

THE SHOT©

by Massimo Gessi

DURING ALL 4 PHASES THE CLUB CONTINUES TO ACCELERATE.

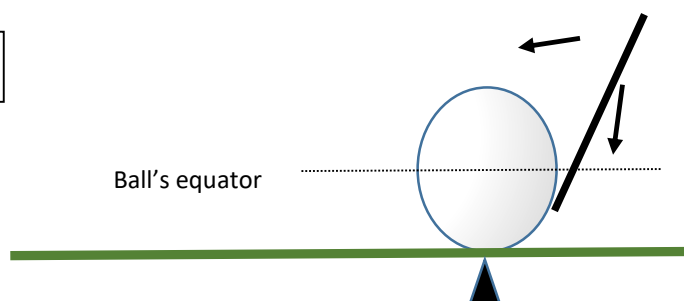
The club is moving forward, horizontal arrow, and **comes into contact** with the ball **just below its equator**.

The small black triangles indicate the point where the ball is or was at rest.

SEQUENCE OF THE CONTACT BETWEEN THE CLUB'S FACE AND THE BALL

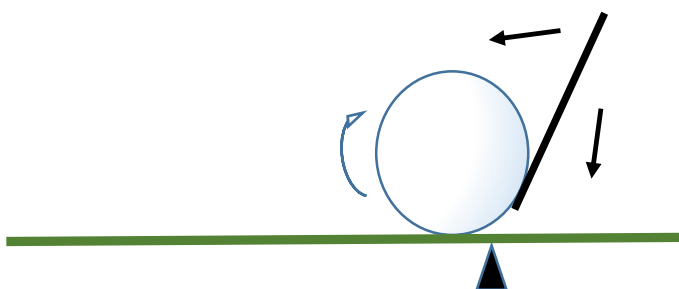
1

Ball's equator



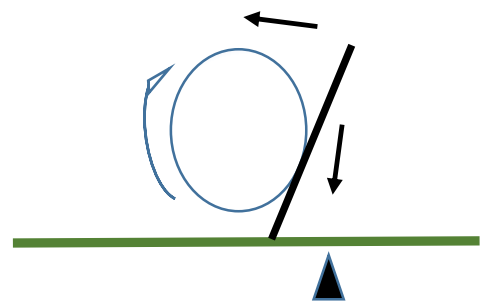
2

The club is moving forward, horizontal arrow, and downward toward the ground, vertical arrow, MAINTAINING HIS LOFT ANGLE. These concurrent actions create a sort of 'compression' on the ball on the ground with the help of ground friction; this develops a ball's rotation in the direction of the curved arrow while the ball starts climbing on the club's face, that sense of rotation is the opposite of the direction toward which the ball flies.



Friction with the ground initially and with the club's face after, create the backward ball's rotation (backspin). Club and ball are moving forward **WHILE CONTINUOUSLY ACCELERATING** until the lower front edge of the club, still descending, hits the ground a little ahead of the point where the ball was at rest. Hitting the ball well below its equator but with the club touching the ground AFTER the ball's resting point makes a 'clean shot', a little lower and shorter than point 2 because the club's trajectory is less vertical and the club's short downward movement makes the ball rotation a little slower.

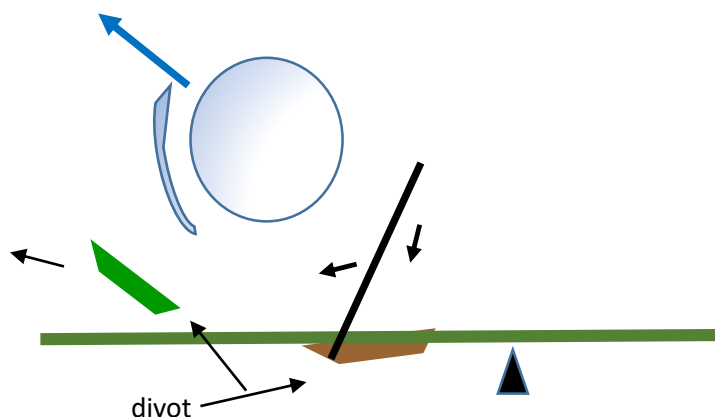
3



Club's lower front edge enters the ground slightly, making a thin divot; the ground contact slows down the club while the ball continues with the acquired speed, detaching itself from the club's face starting its flight.

Take notice: in phase 3 and 4 club's ground contact starts forward of the point where the ball was at rest and see the divot further ahead.

4



ONLY PHASE 1 IS THE CONSCIOUS ONE, THE ONE THAT THE PLAYER THINKS OF; other three points are an automatic inescapable consequence of the correct execution of the first contact with the ball. Learn all the theory but forget the last three while swinging a club.

THESE FOUR FRAMES REPRESENT THOSE TWO HUNDREDTH OF A SECOND DESCRIBED BY GOLF BIBLES AS THE TIME FRAME OF THE BALL/CLUB CONTACT, BUT THEY DO NOT CLEARLY EXPLAIN THE 'SINE QUA NON' THAT IF MISSING, THE CONTACT IS REDUCED TO A COUPLE OF THOUSANDTH OF A SECOND, RESULTING IN A LOWER AND MUCH SHORTER SHOT.

THAT INESCAPABLE CONDITION IS: **CLUB'S HEAD MUST BE ACCELERATING UNTIL THE CLUB HITS THE GROUND OR THE BALL LEAVES THE CLUB FACE AFTER A CLEAN SHOT.**

In a correct shot, club's head mass (272 grams) drives the ball (46 gr.) at a faster speed (130/170) because of the different masses.

When a club head hits a ball at a steady speed of 130 km/h or even worse, decelerating, makes an almost instantaneous contact, a couple of thousandth of a second, driving the ball with a minimal spin insufficient to make the ball flying = a parabolic trajectory like a cannon ball: low and short.

Question: do I have to pay attention to the moment the club contacts the ground or when the ball leaves the club's face? **NONE OF YOUR BUSINESS!**

Once you are addressed on the ball, think there is a big clock in front of you, its 6 hours are in front of the ball and its twelve hours are on your forehead; downswing starts at 2 hours and the follow-through finishes at 10 hours.

FOR THE ENTIRE SWING YOU HAVE TO THINK OF THE CONTACT POINT ON THE BALL AND TO

CONTINUOUSLY ACCELERATE THE CLUB TILL 8 HOURS

doing it in a clean shot you are assured that the ball will be already in flight while you reach 8 hours, in a correct shot the club's ground contact will definitely decelerate the club head and let the ball start its flight.

The only way to learn it is practice and practice again until it becomes automatic, then no more need to think of it.

Backspin, that is the backward rotation of the ball, the creator of lift, that makes it flying higher and further, makes its descent trajectory more vertical for a hard braking at landing on the green, stopping on the spot or just a little more a dream, a magic? NO, it is only Physics, available to all those who make the right things described above.

About the ball's backtrack after it touches the green surface, forget it because it is just a matter of a ball's very high rotation rate, so high that very very few Golfers may ever reach it, adding the fact that surfaces of our local greens do not favor it.

Sometimes for Pro it is too much as we see on TV; for we Golfers too much backspin is inexistent, so may there be a way to increase it? YES.

Two equal clubs, same head's speed, two players may hit two balls that will take substantial different trajectories and different distances, the first: a bit lower and shorter, with a longer run on green landing while the second: higher, a bit longer and it stops on the spot where it touches the green surface; why? Looking at the two balls, they reveal their identities, the first, confidentially called a "stone", is a ball hard to compress with the very good habit of having a longer run but a weakness in its braking on landing onto the green; the second one, horror! there is a sign: "Lady", but its trajectory had been higher, longer and hard braking at landing.

What made those differences is called "ball's compression".

The "stone" for its nature is almost uncompressible (for a Golfer), his contact time with the club is minimal thus acquiring a little spin with the consequence of a lower and less vertical trajectory and almost no bite on the green with a consequent longer run; a 'Lady' ball, soft as a young lady, lets itself get compressed by the club; that compression takes time spent in climbing the club's face, therefore it acquires a faster spin for a higher flight and a steeper descent to stop dead on the green.

Backspin is not magic; it only is a 'waste-product' of the correct way to contact the ball described on first page; the only correct way to hit a golf ball, provided the club's head is still accelerating until the ball leaves its face.

The conclusion is: THE SLOWER YOUR SWING IS OR, BETTER, THE SLOWER YOUR CLUB'S HEAD IS, THE SOFTER YOUR BALL HAS TO BE.

Golf balls come in three gradations: 100 – 90 – 80 = Pro and blacksmiths - average swinging golfers - slow swinging golfers.

LEARN THOSE 4 SKETCHES ON THE FIRST PAGE, PRACTICE AND PLAY **THINKING ABOUT THE FIRST ONLY, THINK TO CONTACT THE BALL JUST BELOW ITS EQUATOR WHILE KEEPING THE CLUB ACCELERATED,**

Physics will take care of everything else that is necessary to make that ball flying.

