 50 percent of his customers renting, remembering that half of his renters will likely be under 16. On the average, a complete set of skis, boots, bindings, and poles will cost the operator \$80 to \$100.

There is good news for the operator concerning accidents, since they are very rare and never, to date, serious. Trails designed for safety as well as enjoyment have made them so rare that most operators can scarcely remember an incident.

Needless to say, all this will require an investment, but upkeep of a ski area is far less expensive than that of a golf course. While staff requirements vary with the service provided, a rule of thumb is to allow one staff member per fifty skiers. Equipment, however, is a major expense.

First a few words about outdoor equipment. Since cross-country skiing is in its infancy, techniques for maintaining trails are still in the experimental stage, but most areas have discovered the need for three main items:

First, you must have something to drag your equipment. Alpine ski areas simply use their commercial vehicles such as a Sno-Cat, which is capable of dragging a couple of tons of equipment up a mountain. It's an ideal vehicle — but at \$50,000, a little out of reach of most operators. Brad Miller has procured a logging machine called a Nodwell which he describes as "half tank and half swamp-buggy." Most areas, however, manage very nicely with a heavy-duty snowmobile; the powerful twin-track models priced from \$1,500 to \$3,000 are perfectly adequate.

Secondly, a groomer is essential. This is dragged behind the vehicle,

and its function is to pack, smooth, and level the track, which should be 8 feet wide to allow double tracking. It is also used to break up old tracks when they become too icy. Operators have discovered a number of machines which accomplish this. Brad Miller has mounted a common galvanized culvert on an axle. Roy Moe of Golf-Ski Haven and others have invented their own machines. Several manufacturers have marketed a number of groomers and track setters (see box above). This is a new field, and the best advice is to visit local ski areas and see how they handle the problem.

The final item is the tracksetter. Essentially this is a heavy sleigh with some sort of protrusion on the bottom to make parallel ruts. Again there are commercial models available, but many areas manufacture their own.

Another expense is the cost of brochures and maps. You can expect to spend somewhere between \$500 and \$1,000, but remember that combining golf and ski brochures with a trail map will save you money. Depending on the layout of your course, you may wish to issue tickets



to skiers, but not all operators go to this trouble and expense. Local ski resorts are helpful with suggestions here.

Another problem is theft of rental skis. If this causes problems, the best advice is to hold the driver's license of the renter until equipment is returned.

### Do it now

All operators I spoke to were enthusiastic about the success of their venture. It has provided them with an interesting way of increasing their revenue. At an average trail fee of \$1.50 per day and a rental fee of about \$4.00 (more on weekends), this adds up. If your course has an efficient restaurant and lounge, your revenue will increase even more. Roy Moe promotes ski parties in the evening which are heavily booked, and this adds substantially to his business.

Any area which can depend on 3 months of snow would be well advised to consider diversifying into skiing. Since it is a fairly new idea, the first courses to begin will have the edge for years to come. □

# Presenting economy at low



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A simple, common sense, idea. Multiplied by a 30 car fleet, just simple enough to mean

# speeds, prestige at all speeds.



thousands of dollars in yearly savings.

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Or call or write Dave Caruso, General Manager/Golf Car Sales, Harley-Davidson, (414) 342-4680, P.O. Box 653, Milwaukee, Wisconsin. 53201.



