Jeffrey D. Brauer is a licensed golf course architect and president of GolfScapes, a golf course design firm in Arlington, Texas. Brauer, a past president of the American Society of Golf Course Architects, can be reached at jeff@jeffreydbrauer.com.

PASSING THE TORCH

With the passing of Geoff Cornish on Feb. 10, we lost our last link to golf course architecture's Golden Age of Golf Course architecture, and intimate knowledge of all golf design eras as researcher and co-author of "The Architects of Golf" with Ron Whitten.

Despite his historic knowledge of design, Cornish's courses reflected the practical needs of his clients more than golf's historic roots. He designed more for the present and future to create affordable and profitable courses.

While Trent Jones, Dick Wilson – and later, others – grabbed headlines, Geoff spent a career delivering what he preached – solid and playable courses, flying under the radar, and yet, responsible for much of the golf in New England and introducing perhaps over a million golfers to the game.

As Geoff's last partner, Mark Mungeam, ASGCA, said:"He was a true gentleman and had wealth of knowledge on golf design and golf in general. He brought so much to public golf as he wanted to create courses that people could really play. Golf, especially in New England, would not be the same without him."

Geoff sent many letters to those in the business, and I got a letter from him just months before his death, asking me to address an issue in my GCI column. I am only happy to pass on his wisdom. He wrote, in part:

I am sure that sooner or later we will have to address this profound problem.

Long ago ROBERT TRENT JONES said "golf course architects have made it a game of relaxed recreation and limitless, enjoyment for millions and a demanding examination of exacting standards for those who seek to excel".

Since then, course architects have made golf courses the most beautiful large landscapes ever created by our species. Yet these beautiful creations are somehow discouraging beginner and forcing older players to give up the game.

Introducing the subject verges on the traitorous in light of what course architects have wrought. Yet ECONOMICS dictates that we in THE AMERICAN SOCIETY OF GOLF COURSE ARCHITECTS must do so.

If Geoff swore (and he didn't — in fact, he was the type you would have your kids hang around hoping some of his class would wear off on them) the "short version" would be, "We make golf courses too damn hard!"

Geoff wrote of the "design triangle": playability, maintenance and aesthetics. He believed every design should address each appropriate to a course's proposed function (entry level, public, club, etc.) Most Cornish courses boasted a balanced triangle, often favoring ease of maintenance and playability by average golfers. Of course, working mostly in scenic New England, aesthetics were usually a natural "given" and he took advantage.

[Geoff Cornish] had a lasting impact on design. His courses stand the test of time. New England golf wouldn't be the same without him. He has provided pleasure to literally millions.

I haven't heard the phrase "design triangle" lately, and too many recent designs lean towards playability (for good players) and aesthetics, while under valuing maintenance concerns. That I have several bunker reduction projects right now speaks to the fact that current architects have largely ignored the practicality which Geoff knew was so important to "permanence."