They are three thoughts, too many; practice and play until they will become a single one deep in the subconscious, only then everybody will really appreciate what Golfing is.

Here below are sketched two mental errors that 90% of golfers do because never they had been explained or taught how the golf shot actually happens.

There are a lot of: press, squeeze, cross the ball; all unfit attempts to describe in words my first 4 sketches.

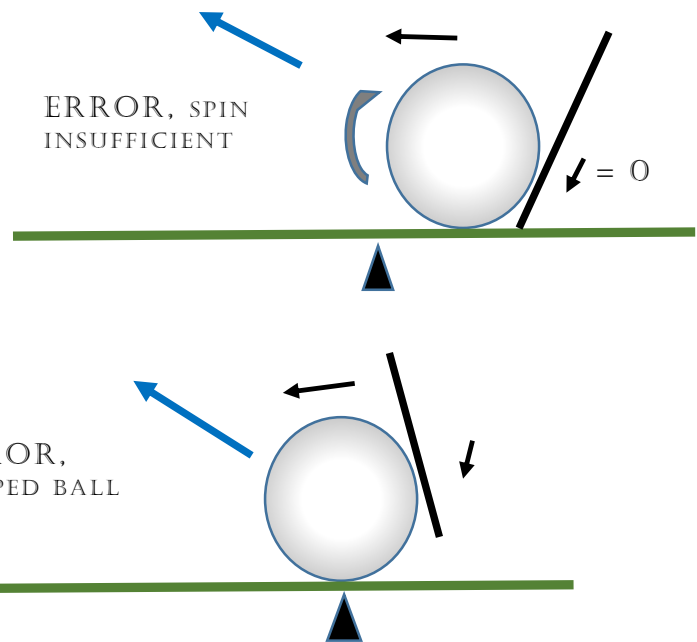
The first sketch here below is the image almost all golfers see in their minds of the ball/club first contact; many know that it is the wrong one but with no idea about what the correct one is.

Here the club's forward movement is already brushing the ground **BEFORE** hitting the ball and the descending component is = 0.

ERROR. Short contact, slow backspin, low and short trajectory. This is not a clean shot because of the ground contact **BEFORE** hitting the ball. For a clean shot see sketch n. 3.

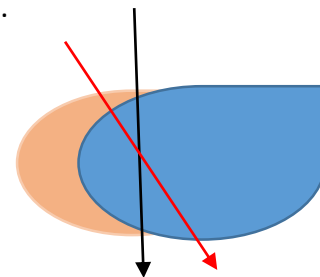
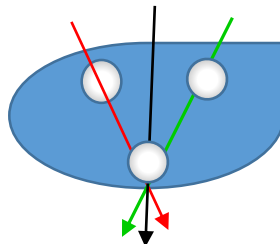
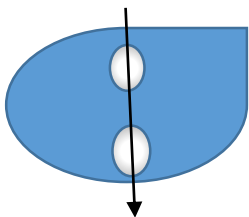
Wrong and almost impossible figuration of a "compressed" ball. No way to have the club's loft so much turned to the left (delofted) but for a breaking wrists turn during the downswing.

Ball = topped, a long ground skidding roll; we call it: a 'vermin's burner'.



There are two more things the beginner must know to try to correct himself through trial and error.

The ball will fly straight to the target only when its spinning is perfectly aligned with the flight's direction, while it will turn right or left for a slanted spin; see sketches below here.



Front view. Black arrow is the flight direction to the target. The ball is climbing the club's face exactly on the same line thus acquiring a strong spin **IN AXIS** with the black arrow, flying high, true and far.

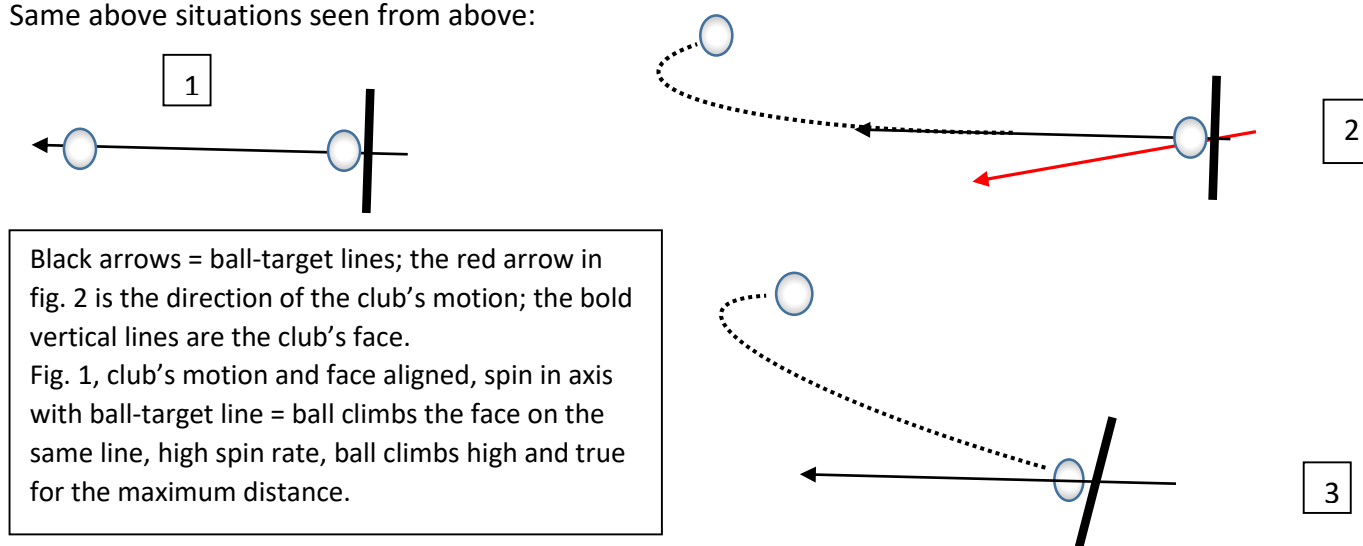
Front view. Central and right sketch, black arrows are the flight directions to the target, red & green arrows are the directions the club is moving to. Right figure, the orange and blue shadows represent a club's head moving along the red arrow; the orange shadow is the club's head at ball impact, the blue shadow that same club's head a hundredth of a second later.

The club is moving along the red arrow, toward the player's feet; looking to the central sketch it is possible to see the ball's path while climbing the club's face at an angle; actually the ball climbs the club's face along the same line of the left sketch, it is the club's face that moving internally toward the player's feet imparts also a lateral spin together with the normal backspin that makes the ball turning right during his flight; a club moving along the green line would make the ball turning left.

Both for a right and left-handed player: a club moving toward the player's feet makes the ball to turn far from the player, a club moving further from his feet makes the ball turning inside the player.

I kept back-spin and lateral spin split-apart only to make easier the understanding of the phenomenon, in reality the spin can be only one, it is the spin's axis that leans toward one side or the opposite side; the more the axis leans, the sharper the curving.

Same above situations seen from above:



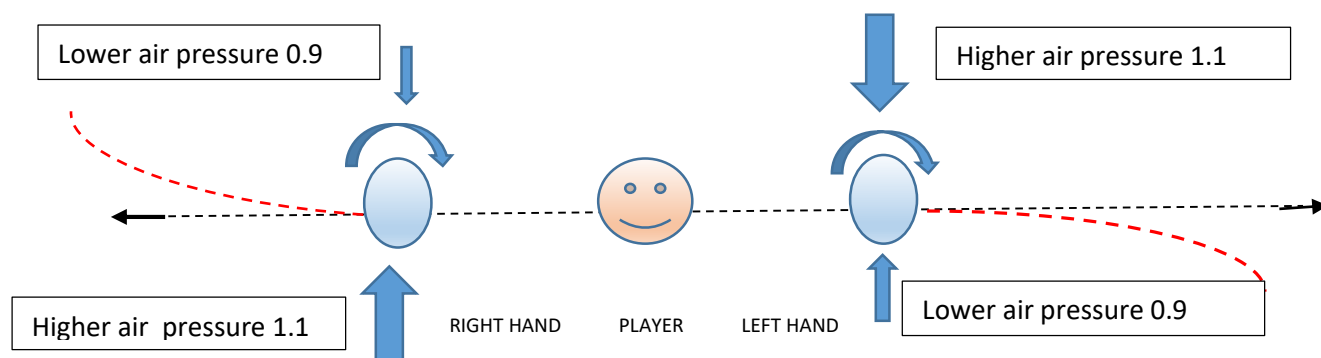
One essential thing that must be known: A BALL ALWAYS TAKES OFF IN THE DIRECTION WHERE THE CLUB'S FACE IS LOOKING TO AT IMPACT.

Fig. 2, face at impact aligned with ball-target line, club travels along the red arrow, toward the player, imparting an away curving spin, the ball takes off on the ball-target line then, a little later, the ball starts curving away from the player.