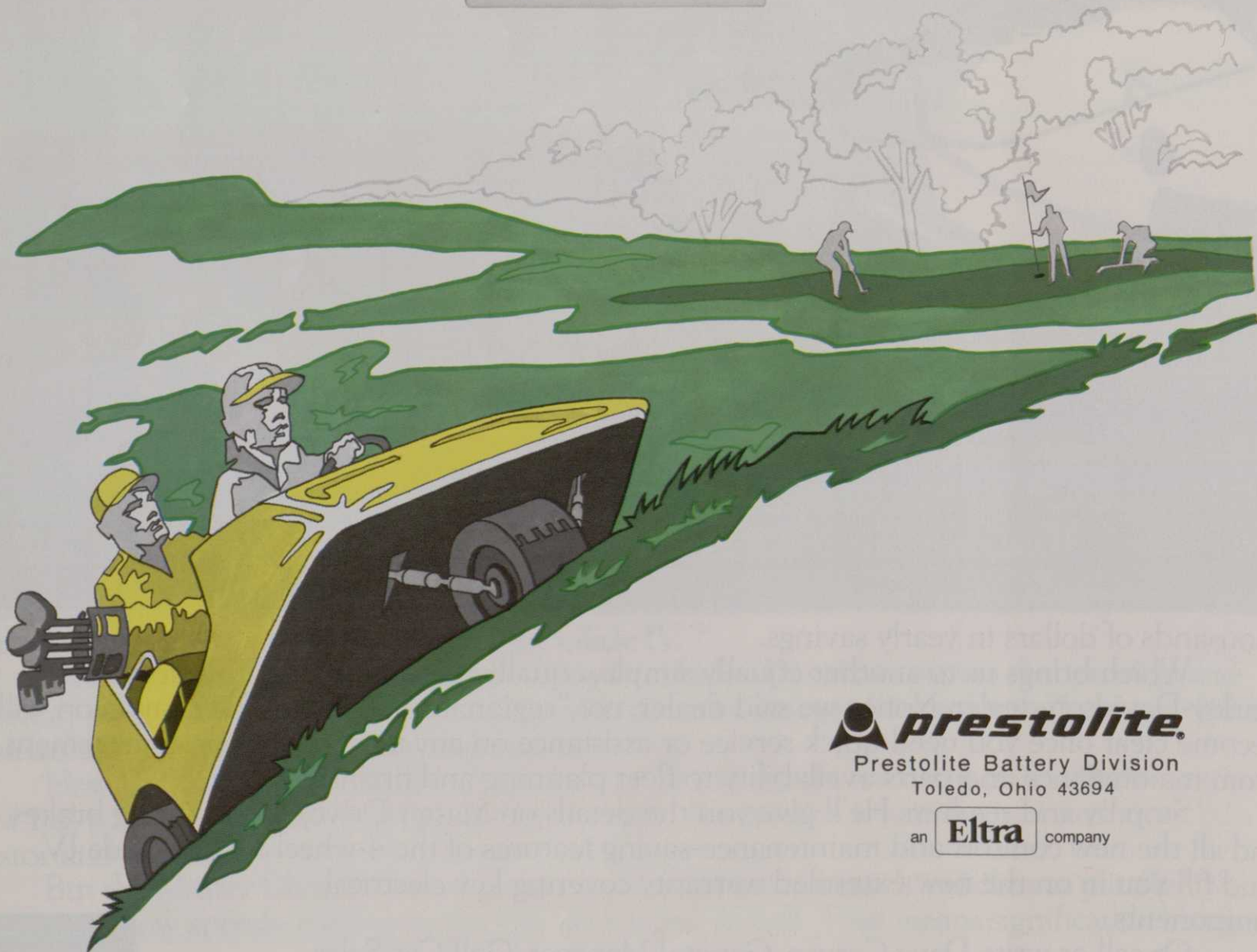
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# Selection and care of golf car batteries

About two-thirds of the nation's golf courses own or lease electric golf cars, and the number appears to be increasing every year. All 12 of the golf car manufacturers listed in the GOLF BUSINESS 1978 Golf Car Guide make electric vehicles; four make both gasoline- and electric-powered models; none manufacture only gas-powered golf cars. Even Harley-Davidson, probably the leading proponent of golf cars with gasoline engines, has introduced a brandnew electric car design, the Master Glide IV.

In short, electric golf cars are here to stay and actually will be seen on American golf courses in ever-increasing numbers. But the very thing that has created their popularity — the nonpolluting, non-fuel-burning power source — also creates some particular maintenance needs and problems. The power source, of course, is the electric storage battery.

**Not the same as the one in your car**  
“As a generalization, the batteries are probably the most mistreated parts of the electric golf car. This may be due to the fact that previous exposure of most people to lead-acid batteries is limited to their automotive experience,” says Don P. Wilson, president of Lester Equipment Mfg. Co., maker of battery chargers for golf cars and other applications.