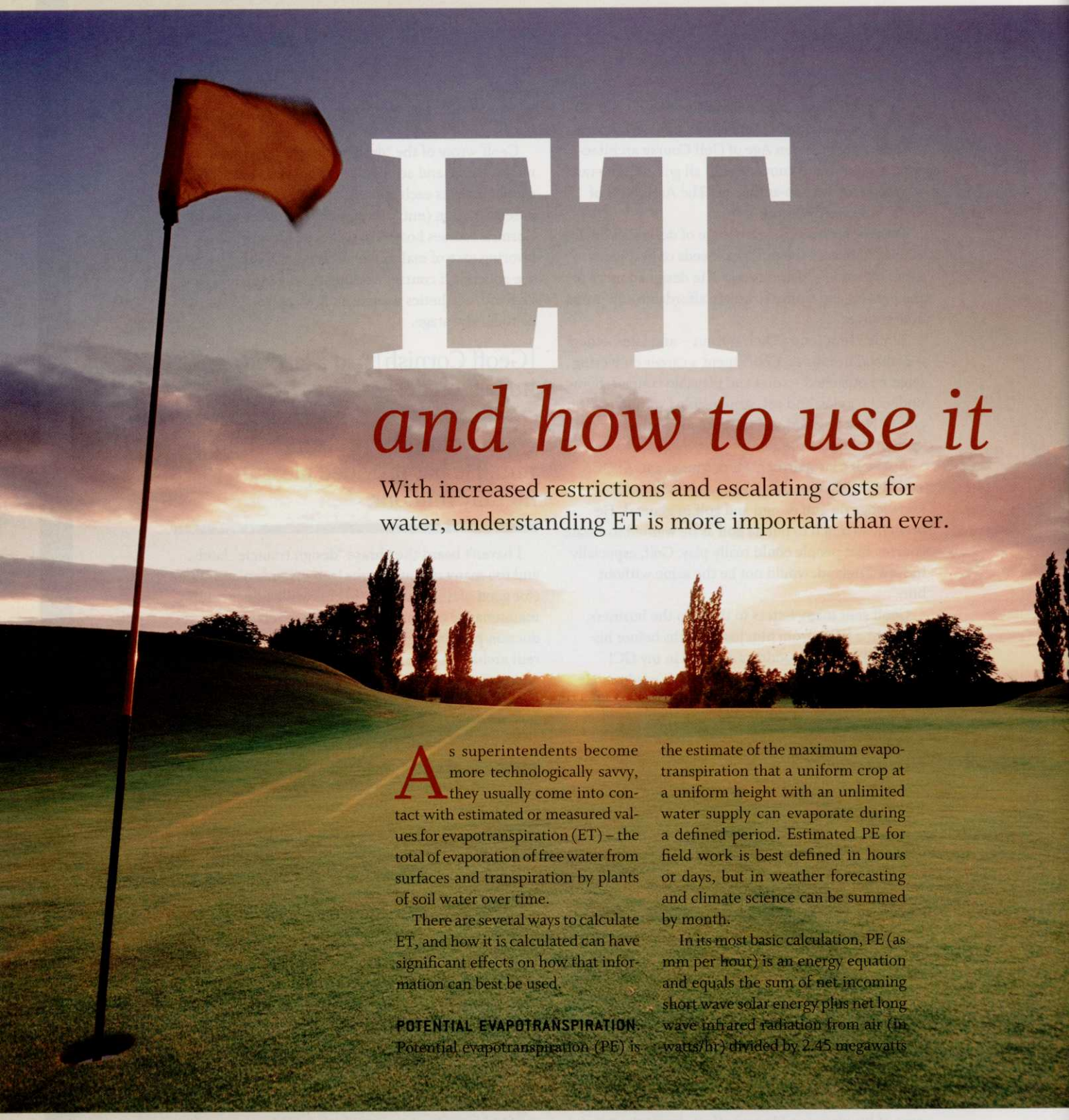
I believe he was distressed that my generation of architects largely kicked his core beliefs to the side of the road, favoring "tournament tough," "highly aesthetic" and sometimes, technically poor and difficult maintenance designs, all in the name of designer awards, visual excitement and instant impact over concern of how they affected golfers every day for a long time.

At the height of the golf boom, we viewed some of his and his contemporaries' work as "pedestrian." However, some newer courses have proven less popular, and have suffered renovation or abandonment while his courses soldier on, still feeling as comfortable as an old sweater. His style is coming back in fashion.

He had a lasting impact on design. His courses stand the test of time. New England golf wouldn't be the same without him. He has provided pleasure to literally millions.

All of those things are a great legacy any architect would be proud to have. **GCI**

BY CHRISTOPHER SANN



ET *and how to use it*

With increased restrictions and escalating costs for water, understanding ET is more important than ever.

As superintendents become more technologically savvy, they usually come into contact with estimated or measured values for evapotranspiration (ET) – the total of evaporation of free water from surfaces and transpiration by plants of soil water over time.

There are several ways to calculate ET, and how it is calculated can have significant effects on how that information can best be used.

POTENTIAL EVAPOTRANSPIRATION. Potential evapotranspiration (PE) is the estimate of the maximum evapotranspiration that a uniform crop at a uniform height with an unlimited water supply can evaporate during a defined period. Estimated PE for field work is best defined in hours or days, but in weather forecasting and climate science can be summed by month.

In its most basic calculation, PE (as mm per hour) is an energy equation and equals the sum of net incoming short wave solar energy plus net long wave infrared radiation from air (in watts/hr) divided by 2.45 megawatts

"There are several ways to calculate ET, and how it is calculated can have significant effects on how that information can best be used."

(the energy required to change 1 mm of liquid water to water vapor).

Unfortunately, the data required to make this estimate are rarely available and if they are, the conditions used to define PE are rarely met. For that reason, a PE estimate calculated from only energy readings is at best a measure of a maximum possible ET that is almost never attained.