Fig. 3, face at impact looking away from the player, club travels along the ball-target line. The ball immediately takes off in the direction where the face is looking to at impact then, a little later, the ball starts curving away from the player.

Let's split-apart the backspin and lateral spin once more. A ball turns left or right because its rotation creates a lateral 'lift' that it is the same as the uplift generated by backspin. Looking from above at a clockwise rotating ball travelling toward the player's left, the ball curves away from the player because air on ball's right side accelerates while on the ball's left side air decelerates. Air that accelerates on a rotating ball will decrease the actual air pressure while the decelerating air will increase actual air pressure, this way the ball is pushed right while it proceeds with its flight; the ball may not proceed straight anymore and starts curving. The very same clockwise rotating ball travelling toward the player's right will reverse the pressures on its sides since now is its left side air that decelerates while its right side air accelerates resulting in a pull to the player's inside.

VIEW FROM ABOVE



Black dotted line = ball – target directions

Red curved lines = balls' tracks

Round arrows = Direction of rotation

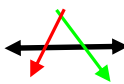
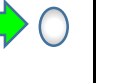
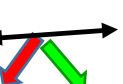
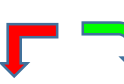
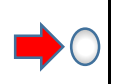
Large vertical arrows = Air pressure higher than actual air pressure

Thin vertical arrows = Air pressure lower than actual air pressure.

Supposing actual air pressure = 1 kg. all around the ball, the movement in a direction coupled with its rotation generates a pressure increment in the side where rotation is in the same direction of the movement = 1.1 kg.

and a decrement where rotation is against the movement = 0.9 kg. This create a force of 0.2 kg. pushing the ball toward the lower pressure side; of course it is a very simplified example, but for the pressure difference between the two side that generates the real active force pushing the ball to curve.

Here is a table to try to correct yourself by trial and error:

RIGHTHAND = RED, LEFTHAND = GREEN		CAUSE, with regard to black line-target line		CURE: MOVE BALL A LITTLE TO:	
INITIAL DIRECTION then	BALL CURVES toward	CLUB's TRAJECTORY toward	FACE DIRECTION toward		Lefthand players
				OUTward swing	OUTward swing
					
				INward swing	iNward swing
					

OUTWARD SWING, think to push your club AWAY from you during the downswing.

INWARD SWING, think to pull your club TOWARD you during the downswing.

When the ball does not take off toward the target it could be necessary to apply both the corrections; swing plane and ball position. Start moving the ball until it takes off straight to the target THEN it curves; now it is time to work on the swing, refining it until the ball flies and stay straight, acceptably. Once stabilized fix in your mind the ball position and the swing plane.

This is all a beginner my do by himself. To go further a Golf Coach becomes necessary.

One last thing that's impossible to learn just looking other Golfers or Pro while playing: THE GRIP.

THE TYPE OF GRIP THAT MEETS MORE YOUR FEELING IS THE BEST GRIP FOR YOU.

Now the hidden part of the grip, the most important issue: THE POWER YOU USE TO TIGHTEN YOUR HAND AROUND THE GRIP. IT MUST BE SO LIGHT TO FEAR YOU WILL LOSE THE CLUB DURING THE SWING, A THING THAT MAY NEVER EVER HAPPEN.

Grip a club, lift it in front of you until the shaft is parallel to the ground, now ask a friend to take it out of your hands; should your arms be pulled away from you even just a little, your grip is still too tight.

Humans possess automatic reflexes like breathing, blinking, etc. One is called "Palmar Grasp Reflex" (PGR). It is the automatic reflex by which we can grasp a feather or a book without having to think about the power we have to exert with our fingers in those two circumstances; it is so sophisticated that it can correct its strength during an action like swinging a book: hand grasp automatically increases since the book at the bottom of the swing is heavier, exactly what happens while we swing a golf club; but the PGR has a limit: IT KNOWS NOT THE POWER EXERTED ON THE GRIP BEFORE WE START OUR SWING MOTION. IT ONLY KNOWS THAT WHEN ANY MOTION IS STARTED, IT NEEDS TO INCREASE THE MUSCLE POWER OF OUR FINGERS TO AVOID THE SLIPPING OF THE CLUB.

You must know that a golf swing relays more on muscles' elasticity rather than strength and since in a downswing there are 22 muscles working together in an orderly way, more like an orchestra rather than a weightlifting session, that muscles chain needs to be relaxed before they spring into action; fingers are the FIRST link in that chain.

All that above means that if we exert any pressure on the grip BEFORE starting the swing, our PGR will ADD the necessary pressure to lift and swing the club; compounding your voluntary initial finger's pressure with the PGR automatic pressure, at the top of backswing your fingers would be black because the blood flow is blocked, in addition, that excessive pressure will be transmitted to your forearms then to your shoulders' muscles making you a solid piece of wood, totally unfit for a golf swing.

A very good little exercise is: just an instant before starting the swing, relax your grip to the point that almost all fingers are detached from the grip then immediately after, start swinging.

Should you be able to make it the 'trigger' that starts your swing, you will have laid the foundation stone of a very good swing.

I dwelled so long and insistently on the grip because it is for sure the foundation stone of the golf swing. Who will succeed in doing so, he shall struggle a lot less to learn to play this beautiful Game.

Everything I wrote till now makes the transmission chain from Golfer to Beginner that, with these few things well understood in his mind, will grip a golf club having in mind the exact figure about what to do: NOTHING ELSE BUT IMPACTING THE BALL JUST UNDER ITS EQUATOR WHILE HIS CLUB IS STILL ACCELERATING, nothing more, nothing less; in the beginning does not matter how he will do it, he will learn the better way by trial and error.

THE PERFECT UNIQUE SWING DOES NOT EXISTS. Just listen to TV commentators that for each Pro they highlight their swing peculiarities, ending invariably:"..... but only he can make such a swing". Approximately rendered: every player possesses its own swing which means that there are 60 million different swings all over the world. Each one of we Golfers have our own peculiarities that only we are able to manage, including Iron Byron, the robot at the USGA venue in Far Hills, built to imitate Byron Nelson's swing deemed the most repetitive and consistent swing of all times but NOT the perfect unique swing.

It is also true that any circular movement of arms and shoulders do not necessarily make a golf swing, but it is proven by millions of Golfers that anybody may learn how to swing a golf club by imitation with just a little help by a friend. Bubba Watson is the icon of such a way to start playing Golf but I really think that a lot of time will pass before a second Bubba will come again on the scene.

It is also true that the thousands of self-made swings in USA are not worse than the thousands of coached swings in continental Europe that I had seen as a player and a Referee.

I do not speculate on the self-made golfer toward the coached golfer, which one is better. I support the argument that the millions of golfers may not come through Golf Club's Coaches.

They may come either through a number of public golf courses in the Countries that provide them or through even a single hole of my SCATTERED GOLF®. Consider a small village in the middle of mountains with no golf courses in the radius of 50 km.; 4 villagers, golfers of course, hire a hectare (102 acres) of a former corn field to build one SCATTERED GOLF® hole to play golf, the curiosity it would rise and the potential for future golfers would be enormous.

Such a potentiality may not be matched by isolated driving ranges where players just hit balls to nowhere; after 50 shots boredom settles in, while on my SCATTERED GOLF® hole, Golfers ACTUALLY PLAY.

While writing about the birth of a golfer I just realized that me too, I was born as a self-made golfer in India at the New Delhi G.C. where I went the first time just out of curiosity, to see what Golf was.

I had been lucky enough because, at the time, there was not a driving range so I started immediately ON the actual golf course. That had been the magic that hooked me to the point that three days later in Tokyo I bought my first set of golf clubs (at that time my home base was in Tokyo).

I doubt that I would have become a golfer if my beginning would have been on a driving range only, because I know myself: I become annoyed very easily in doing repetitive things where I do not succeed.

Once returned home in Rome, Italy, I started taking golf lessons with a Golf Coach and since then, all over the world, wherever I took a golf lessons the argument had always been one and only one: the swing, the plane, the right elbow, etc. but never the ball, besides: compress, cross the ball; the contact with the ball was an inexistent part of the swing.

I said already that there are 60 million different swings; take Arnold Palmer or Jim Furik, the kings of personalized swings, in spite of their swing's peculiarities they had been n. 1 and 2 of the world ranking; shall we talk of Ballesteros? He started alone with his brother's 3 iron playing alone on a beach near home. I call on them to testify that the swing is only the mean to reach the ball while the real purpose is to HIT THE BALL IN THE CORRECT WAY.

I wonder why don't we start teaching how to hit the ball first and let the swing form itself as freely as possible, just correcting the eventual lethal mistakes.

Personally I would explain the initial 4 sketches above, urging the beginner to think just and only of the first.

Hitting a golf ball in the correct way is a necessary and sufficient condition to make the ball flying, while a 'correct' swing it is not.

The synergy between a good swing and the correct ball's impact makes the ball flying high, far and true. This synergy's name is "TIMING", a single word composed of two actions: arriving at the right moment to contact the ball with a square club's head looking toward the target PLUS ball's contact point just below the ball's equator.