John J. Zalecki, national service manager of The Prestolite Co., a battery manufacturer, adds, “Golf car batteries are similar to automobile batteries in only one respect. That is, they are both electrochemical devices that store energy in chemical form and release it as electrical energy. That is about where the similarity ends, because golf car batteries have a service requirement that is very different from that of your car battery.”

Joe Pace, assistant to the vice president of engineering for another battery manufacturer, ESB Brands, Inc., concurs: “In a car, the battery's primary function is to start the engine. Once the engine is started, the battery's job is really over. Whatever electrical drain is used in the starting is quickly replaced by the alternator or generator.

“On the other hand,” Pace ex-

*Proper recharging is an important part of good battery care, and a well-designed golf car storage facility makes it easier to do it right. The one shown is at Brown's Run Country Club, Middletown, Ohio. Building by Armco.*



plains, “the batteries in a golf car are the sole source of power. The batteries, providing motive power, are the engine. The average life of a golf car battery is probably half that of an automotive battery.”

This fundamental difference in the purpose or use of the batteries has great effect on the design of the battery and the demands made on it. To understand this, it is necessary first to understand that the batteries are used in what is known as “cycle” service. According to Zalecki, “The action of supplying current (discharging) and then receiving current (recharging) is called a cycle.”

“Car batteries,” Zalecki says, “are subjected to shallow discharge cycles — 2 to 3 percent of their capacity. Also, they normally operate near full charge condition, in the 90 to 100 percent full charge range.

“Your car battery must deliver high cranking motor current (300 to 400 amperes) and maintain its voltage for the few seconds it takes to start your engine. Because of this type of service, your car battery is designed with maximum plate area and low internal resistance. This combination provides the cranking performance required to start your engine.”

On the other hand, Zalecki says, “Golf car batteries must deliver all the power to the golf car motor. The power required varies with the type of service, load in the car, and type of terrain. The energy required can range from 40 to 350 amperes. Normally the discharge of energy in intermittent service is approximately 75 amperes.”

Golf car batteries are discharged much more deeply than automobile batteries, as much as 60 to 70 percent of their capacity, because of the type of service they perform.

Joe Garvin, marketing manager of ESB Brands, points out, “The life of a golf car battery is determined both by the number of cycles and the depth of each cycle. Therefore, a lower capacity battery will discharge more deeply than one of higher capacity used the same number of holes. A battery which is cycled deeply each time will not last nearly as long as one which is not so deeply cycled.”

## What to look for when buying

When buying new golf car batteries, whether specifying what you want in new golf cars or replacing those in cars you already have, note the specified capacity of the batteries. According to Pace, “The only real rating applicable for golf car usage is the number of minutes of continuous running time. This is defined as the capacity at 80° F. for a 75-ampere discharge to 5.25 volts. The more minutes of running time, the more deeply the battery can be discharged without damage. Ratings incorporating the old 20-hour automotive rating are not meaningful with regard to golf car applications.”

The rated capacity you need will depend on the length of your course and the type of terrain on it (specifically, how hilly it is) as well as the amount and length of service your cars will see (whether they normally will go 9 or 18 holes at a time, whether they will normally go out once or twice or even three times per day).

“In other words,” Pace says, “if you are going to push the cars to 36 and possibly even 54 holes on a somewhat frequent basis, it is best to go with a higher rated battery. A very long course or very hilly terrain is also a factor to keep in mind. Again, the battery will be more deeply cycled on

a very hilly terrain over the same yardage than over level terrain."

Size of the battery can be an important factor. BCI (Battery Council International) has set up categories for batteries of specific physical sizes; golf car batteries are BCI group size GC2. Pace cautions, however, "to make sure that the height of the battery is such that it will fit in the golf car."

He adds that "the configuration of the terminal posts is also important to insure proper fit in the battery box and proper connection. Make sure that the battery cables are compatible with the terminal posts on the new batteries."

Both Pace and Zalecki consider warranty an important consideration in choosing golf car batteries, as well as the kind and quality of service available from the dealer. "Long-term warranties are worthless if the selling dealer will not adjust failed batteries," Zalecki says.