The Penman-Monteith (PM) method is perhaps the most complicated of the PE estimation processes, but despite that complexity is the most commonly used and well-regarded of the equations, so much so that the PM equations have been adopted by the United Nations' FAO service for use worldwide in agriculture and related fields.

Unlike the basic PE calculation, the PM process takes into account several addition factors. PM adds wind speed, vapor pressure changes, air density and soil heat exchange and as a result provides a more accurate estimate of the PE from a well-watered, uniform plant stand such as a golf putting green or other sports turf surfaces. For larger plant surfaces such as fairways and field crops where water is finite and plant density and height vary, the PM equation has a tendency to overestimate ET.

ACTUAL EVAPOTRANSPIRATION. Actual evapotranspiration (AE) is the amount of evaporation that actually occurs given the constraint of available soil water. When a uniform crop at a uniform height has a limited water supply (plant-available soil water) the amount of evaporation that can occur is strictly controlled by the amount of available soil water. Available soil water is defined as the water content of a soil profile between its field capacity and permanent wilt points and by definition is a finite resource.

Unlike PE, AE is very difficult to accurately estimate. Even the use of soil moisture sensors with site temperature and RH data still require the complex use of a so-called 'water budget', an 'energy budget' and a soil's 'moisture release curves' to estimate accurately.

As a result, the difficulty that a finite water supply adds to the estimation process resulted in a different ET process called the Hargreaves Equation being developed. This equation uses significantly fewer variables to calculate ET – temperature, RH, and solar energy – and does take soil water content into account by basically looking at the net effect that AE has on these variables near the plant growing surface rather than trying to estimate AE from these variables. It is a subtle but significant difference and creates an estimation process in which available soil water plays a pivotal role no matter what site conditions the plant population is grown under. The one negative with this method is that unlike the PE/PM methods it should not be used on a time frame shorter than 24 hours.

WHY SHOULD YOU CARE WHICH METHOD IS USED? About a decade ago, any ET calculation method that got you into the ballpark was good enough. But, today with increased water use restrictions, limited water resources and steadily rising costs, in the ballpark doesn't cut it.

If your ET information source uses the basic energy method, adjust that value and your water use to an appropriate percent of the estimate (usually 40 percent to 60 percent) that produces the results you seek but does not over water in the process.

If your ET estimate is done using the PM method, then those values can almost be directly used for well-watered greens, tees and other sports turf surfaces – making sure to adjust the estimates for local conditions such as slope, orientation, transient shade, etc.

If your ET source uses the Hargreaves method, that daily value can be directly used on fairways, roughs and ornament turf areas with little change. It can also be used on well-water surfaces, but depending on management style and local conditions may require the application of additional water above the estimated ET losses.

Whatever your ET information source, ask your provider which method they use. If the method they use is unfamiliar, ask them if the ET method is a PE or AE process. If they don't know, find another information provider. **GCI**

Christopher Sann is the owner of Applied Climatology LLC, Wilmington, Del., Which provides climatology and biological modeling as it relates to plant conditions.

Key points

- There are several ways to calculate ET, and each can impact how you use water at your course.
- Potential evapotranspiration (PE) is the estimate of the maximum ET that uniform turf at a uniform height with an unlimited water supply can evaporate during a defined period.
- The Penman-Monteith (PM) method includes wind speed, vapor pressure changes, air density, and soil heat exchange and provides a more accurate PE estimate.
- Actual evapotranspiration (AE) is the amount of evaporation that actually occurs given the constraint of available soil water. It is more complex to calculate.
- The Hargreaves Equation calculates ET with fewer variables – temperature, RH, and solar energy – and does take soil water content into account by basically looking at the net effect that AE has on these variables near the plant growing surface rather than trying to estimate AE from these variables.

Terry Buchen, CGCS, MG, is president of Golf Agronomy International. He's a 41-year, life member of the GCSAA. He can be reached at 757-561-7777 or terrybuchen@earthlink.net.

Travels With Terry

Globetrotting consulting agronomist Terry Buchen visits many golf courses annually with his digital camera in hand. He shares helpful ideas relating to maintenance equipment from the golf course superintendents he visits – as well as a few ideas of his own – with timely photos and captions that explore the changing world of golf course management.