I never heard anybody say that.

By virtue of what title do I argue over golf technicalities since I am not a Golf Coach? Because I am a Golfer, a Golf Referee, professionally I had been an Instructor and Check Flight Engineer for almost a third of my professional life where instruction and checking of the professional capacities, 4 times a year, were conducted with the highest skill; all this qualifies me for examining an educational process to look for areas where there are chances to better or to correct it.

In flight very light fades or draws may be acceptable but one thing must be assured: never a wild slice or hook should ever happen, that's why a beginner will continue his in flight training for six months more since his first wild hook would be also his last; in Golf all this should not be necessary.

HOME

What I am talking about is not the container but its content.

A golf bag full of shining clubs in a descending scale is for sure a very attractive and elegant object; when it is carried over the shoulders it transforms anybody in a Tiger incognito.

It does not matter that Tiger and his colleagues carefully avoid doing it.

When I bought my first golf bag, last century, 1983, in Tokyo. I had been told that all these clubs were necessary to cover different distances using a same swing, thanks to their different lofts and shaft length. Never, in good faith, lies more mendacious had been ever pronounced. The same swing were actually 13 and the different shaft length was only a burden as I demonstrated in my "Bryson de Chambeau is right".

What practice taught me was that the different distances depended more on woods as the longest and irons as shorter depending on their number. Then, 20 years later, I noted that my driver's distances were decreasing at a fast rate; I thought about climate change or the air pollution that made air soupy. So the research of the 'sacred' driver able to restore the lost distance started, together with the old research for an automatic putter; final result: about ten drivers, driving irons and putters.

The Bryson de Chambeau's coming on the scene raised my curiosity, so I started to study golf clubs' Physics, starting first with the putter.

I started from a nail as a putter and I built a "machine" to compare different putter's performances, after about 20 prototypes I created a putter's family with a nullified twisting, resulting in a sweet spot as large as the entire putter's face; they are now my only putters. On the way, a multiple device was born; I can't call it a putter because of its appearance, but it is a perfect training device to learn a steady central contact with the ball.

Then I started to study golf irons, when I still was in the illusion of the longer the shaft = the longer the distance, so I created two 'golf hammers', again because of their appearance. I abandoned them as soon as I succeeded in demonstrating the 'one length' golf clubs' theory; meanwhile I was taught much on the dynamic of a golf club. Those two hammers are now a good training device to teach to hit the club's sweet spot.

Obviously, I had to revise all my supposed knowledge on golf clubs (putters excepted) and now here it is the demonstration why a golf bag should not contain 14 clubs all the way during a golfing life.

An initial golf bag should contain few irons only, then slowly increasing its club's number to reach 14 when the player's golfing ability shows the need for additional clubs, then with the hair going thin also the club's number has to start to thin out till only irons remain until the last round.

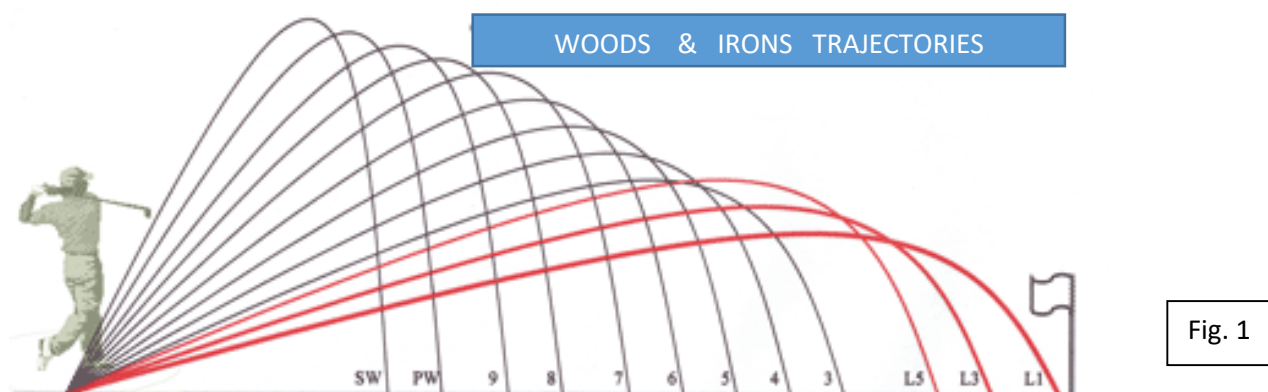
The beginner should start with 9 irons, from 5 or 6 to sand, SINGLE LENGTH, and a putter so that in two months of a couple of hours of weekly lessons he may start playing a 36 handicap from green/orange tee or with my TOMORROW GOLF® from 100/120 meters GPS tee.

I sustained the theory of the variable golf bag since the last century's nineties, but at that time only my experience was suggesting it.

Let's start, next page's figure shows all club's trajectories, hybrids are missing but it is possible to use the 3 wood for hybrid 1, 5 wood for hybrid 2 and 7 wood for hybrid 3.

I will only use the simplified Physics of a grandmother who knew only the four arithmetic operations and that anything thrown upward would come down sooner or later.

Demonstration:



Irons 3 & 4 are rightly off the shelves, the few remained are reserved to Amateurs, in reality the future Professional, at least those who shall make it.

It is time to recognize that there two GOLF: the one played by Professional and Amateurs up to handicap 6 and the GOLF played by the remaining 50 million: the GOLFERS.

For each single golf player, as the days go by, their joints and muscles wear down, because of that the power they exert on the ball is CONTINUOUSLY DECREASING, thus club's distances are shorter and shorter every passing day (do you remember $F = mv$?) but there is a but, too often the player himself contributes to make those clubs even shorter.

Should we give it up? Absolutely not! We have to use only those clubs that we succeed in making a decent distance with a decent consistency. Here is why.

Let's confront two curves, the golf club's curves above and the curve of a cannon ball here below (forget the red arrow).

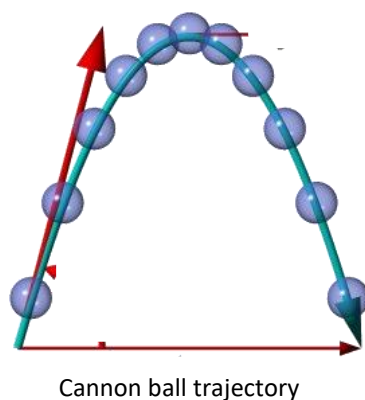


Fig. 2

Golf clubs trajectories
from CANE GOLF,
cannon ball trajectory
from Wikipedia

The first thing the eyes spot is the form: symmetrical the cannon ball, that is, the ground distance covered while climbing is equal to the ground distance covered on descent, the red line at the base, while all golf club's trajectories are asymmetrical: the ground distance covered while climbing is quite longer than the ground distance covered on descent, notwithstanding the fact that both golf and cannon balls are spherical, so why their trajectories are so much different? Their surfaces make that differences, the cannon ball has a smooth surface while a golf ball's surface has many dimples.

A cannon ball may only follow a parabolic trajectory dictated by Gravity, as they climb so they descend.

A modern golf ball FLIES, literally. Modernity starts at the beginning of 1900 when from little cannon balls they start to fly just a very few years before first human flight, since then humans and golf balls flew better and better.

Welcome to my home. I am a pilot but for this occasion I am above all a Flight Engineer, pleased to have you all as my guests; from now on, everybody has the right to understand what I will say, that's why I will keep Physics at the most understandable level; Physics CAN BE for everybody.

Assumptions:

A – a golf ball and a golf club form an aerodynamic system functioning exactly like an airplane, or better, like a sailplane. The ball is the sailplane, flying the same, and the golf club is its sling.

Yes, sailplane may be launched in the air with a big elastic sling from a downhill slope; it was still happening in the mid '60s when I became also a sailplane pilot.

B – golf balls FLY. Think to be on a starting tee with the ball on its tee and a club in your hands; when the club's face will hit the ball; three things will happen:

- 1 – the ball will start its flight toward the target if the face was square with the line at impact
- 2 – the ball will start with an inclination proportional to the club's face inclination (loft) at impact
- 3 – the ball starts to rotate in a sense opposite to its flight direction at a rate of 2000 to 5000 rounds per minute (RPM). This rotation is named 'BACKSPIN'.

Yes, they are thousands, the higher rotation happens for a higher face angle (loft).

Now let's see the reason why a golf ball FLIES.

Let's take point 3 above. Because of so fast a rotation while flying, the ball's many dimples (up to 420) grasp air molecules, treating them in different ways: on the upper part they will be accelerated because they move in the same direction of the air flow, and in the lower part they will be decelerated because moving in the opposite direction. Physics and reality state that: an airflow dividing itself in two parts around an aerodynamic profile (the wing) or around a circular rotating surface (the ball) will change the actual air pressure around their surfaces in this way: when the air molecules accelerate on the upper surface, the actual air pressure will DECREASE but when the air molecules decelerate on the lower surface, the actual air pressure will INCREASE; this difference in air pressure will LIFT the wing or the ball.