Pace adds another warning: "Watch out for verbal guarantees regarding the expected life of golf car batteries. Only a written warranty statement is an adequate safeguard."

#### Careful maintenance=long life

Even though manufacturers are attempting to develop maintenance-free golf car batteries, these are not yet available. Until that day arrives, golf course operators can get the most out of their electric golf cars by paying close and constant attention to the care of their batteries. Fortunately, the maintenance does not cost as much in cash as it does in diligence. Establishing and following a proper maintenance routine will insure that you get the longest possible life from your golf car batteries, no matter what brand or capacity you buy.

Also, be sure you and your employees follow safety precautions when working near or servicing the batteries. Batteries produce explosive gases, so keep sparks and open flames away. There should be NO SMOKING in the golf car storage and maintenance areas; this should be posted for the benefit of workers and visitors alike. Good ventilation is a must for the golf car work area.

Employees should always wear eye protection when working near the batteries. Remember, too, that batteries contain sulfuric acid, which can cause severe burns. Workers should avoid contact with skin, eyes, or clothing.

The first step to good battery maintenance is to keep the batteries filled. Most experts recommend checking the water level at least once a week. Water should be added as necessary — but after charging, unless the water level is below the plate separators. In that case, fill the batteries to cover the separators, then charge fully, then fill completely.

Be careful not to overfill, however, since this causes loss of electrolyte, not just water. Don Wilson notes, also, "When batteries are brand new they appear to need additional water very infrequently, but don't be misled by this initial experience. After they get cycled-in and start aging, water requirement increases steadily throughout their remaining useful life."

Robert Balfour, a veteran of the golf car/electric vehicle industry, admonishes, "Under no circumstances should batteries be watered with a pressure hose." It's just too easy to overfill a battery using a hose.

Also, use of distilled water in golf car batteries is preferred. You could, as Balfour suggests, call your local telephone company to see if they use the city's tap water in their standby batteries, then do as they do. Or you could have your tap water tested yourself. In any case, don't use water with high mineral content or other impurities. Never use creek or well water.

In general, the outside of the batteries and all cable and terminal connections should be kept as clean as possible. Wash them periodically with a brush and a solution of baking soda and water, then flush with clean water and wipe dry. If a coating of acid-soaked dirt is allowed to accumulate on top of the batteries, electrical current can leak across it and cut both efficiency and life expectancy.

Furthermore, ESB's Joe Garvin recommends, "The battery carrier and hold-down should be free of corrosion and rust, and should be painted with a corrosion-resistant paint. Frayed or worn-out cable connectors should be replaced. All connections should be clean and tight, and a thin coating of nonmetallic grease or protective spray applied to ward off future corrosion."

Periodic use of a wire brush to clean battery terminals and cable connectors is recommended.

#### Charge it

Periodic maintenance of electric golf cars should also include checking the

#### SPECIFIC GRAVITY (@ 80°F.) VS. STATE OF CHARGE

charged	initial full charge of 1.265
100%	1.265
75%	1.225
50%	1.190
25%	1.155
discharged	1.120

#### CATCH-UP CHARGE

State of Charge	Charge
1.260-1.280	none needed
1.240-1.260	4 hours
1.220-1.240	8 hours
below 1.220	12 hours

Charts above, from The Prestolite Co. (top) and ESB Brands, Inc., show the importance of taking specific gravity readings, as well as how to relate them to state of charge.

batteries to be sure they are in a good state of charge. Use a hydrometer to check specific gravity — in all batteries, not just one, and all three cells per battery. If the highest and lowest readings in any one battery show a difference of .050 or more, the battery is on the point of failing and should be replaced soon. Recharge and retest it before scrapping it, though.

Charge all of your golf cars' batteries at least every day after use — even more often if possible. Follow the battery manufacturers' directions for recharging. Put the batteries on the charger as early in the evening as possible, to insure a full recharging.

But on the other hand, be careful not to overcharge — for instance, by recharging every day the car is not used — because overcharging will also shorten battery life.