HOMEMADE LEAF VACUUM

This 1950s vintage Toro general tractor (gasoline engine) was transformed into a vacuum/blower used primarily for leaf cleanup around the clubhouse at The Manor Country Club in Rockville, Md., where Randall Pinckney is the superintendent and Richard Bassett has been the equipment manager for the past 26 years. Bassett used a gasoline-powered, low-blow blower/vacuum with a 12-inch-diameter suction hose mounted in front of the radiator after the frame was extended. The HVAC heavy-duty ductwork was extended from the blower to a plywood box. The 3/4-inch-plywood box measures approximately 8 feet by 10 feet with a metal mechanical tailgate made from tubular steel and flat steel. It has four 9-inch-diameter holes with screens on either side to release the volume of air from the vacuum. It took about 10 days to build and most of the parts were in inventory.

SCUBA AIR TANK

Grand Cayman in the Cayman Islands, British West Indies, has a strong scuba diver presence. The North Sound Club, the only 18-hole course on the island, repurposed a used scuba diver tank. A high-pressure flexible air hose and air chuck made it into an easily transported air tank, used to pump up the tires on the 40 E-Z-GO golf carts in their fleet. The used scuba tank holds from 2,700 to 3,000 PSI, and costs about $4 to fill up completely with oxygen at a local specialty scuba shop. A regular air tank holds much less air at a lower pressure – which would run out quickly with use.With regular use for the carts, it would usually need to be refilled every 2 weeks. Though the tank is moderately heavy, it can be moved easily enough be one crew member to fill cart tires by hand. Two valves are installed on the tank, with one controlling the on/off operation and the other regulating the flow of air. The high-pressure flexible air hose and air chuck were acquired at a local auto parts store and installed by the crew. Jason Deerwester, director of golf, Robert "Chilly" Chilman, associate golf professional, Anthony Persaud, acting superintendent, and Davy Eubanks, general manager are the team members behind the repurposed tank. The used air tank cost the club about $150, the air hose/air chuck cost about $45 and it took about 15 minutes of labor to install the air hose. **GCI**

CORRECTION

In the February print edition, we ran images of the scuba air tank with a story already run in the January edition. We regret the error.

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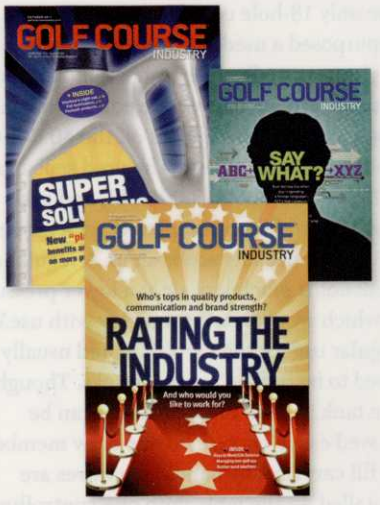

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(continued from page 66)

Know how water is moving in your soil to make the best irrigation plans.

some point in everyone's season or career. Having a large percentage of non-English speaking employees, I needed a way to train my staff in a way they would understand without butchering their native language in the process as I was unfortunately prone to do from time to time.

I grabbed a laser thermometer and a soil sensor. Showing the relationship of how too much soil moisture led to higher soil temperatures than surface temperatures was eye-opening to them. They learned the art of putting on the right moisture in the right place to achieve the desired goals. More importantly, they learned the duration of those effects knowing how much time they had before the practice was needed again. Even in warm-season environments where the grasses can tolerate high ambient conditions, the roots still cannot survive sweltering soil temperatures. So managing our soil moisture throughout the year is critical for achieving the finest conditions. Period.

We are all under the gun for irrigation conservation, as we should be. Those of you that drink bottled water pay more for that per gallon than we do for the highest gas prices – six times more. And those prices are translating onto golf courses more and more every day. Water regulators are learning from companies and individuals like me who have studied the relationship of soil and water to great depths. They are learning that we can manage our water better and the time was yesterday to do so.

We live in a world where the best irrigation managers can still do it better. I'm happy that the technology of soil monitoring is advancing as we speak and becoming more affordable than ever. We are in a world now where we want solutions and guarantees.

While it is difficult to guarantee anyone's success or the outcome of any particular practice, one guarantee I can certainly make from experience is that the more you know about your soils and the presence of water in your profile, the more successful you will be at determining the best practices to meet the needs of the turf. Don't neglect to understand how water moves through your entire profile. A dry lower profile will lead to increased problems beneath the surface.

After designing a proprietary profile uniformity index that considered soil type and the positioning of soil solution throughout he profile, I found statistical correlation between a high index (indicating soil moisture near the surface as compared to in the lower profile) and the incidence of root loss, turf thinning and disease outbreak.