Same club, same swing. The smooth ball, same dimensions as a golf ball, acts like a cannon ball (red line). the golf ball (black line) flies higher and further because to the club's thrust, aerodynamic adds the LIFT generated by the ball's rotation (backspin).

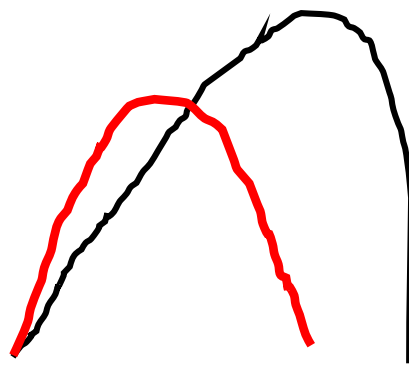


Fig. 3

Remember. The lift must be higher than the ball's weight (46 gr.). When the club is too slow, unable to generate the necessary ball's backspin, that ball will act as a cannon ball flying the red line instead of the black line.

The sailplane will take off as soon as the speed will generate a lift on its wings higher than its weight; the same happens for a golf ball, its backspin must be high enough to generate a lift higher than its weight. Whoever wants to play golf must spin the balls a lot.

You may have seen on TV that sometimes they display the club's speed at impact and the initial ball's speed, examples: the Tiger alike swing their drivers at 125 MPH (200 km/h) while the ball sets off at 190 MPH (301 km/h), this is due to the different masses: 200 grams the driver against 46 grams the ball, since $F = Mv$ (driver) = mV (ball) it means that any bigger mass will set off the ball at an higher speed with a ratio of ≥ 1.5 for Pro and blacksmiths, about 1.4 for good Golfers and ≤ 1.3 for the majority of Golfers.

The conclusions are:

- 1 – a golf ball flies only if the backspin is fast enough to generate a lift higher than the ball's weight.
- 2 – backspin, for an equal power applied by the player, will be higher depending on a higher club's loft, for driver 2000 and for a sand wedge over 5000 RPM.

3 – the ball FLIES and CLIMBS UP with 2000 RPM but FLIES and CLIMBS UP BETTER AND MORE with 5000 RPM. With a backspin lower than 2000 RPM the ball cannot fly because the backspin generates a lift lower than its weight, the ball will take the trajectory of a cannon ball, lower and shorter (fig. 3).

Obviously, the given numbers, although not at a great distance from reality, are only representative of the concept.

Above I wrote that over time our muscular power continuously decreases, it's life!

At forty I can swing an 11° driver fast enough to generate the minimum 2000 RPM required to make the ball flying, obviously at 60 I cannot succeed, the backspin is slowed down to 1750 RPM, for instance; this means that at 60, persisting in using a driver, I will only have a ball that follow a cannon ball trajectory, low and short.

The table below display the RPM for each golf club and their variation on the basis of age increments or on the worsening of a physical situation; at 40 a bad back does not get older of age an individual but surely makes 'older' his swing that could quickly descend the red stair depicted in the table; but cleverly accepted, it does not grow old the pleasure of playing Golf.

Fixed at 2000 the minimum RPM of the backspin necessary to make a golf ball flying, here is the table with a gray area where the backspin is to slow and the ball do nor fly. That area grows bigger with the aging or the worsening of the physical condition; the only cure is using clubs with a higher loft still able to generate that crucial number: 2000 RPM.

AGE >	40	60	70	75	80
BAG	RPM	RPM	RPM	RPM	RPM
driver	2000	1750	1500	1250	1000
3 wood	2270	2000	1750	1500	1250
5 wood	2540	2270	2000	1750	1500
iron 5	2810	2540	2270	2000	1750
iron 6	3080	2810	2540	2270	2000
iron 7	3350	3080	2810	2540	2270
iron 8	3620	3350	3080	2810	2540
iron 9	3890	3620	3350	3080	2810
pitch	4160	3890	3620	3350	3080
gap	4430	4160	3890	3620	3350
sand	4700	4430	4160	3890	3620
lob	5000	4700	4430	4160	3890

Thankfully, age's scale may grow quiet longer but I have no data to theorize it.

The only practical data I possess comes from the executive course of New Delhi, India where I had seen a Gandhi, for his appearance and dressing, 90 years old in my opinion, assisted by a caddy holding two clubs only, a pitch, I think, and the putter, because they walked every hole till 20 - 30 meters from the green, then he approached and putted till holing out.

I sustain wholeheartedly that also that was full-fledged GOLF, indeed that Gandhi had been the perfect practical example of the social value that Golf must take on the role if Golf wants to expand into the future and in the world.

Golf is not for older only, starting from childhood, all human ages may and should play Golf for how and how much each one is able to play.

The table's numbers are only representative of that minimum backspin necessary to generate a lift higher than the ball's weight.

That specific number is peculiar of each type of ball present on the market because too many factors influence it: the material and the way it is built, the cover material, but mainly the dimples that are the primary responsible of the ball behavior because of their form, depth, ledges, their number and placement pattern.

In the '80s, to study those dimples, few brands used the NASA wind tunnel for a 1 million fee of that time. All this proves that a golf club and a ball set up a very sophisticated aerodynamic system.

For everybody, the day will come when the driver will send the ball along a cannon ball trajectory while the 3 wood still makes the ball flying that reaches and later on will surpass the driver's distance, a little later will be the 3 wood turn to be surpassed and so on until the longest club in the bag will be the 6 iron that is, not by chance, the last performing club in the table above.

Point 3 above had been underlined not for nothing. Driver is the club that generates the slowest backspin among all clubs in a bag thus it will also be the first to descend below the minimum backspin (2000) required to make a ball flying, while all other clubs as well has slowed down their own backspin as you can see on the 60 years' column, driver is already below 2000, aeronautically we say it stalled, it cannot fly anymore; the backspin of its ball render it almost a smooth cannon ball, see fig. 3; meanwhile also 3 wood slowed down from 2270 to 2000 RPM the lower limit to make the ball flying, this is the phase where it is near the moment when 3 wood will beat the 1750 RPM driver.

Above I wrote that the table's red stair ends before the 6 iron not by chance. The table shows that at 80 years the longest club reaching 2000 RPM is the 6 iron; this data is not a calculated data but the reality of our little bunch of three friends playing 3- 4 times a week a 9 hole round that, by the way, is not the old-timers round, the 9 holes round is the round of the future if Golf has to enter into the future.

5 iron as well is subjected to the obsolescence of the player's aging because Its stall speed is estimated by Wishon Golf at 85 MPH (136 km/h) a speed that, last year, was my driver's speed; this obsolescence is confirmed also inside our group where we all make the 6 irons' ball flying in our eighties, besides being anything but evergreen athletes; at a banquet table we could easily hit 5° lofted drivers.

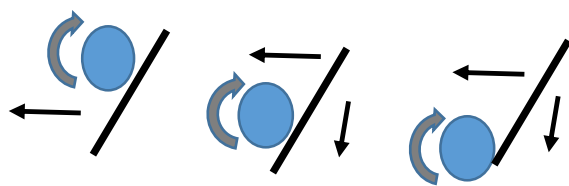
One of us, the Skeptic, after a few rounds played with my TOMORROW GOLF® with inside the bag only irons from 6 to sand wedge obtained lower scores than when playing all 14 clubs.

We three are between 73 and 80 and our 6 irons fly between 125 and 110 meters, we almost lose no ball and get less tired at the end of the round instead of when we play also our woods.

This demonstrates that Golf is not a lesser Sport, it is not a cake-walk because a swing takes the same energy of a sit-up that is more fatiguing if made with a wood than one made with an iron; in two hours we make about 40 of them.

Now it still remains to explain why a more lofted club imparts more backspin to the ball; the easiest way is drawing few sketches.

I already said that the club/ball contact lasts about two hundredth of a second = about 20 thousandth of a second:

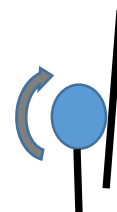


Sequence of a pitching wedge, loft 48°, from right to left:

1° club/ball contact

2° and 3°, while the club trajectory is still descending and moving forward, the ball climbs the face acquiring more and more backspin up to 4160 RPM.

Contact duration: 23 thousandth of a second



Driver, loft 10°, one single contact point, almost instantaneous rotation of the ball at 2000 RPM.

Contact duration: 14 thousand of a second.

Horizontal arrows indicate the clubs/ball direction of movement. Vertical arrows indicate the club's vertical descending. Curved arrows the rotation sense of the ball: backward, thus backspin.

Here, again, all numbers, not too far from reality, must be taken as representative of the concept.

THIS IS THE REASON WHY WHEN OUR FORCES DECREASE, IT IS NECESSARY TO INCREASE THE MINIMAL LOFT WE CAN MANAGE; to increase the minimal loft in our bag means to leave home the driver for first then the 3 wood then the 5 wood and for last the 5 iron. At the moment the epidemic has stopped at the 5 iron, should it restart at 85 is something I will tell you, God willing.