Don't send an electric car back out on the golf course unless the batteries are in a good state of charge.

If the batteries are cycled more deeply than they are recharged, they will soon be dead.

Wilson offers these final tips on charging: "The ampere-hours of power that batteries can deliver and receive from the charger varies directly with the electrolyte temperature. Hence, in periods of cool or cold nights, the cars should not be sent out for as many holes as they go in warm weather.

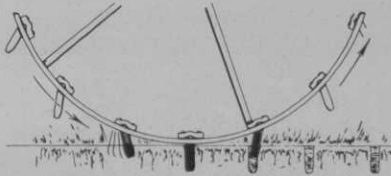
"In addition, the cars should be put on charge as soon as they come off of the last rental, while the electrolyte is warm." □



# Dedoes

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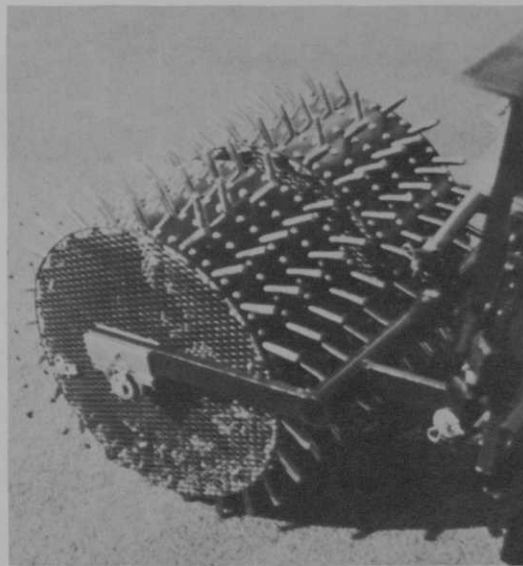
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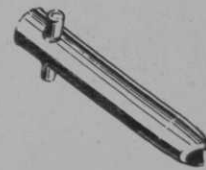


The hydraulic principle utilizes the weight of the vehicle for down-pressure giving you needed hole depth.

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# Products

## Big-tractor features distinguish small tractors

John Deere's model 850 and 950 tractors are powered by three-cylinder, water-cooled, fuel-injected diesel engines driving through eight-speed manual transmissions with two-lever control. The 850 delivers 22 horsepower at the power takeoff; the 950, 27 PTO horsepower. A differential lock engages on the go to keep you going through mud, loose soil, or wet turf with power to both rear wheels. A category 1 three-point hitch enables quick attachment of a flail mower, spin spreader, or other equipment. Also offered: a 6-foot rotary mower.

Circle 201 on free information card



## Battery-powered herbicide sprayer

The Herbi spinning disc sprayer, from Micron West, Inc., features a rotary atomizer which spins at 2,000 rpm, converting the spray material into a hollow cone of even-size 250-micron droplets. Its 12-volt motor is powered by flashlight batteries. The Herbi utilizes the amount of active ingredient specified by the chemical manufacturer, but with a fraction of the normal water required. It works equally well for pesticides and fungicides.

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## Aluminum walkways bridge streams, roads, and gullies

AEF Aluminum Structures Ltd. designs and builds aluminum bridges and walkways encompassing a wide range of applications — including many on golf courses. The bridges and walkways are pre-engineered and of modular construction for economy and ease of assembly; no field welding is required. Made of high-strength, lightweight, corrosion-resistant aluminum extruded alloys, they require no painting and are maintenance-free. The bridges are triangular or rectangular in cross-section and of angular or tubular construction, depending on the design parameters and end use. Standard models can span 100 feet or more.

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## Loaders for compact tractors

Schwartz Mfg. Co. offers its new 1100 and 1200 loaders for domestic and imported tractors in the 10- to 30-horsepower range, both two- and four-wheel drive. Lift capacity at full lift height is 530 pounds for the 1100 loader and 800 pounds for the model 1200. Maximum lift height of the 1100 is 72 inches; of the 1200, 90 inches. A wide range of buckets is available. A slim-line crossmember gives optimum visibility with maximum rigidity.

Circle 203 on free information card