> "We didn't get any snow, but we didn't get any rain, either." — Brian Vinchesi

Take the time to identify the conditions in your soil and the activity in your turf. Nobody knows your course better than you. Make the right decisions by understanding the needs. **GCI**

Carmen Magro, CGCS, MBA, is chief agronomist/proprietor of Agronomy Management Solutions and a frequent GCI contributor.

Pat Jones is editorial director and publisher of Golf Course Industry. He can be reached at pjones@gie.net or 216-236-5854.

YOU CAN FIX STUPID

I adore Ron White. The former "Blue Collar Comedy" standout lives life however the @#%! he wants and says whatever the #@&! he wants. And people are willing to pay $100 a seat to go laugh at him.

He riffs on all sorts of stuff and I steal lines from him all the time. I'll randomly throw, "They call me Tater Salad," into a speech sometimes just to wake everyone up. His funniest stuff was definitely the "blue" part of Blue Collar Comedy and can't be reprinted here, but there's a billion hours of YouTube clips of him if you want to check him out raw and uncut.

His most famous catchprase comes from a bit on plastic surgery and the other miracles that allow medical science to repair your parts as you age: "If your eyesight starts to go bad, you can get Lasik surgery and they can give you 20/20 vision at any age. If your hearing starts to fail, they'll put a little device in your ear that makes you hear as good as when you were born. But let me tell you something folks- **you can't fix stupid**. There's not a pill you can take. There's not a class you can go to. Stupid is fo-evah."

You see examples of "you can't fix stupid" every day. Morons texting while driving 80 mph. People in front of you in a checkout line arguing with clerks about a 25 cent coupon that expired months ago. The list is endless.

And the stupid list contains plenty of examples from our happy little business. Stupidity was condoned – even encouraged – for decades during the churn-and-burn days when people were lined up to join clubs or getting up at 4:30 a.m. to snag a tee time at someplace decent in the burbs. One would think that the days of stupid would be over… yet we still find things like:

- Overinvesting in lavish clubhouse improvements (or, god forbid, adding the dreaded "Spa") while shortchanging the golf course capital improvement budget. Is someone more likely to join or play regularly at a particular facility because they have new window treatments or because the irrigation system works well enough to keep the giant green money-maker outside that window alive?
- Daily-fee facilities that still treat customers like dog doo when they walk into the pro shop. I do a lot of "secret shopper" visits to courses and I'm still more likely to get a suspicious stare-down from the pimply-faced wannabe pro or craggy old ranger reject behind the counter than, "Hi, welcome to Shady Acres. What can we do for you today?" Why the hell can't we routinely provide the same customer service ethic you find at the average Kwik Shop?
- Presenting a good product poorly. I've seen lots of fine golf courses that just look seedy around the edges. Peeling paint, overflowing trash cans, crappy carts, dirty bathrooms, cigarette butts all over the place: all little things that you remember instead of the quality greens and fairways. Seem picky? Guess who it matters to? Female players. Guess where the growth of the game is coming from? Get it now?

Yes, there are plenty of stupid little things we do to impede our success. I'd have to kill a lot more trees to give you my complete list. But, instead, allow me to present the one, ginormous, *el grande stupido* thing that I am constantly amazed is allowed to continue. It's the single most common, pervasive example of massive dumbness that hangs like a giant dead albatross around the necks of too many otherwise good facilities.

Ladies and gentlemen (stupid drum roll please!), I give you… the kitchen. Ah yes, the infamous F&B operation. The thing that loses money at 75 percent of U.S. clubs by my educated estimate. It's the massive black hole that never closes, happily sucking dollars away from the large turf-covered ATM machine out front. It's the one element of most facilities that's still operated like it's 19-friggin-52 and Ward and June Cleaver are still dining at the club four nights a week.

Ladies and gentlemen (stupid drumroll please!), I give you... the kitchen.

Well, here's what you're gonna do if you're tired of it and you want to actually try to fix stupid: change it. Einstein famously said that the definition of insanity is repeating the same action over and over and expecting a different result. Running a money-losing F&B operation the same way year after year fits that definition neatly.

Outsource it, downsize it, eliminate it or do it right. Make it a unique and spectacular profit center. Forget the chateaubriand and 5,000-bottle wine cellar and convert to wood-fired pizzas or really awesome hot dogs. Just do something, for god's sake. It's stupid… and you can fix it.

The future of golf ain't in the tater salad you're serving to an indifferent bunch of members who are only reluctantly coming into the clubhouse a couple of nights a month to eat up their minimums. The future of golf is golf. GCI

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