THE DEMONSTRATION OF THE NEED OF A VARIABLE GOLF BAG IS OVER, BUT THE PLEASURE OF PLAYING GOLF IS NOT ONLY ABSOLUTELY DETACHED FROM THE NUMBER OF CLUBS INSIDE IT; THE FEWER THE CLUBS THAT ARE IN ACCORD WITH OUR FORCES THE HIGHER THE PLEASURE FOR A GOLF THAT WILL BECOME BETTER because of that cleansing.

HOME

STORY OF A SPECIAL DRIVER

by Massimo Gessi

I said that a golf bag should start with 9-10 clubs maximum, later on shall increase up to the allowed 14 clubs following the player's ability increments, then, with the thinning of the hair, slowly must thin also the club's number, down to 10 again. The driver should be the last to join company and the first to leave for good.

A Rule, a Law, a system may not exist without their own exception that confirms them; it couldn't be otherwise for me.

That exception was created in 2002 by the World Golf Authorities with the big unfairness, at the time I named it in a more definite way, about the COR of the last new drivers that were too powerful for Tiger and the alike who, by the way, they were paid to use them.

To preserve the "Spirit of the Game" embodied in any golf course design that was humiliated by those new modern drivers, They decide to ban for ALL players any driver with a COR higher than 0.83; obviously the ban had been established AFTER they were already on the selves all over the world and already entered our golf bags since long at a price not astronomic but for sure Himalayan.

Few years later, even without the augmented COR, the new balls were ridiculing any golf course the world over. About we Golfers, never was more appropriate the dictum "add insult to injury".

Suffice to say that 0.86 COR is the spring effect built in the driver's face that return more energy to the ball than the 'normal' driver who return only a factor of 0.83 COR.

One more 'little sin' built in the spring effect was that it needed a club's head very high speed, reachable by only the very strong players; that speed was around 160 km/h, over 100 MPH, a speed unreachable by 80% of all golfers, a speed that my clubs reached only on board my airplane.

September 2018, I decide, once and for all, to give a last chance to my 6 drivers, I played them but none of the first 5 made the ball flying, then the 6th, a mega driver of 520 c.c, reserved for me a beautiful surprise. With the first shot, sweetly hit, the ball reaches 180 meters metered, I play it again next day in the friendly usual contest and on an elastic terrain with a little wind from behind it reaches 210 meters, metered. With a mediocre shot it reaches 160 mt, the best distance for my 3 wood. Obvious my great joy.

Deeply looking inside that surprise, the only logic explanation is:

It is a fact that the spring effect works 100% only at a specific speed and with a lower percentage at few km/h above or below; it must also be considered that the best speed is variable according to ball's type that can move it a little above or below; in all cases, westerner drivers were calibrated at a speed usually reached by strong Amateurs and Pro. Certainly not we Golfers that, in this occasion, had been used as cash dispensers; this is why I cannot forgive them.

This my mega driver however comes from the Far East, I bought it in Tokyo in a sale, it is an off-brand of which I know nothing but for the R, regular, on the shaft; I paid for it ¼ of the westerner drivers cost. Evidently, as good Japanese, they thought about their Golfers instead of Amateur or Pro, two categories certainly not in need of extra power.

Being its face so huge, it had been possible to build in the face a spring effect working at low speed, our Golfer's speed.

Today my driver's speed is about 135 km/h, at that time it was just below 150 and I was using hard balls, the 'stones', to get few extra meters; most probably that combination was in excess of the spring effect limits thus the ball left the driver's face before the face could return the extra thrust, so I noticed no advantage in using that mega driver and let it get a long rest in my garage.

Today with the correct combination of driver's speed and 'Lady' balls, that spring effect unleashes all its power, resulting in 30 – 40 metered meters more of all other 5 'normal' drivers.

An important notice: that stratospheric actual distance gain is fictitious. Real but fictitious?

When I buy something for 60 euros, paying it with a hundred-euro bill, did I earn the 40 euros change?

This is what actually happened to my mega driver. First of all, nobody may ever build a driver that could give such a monstrous distance increment unless, behind it, I light a little rocket for every shot; the reality says that we are not talking of a gain but of a loss, the loss of those 'normal' drivers who, all, reached only 150 meters because they could not make the balls fly anymore, only cannon ball trajectories, low and short.

Talking of the one-eyed man who, to avoid being called so, went to live with the blinds so that they named him 'eagle eye', it is not the mega driver that 'gained' distance; this it is so true that the actual mega driver's distances are more or less the same distances I used to make in the good old days; the blame is of the 'normal' drivers that ask for unavailable energies so ending with too short distances.

Both then and now, they should have made and let use 'super spring effect' driver to Golfers only, now Golf would count many more Golfers and we old guys we'd have enjoyed a better Golf since then.

At what cost? ZERO COST!

The only consequence: a general lowering of all handicaps for a limited amount or in my TOMORROW GOLF® just a limited retreat of the GPS tee. What a wasted opportunity that ban had been for Golf promotion!

It is not by chance that on my TOMORROW GOLF® Rules I leave almost totally free the design specifications with a minimal restrain like having an identifiable hitting face but free creativity for any implement that may increase the club speed provided it is contained inside the head but may not be activated before a shot.

No Golfer will ever humiliate a golf course by the way of the most powerful drivers and the most performing golf balls, but hitting 200 meters shots makes a Golfer really happy and a perspective beginner more attracted, without the minimal weakening of the sporting challenge; still remains unchanged the skill required in making the shot and hitting the ball properly to keep it on the fairway; this means that THAT ARTIFICIAL BOOSTER SUPPLIES THE PLAYER'S POWER, NOT HIS SKILL, it is the opposite, the longest the shot, the smaller the angle that keeps the ball inside the fairway, the highest must be the player's skill.

I strongly support that the booster is perfectly in line also with the actual Spirit of the Game.

An apparent incident during one of our friendly matches with my TOMORROW GOLF® became one more proof of the fact that drivers has to be the last incoming and first outgoing club inside our bag. A driver is incompatible in the very beginning of a golfing life because of the high skill required and again in the descending phase of that same golfing life because the energies necessary to reach that minimum 2000 RPM hitting a driver are gone forever.

In my TOMORROW GOLF® may play concurrently both a full bag and a bag inside which there are only irons, 6 iron being the longest; the full bag was playing from the 150 mt. GPS tee, I was playing the iron bag from 124 mt. GPS tee together with the third player playing from the 109 GPS tee. On the 4th hole, a short par 4, on the starting tee something peculiar happened: the full bag, with a driver, was starting 12 meters ahead of me, while the other iron bag was ahead of the full bag; a monumental error in my TOMORROW GOLF®!

The full bag was of the 79s pal with an energetic level naturally lower than mine at 73, but he insists in playing a driver with a 150 mt. distance, a cannon ball range. The system is predicated on the longest distance the player declares, his 150 mt. were true but not of a flying ball while the system's length table

are predicated on flying balls, so his score was built on a club/distance value inexistent on the reference table where all values are related to flying balls; my score, on the other hand, was built on the iron distance of a flying ball of a ghost driver much longer, 190 mt. but the 6 iron was flying consequently. The proven conclusion is that a non-flying driver is deleterious if kept inside your bag and played, those wretched 2000 RPM are very hard to reach and impossible to on the second youth.

The most peculiar, incredible thing resulting from insisting in hitting a non-flying driver is that all clubs adapt to the shortness of the driver.

Since then I look all players I see on the course, invariably, all those that shouldn't use a driver but do it, all their clubs hit distances in accord with their driver short length, the evidence of the Skeptic that since he abandoned all woods play longer irons compared with before, is a second proof.

A six iron is still flying at 80s, we testify it, even though we devote ourselves more to the fork rather than to the practice range.

HOME

OUR GOLF BALLS *(those we keep inside our golf bag)*

by Massimo Gessi

Somebody may have noticed in my STORY OF A SPECIAL DRIVER the sentence: "the correct combination of driver's speed and 'Lady' balls". It is very correct, why?

A golf ball receives a big thrust from a golf club, then it adds a lift because of its backspin, but there is an additional 'internal' thrust resulting from a peculiarity: golf balls are compressible, not by hands of course. Bombers hit the ball with a gigantic instantaneous force, so big that in the recent past they used to change those balls made with a very long elastic wrapped around the solid core every 2 – 3 holes because they got so deformed that it could take over 20 minutes to gain back their sphericity.

On TV you may have seen the bomber drive's slow motions, those balls were compressed for over the 20% of their diameter then regaining their spherical form in flight.

It is that expansion after the compression that gives an additional thrust; the more they get compressed, the higher the additional thrust they receive.

It is so true that new ball's generations are made of up to 7 seven layers of different materials so that any kind of golfers gains an advantage in distance, proportional to how many layers they are able to compress with the speed of their driver.

Warning, supposing that Tiger gets 21 meters more compressing all 7 layers, this does not mean that each compressed layer returns a 3 meters gain, because the gain restitution is not directly proportional to the number of compressed layers; 2 compressed layers gain 2 meter, 5 compressed layers gains 10 meters, all 7 layers when compressed gain 21 meters.

This time, numbers are only for examples, they are far from reality, no ball can gain 21 meters but the scale maintain the correct progression.

Today the market offers at least 20 different types of golf balls with 20 different in flight behaviors when they are hit in the correct way.

There is the unforgiving but highly performing, the forgiving easy playable, high spinning, vulnerable in the wind but hard braking on the green, etc. There are not fixed parameters toward which compare them, the only way is to play them.

I wish the market to continue researching to improve such a technical wonder, but I really wish that it will always keep making the 'normal' balls, not the state-of-the-art, but still a good golf ball.

Nothing against the 8 euros-a-ball quality, but I think of paramount importance to have the 1-euro-a-ball quality in continuous, never ending production; they are imperative if Golf wants to increase its numbers.

That's really my thinking, until a player has not yet reached his real game's level, anything spherical will do the trick; once he is there he will have to decide what player he wants to be: a Golfer who plays for his enjoyment that asks for a commitment but still leaves enough room for an easy life, or an Amateur, in this second case, by then, he will have taught himself what shall be done.

So, what to do? Let's examine the issue; there are three parameters to take in consideration:

1 – ball's compressibility that, broadly, is divided in three categories: 100 for Pro, Amateurs and blacksmiths, 90 for the average Golfer and 80 or less for driver's speed below 135 km/h (85 MPH) (mainly those with a bad back, the otherwise young and slender ladies).

How to discern one compression from another? Some brands put a number on each ball: 100, black colored, 90, red colored and 80 or less. For the balls without a number, Internet is the only way to know their specifications.

2 – Cover's hardness (the stones) that we Golfers cannot compress but provides a longer run to the detriment of brakes, very weak on the green to the point that too many times they accept chip and run only (almost).

These are the two most important parameters in choosing a ball, after these two comes the list of secondary specifications like: high backspin, low or high trajectory, cover softness for feeling, etc.

These secondary specs are not all available for all ball's three compressibility types.

3 – Your personal feeling. Its importance is worth three times points 1 and 2. Just you are the final judge on this matter.

I think that in the beginning the choice of second hand market would be the best for more than a reasons: to try all ball's types but mainly because removing the economic factor, no matter how rich or thrifty one is, it will be easy to forget the water hazard in front of you or abandon a search for the ball either difficult or long; it will be easier to learn a better use of your playing time, long, frustrating search will badly influence your next shot with the risk to lose one more shot.

Hardly there is a more damaging action on your game than substituting a new ball with an old battered ball to fly a water hazard. The player is ordering his brain to send the ball into the water since all his thoughts are focused on the water and the thought: "Don't go into the water" is the positive order to go into the water since brain knows not the negative concept thus ignoring "Don't" what remains of that order? All thoughts must stay on the target, never on the water.

Two small nuggets of wisdom known by all but implemented by few, almost none of the beginners, perhaps they are not enough underlined and proposed to them.

Once the player's game is stable and there is a certain amount of experience, then a decision shall be taken, may be from time to time, about which is the best ball for the occasion, looking at the course design: high backspin for a many dog leg course, with the low trajectory in a windy day, the hard braking for hard greens, etc. obviously a little more experience is needed to make the right pick.

In this department a smart Golfer may beat a Pro since Professionals choose a ball for almost all their life because it is a necessity for them if they want to reach the top.

On the opposite, a smart Golfer may use the right ball for each hole, unless the 'single ball' Rule is in force, so getting the possible best all the times.

You might have seen how delicate the 'which ball to use' issue is, when, in the Ryder Cup during foursomes, the two players use different balls.

Overtime and with air pollution increasing, all clubs, mysteriously, become shorter; at this point, Physics says that time has come to use compressibility 80, but many of those balls are signed "Lady".

Surely, a man has to have a strong manhood, sufficient to stand, in public, holding the wife's purse for a few minutes while she is trying on a dress or to hold the opponent's stare when, picking up the player's ball, he notices the sign "Lady".

My thinking on this matter is: having not to make amorous activities with the ball, on the contrary, I have, literally, to beat it with my clubs putting in all my power, I remain absolutely indifferent to the sign on it, so long as it flies.

If you want to see your balls flying, intelligently, use the most suitable for the occasion; with low club's speed 80 is the right number to gain few meters more; do you remember the compression's extra energy?

That compression, proportionally, gains more power while club's speed is decreasing.

Many years ago, to strengthen your hands you were used to press old tennis balls, today you press foam rubber balls; it's life my friend!

[HOME](#)

WHY BRYSON DE CHAMBEAU IS RIGHT TO PLAY 'SINGLE LENGTH' CLUBS.

By Massimo Gessi

Is it possible that a single player is right when 60 million golfer and golf club's brands manufacture almost only progressive length clubs?

Why only one Pro on the Tours plays 'single length' clubs, until now?

Answer to first question: Bryson is absolutely RIGHT!

Second question: Why only him ? A Professional took long years to fine-tune the golfing machine he has become: an athlete, a conductor to control the rhythm and timing of his swing, a dancer for the proper control and sequencing of his muscles. Any change in such a complex machinery could pose a threat to his game that provides his incomings, moreover, a modern Pro has not much to gain from the 'one' swing, almost all they are in perfect control of their progressive length clubs, so only the few could surely gain. Rory McIlroy long troubles for having changed just the brand for commercial reasons are a proof of what I have just said.

This means that it will take a long time before 'single length' clubs set will take hold in the professional world, while in our golfer's world it could take a very quick hold both for beginner and we golfers since long but still young enough for continuously looking for new way to extract the most from our golfing.

I am not theoretical, I play since 2018 an old set of mine adapted to 'single length' with the help of a very good, young club maker.

My game has greatly changed for the better, the confidence is doubled and as a consequence, consistency is now much better than in my long past; let's be clear I am not become a Pro but everything is better now and I gained also some distance, even though it was not true.

I mean that the more distance is not due to the Club's new mechanic, it comes from my higher confidence that make me boosting more my swing, something that, before, I used to do only in my rare days of golfing grace.

Now, Bryson is right because:

It is known that a longer leverage generates a higher speed, it is proven fact!

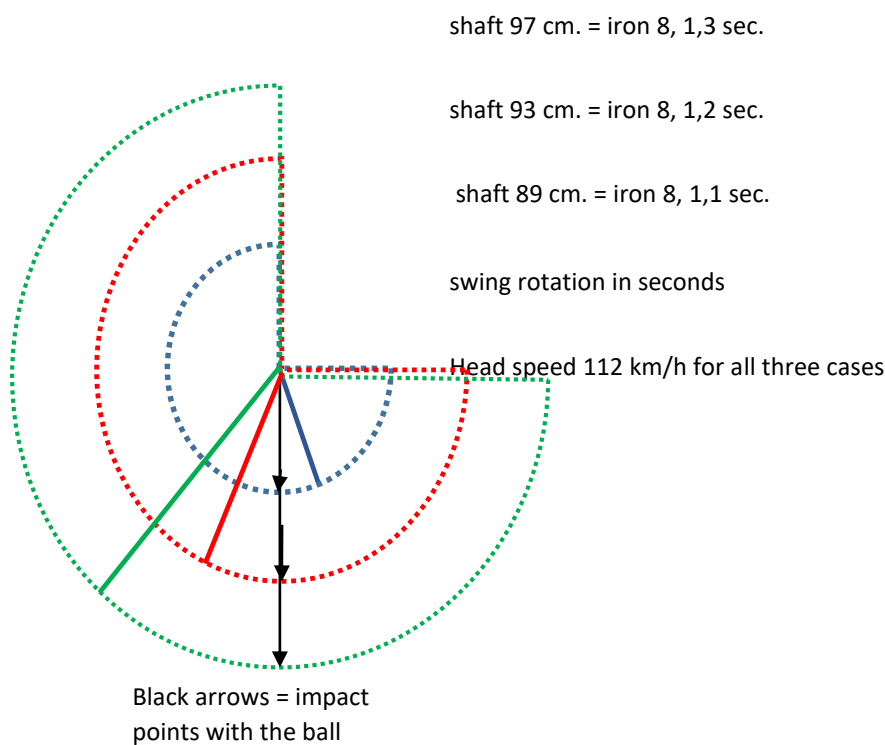
Absolutely true, no one is disputing that principle of Physics, BUT it is incorrect to apply it to a golf shaft, that's why Bryson is right, let's see why.

The Physics discussed here will be the simpler possible because it must be understood also by a grandmother who only knows the four arithmetical operations and that something thrown up, sooner or later it will come down.

Now we apply it to a golf club looking for what will happen while changing some of its mechanical parameters.

The concept I will explain will be correct, the numerical values will be adapted to the easiness of comprehension and calculations; if something increase or decreases it will be absolutely correct.

Let's start:



Just one little formula to understand and keep in mind: $F = mv$ it means that when I kick a basket ball with a certain kick, the basketball will move at 10 km/h, giving the same kick to a lighter volley ball it will move at 20 km/h, finally I give the same kick at a tennis ball that will move at 30 Km/h.

That initial little formula says that with the very same kick (the Force) to three things of different weight (the mass), the resulting speed will be different: the lesser the mass the higher the speed.

Now, from a new perspective, we take a volley ball and kick it twice, **APPLYING THE SAME FORCE**, in sequence but the first time moving only the lower part of the leg bending the knee, the second one leg straight, **BOTH TIMES THE BALL'S SPEED WILL BE THE SAME**.

How can it happen? To apply the same Force, the arc of the straight leg will be shorter than the one of the bended knee, because it is true that a longer leverage would apply A BIGGER FORCE THUS A HIGHER SPEED BUT THE INITIAL ASSUMPTION WAS: **APPLYING THE SAME FORCE**, so $F(orce) = M(ass) \times V(speed)$, if Force = 10 and Mass = 2; $V(speed) = ?$; $10 = 2 \times 5$, because Force stay the same, Mass is the SAME iron head; could the speed change? Absolutely not!

So the straight leg must reduce its arc in order to maintain equal the Force.

The above figure shows the trajectories of three equal 8 irons but with different shaft length, the red one is my own 8 iron, 93 cm, 36 and 1/2 inches long.

$F = mv$, the basic formula governing energy transfer. Doesn't matter how it will be done, with a kick, a billiard cue or a golf club; if all three methods transfer the same energy to the same mass, the resulting speed will be the same for all three times; about the above three 8 irons moved by me with the same (weak)

Force; swinging three equal clubs WILL MOVE THE HEAD WITH THE SAME SPEED: 112 km/h, radar controlled. It is a fact, no discussion about it.

Everything is equal in the figure above? No, what is different is the rotation speed of each swing.

Unless Golf feels like to use an alien Physics, here what's going on in the above figure: I swing my 8 iron, 93 cm. long, at 112 km/h peripheral speed (head speed), should I lengthen the shaft at 97 cm, my swing's rotational speed, green trajectory, will slow down because for a same force but a longer shaft rotational speed will be lower, BUT a longer leverage will obtain the SAME peripheral speed of the shorter leverage at a lower rotational speed; being the Force unchanged, the energy transfer will make the same head's speed in both cases but the longer the shaft the lower the rotational swing speed, the shorter the shaft (blue line), the faster the rotational swing speed but ALL AT THE SAME HEAD'S PERIPHERAL SPEED, THE ONE THAT COUNTS.

TEST AGAINST: TAKE YOUR PITCHING WEDGE, MAKE TWO SHOTS FOR EACH OF THE FOLLOWING DIFFERENT GRIPS, **USING THE SAME SWING WITH THE SAME POWER.**

1° GRIP AT THE TOP OF THE GRIP, 2° GRIP AT MID GRIP, 3° GRIP WITH YOUR TWO LOWER FINGERS ON THE METAL OF THE SHAFT.

FINAL RESULT: ALL SIX BALLS AT THE SAME DISTANCE, with a couple of meters' tolerance.

The shared idea that a longer shaft = higher peripheral speed may happen only if somebody borrows me some of his power when I lengthen a shaft.

Attention please, Engineers and Physicists (the real ones), spare yourself from crossing the T's, dot the I's ... or to compute the decimals that would show minimal differences with the values I used here.

The final result would only be to confirm, more precisely, that the same kick with a bended knee or straight leg will move the same ball at the same speed.

The above figure leads to other considerations: the three colored lines cover different distances, since just above had been demonstrated that the three heads move at the same speed, 112 km/h at the contact points with the ball; times to reach their contact points starts at the top of the swing, this means that my 8 iron (red line) will take 1.2 seconds; the blue line, the shorter shaft, will take 1.1 seconds and the green, the longer shaft, 1.3 seconds.

One tenth of a second more or less, is it so important? It is exactly that tenth of a second that forces the Pro to become conductors because they must learn, refine and deal with 14 different swings, should they want to be the winners. They succeed in doing it; we golfers learn to manage each one of them one at a time: a day the woods, the next the irons and the third the putter, but never all together in the same day, it might be at Christmas.

To the 14 swings of progressive clubs, must be added 14 different stances for the ball moving from the left to the right feet, add 14 more positions for the ball further to near your feet, I discount you how close the feet for each club have to be, but not the 14 different shaft's angle, one for each club.

These are the reasons that troubles so much we golfers, making miserable our game too often.

With the 'single length' clubs it is ONLY ONE for each of the above items. ONE AGAINST FOURTEEN, this is the ratio of things that must be learned.

Golf will smile to you much earlier and with a fourteenth of the broken sweat used with the progressive clubs.

In conclusion, Physics and Bryson are right: for the player, the shaft length does not change the distance he can reach with a same club.

Not the distance, but other things surely change:

- 1 – single length clubs hugely promote swing's repeatability and its learning
- 2 – single shaft length, single heads weight, single dynamic weight, single shaft flexibility and grips specific for the player, make a so very easy environment for the beginner that it makes logic to

suggest that a training of a couple of month will be enough to start PLAYING golf as a beginner
3 - all the above, applied to an average golfer, will raise the confidence in his game and a higher consistency of his shots; his entire game will become a lot more satisfactory

I am so enthusiast about single length clubs that I decided to let other golfers try them; I adapted another old set of mine to single length and put them at my Golf Club at the disposal of any golfer that would like to try them for free.

Questions:

Q: A progressive set adapted to single length is it the same as a single length set built anew?

A: From the performances' point of view there are not substantial differences, provided the club maker knows well what there is to do, because there is a lot more than just shortening or lengthening a shaft. For instance, the knowledge if that set may be transformed, since not all materials can stand it.

From the player's point of view, a little difference happens from pitch to sand wedge: their dead weight is 30-40 grams higher than the built single clubs, but their dynamic weight (swing weight) are the same as all other club in the set; all clubs have the same dynamic weight, so when swinging them the player feels no difference from the other clubs in the set.

Q: From pitching to sand wedge, do they make more distance compared with the same progressive?

A: Those born single length: NO, while the adapted, they could make 3-4 meters more since progressive clubs from PW to SW are heavier of the corresponding born single length, on the other hand, they could make a lot less distance should the cooperation player-club maker be not up to the extent required to reach the complex necessary trade-off to make them playable like all others in the set.

It's not a mission impossible, just a solid knowledge from the club maker part is essential.

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HOLE'S ENLARGEMENT

by Massimo Gessi

It is time that ball/hole ratio be updated, enlarging the hole but with precaution, it means restoring the traditional ratio between ball versus hole's diameters established in 1893 when the Musselburgh's hole diameter became the standard: 41.15 millimeters the ball and 108 mm. the hole's diameter.

This ratio remained in use in Europe until 1990 when the large American ball was adopted all over the world as the new standard at 42.67 millimeters.

Nobody ever thought about the consequences of this change because that remained undetected until stimpmer remained below 8, Augusta included until the '80s, no secondary effects reported.

In the last decade of last century technical and agronomical progress raised the stimpmeter up to today 12-14.

The actual green's surface smoothness and the new grassy essences almost resembling a billiard table raised substantially the putt's number that circled the hole's rim with the ball curving out of the hole, sometimes completely circling the hole's circumference without falling in.

This became a public issue but never any number about the enlarged hole became public until the Golf Authorities decided not to enlarge the hole because the actual diameter had been considered a filter to separate the best Pro from the good.

For the umpteenth time the 10 million Pro and Amateur gained the due consideration; the 50 million Golfers will have to do whatever they can; they have no standing in front of Authorities, this is the final bitter conclusion.

I'm sorry but I won't accept. For we Golfers it is of paramount significance the RESTORATION OF THE OLD RATIO BALL/HOLE because putting is half of the entire game; our green surfaces are definitely not of the same quality of Augusta's greens and more and more greens will lower their quality in the future due to the herbicides ban expanding more and more; rightly I say.

Let's define the enlargement, its dimension are millimeters; since the issue concerns 50% of the Game, it is absolutely necessary to maintain the challenge of putting, but a fair one!

An excessive enlargement could make putting an amusement park's distraction, an insufficient one would only throw away financial resources and leaving unchanged Golfers' troubles; often they putt on green surfaces that could envy Augusta fairways; nonetheless they are still playing Golf but with an added unfair difficulty: a too small hole since the larger ball was adopted.

It must be considered that greens will become more and more natural (no herbicides), a little irregular and slower, until Golf will adopt artificial greens.

Golfers play all week long, the greater part during weekdays (where they are by the millions) when holes are not 'young', grass enjoyed at least 72 hours of growth and golfers played that very same hole for 4-5 days creating a very nice and visible vulcan cone because of the many feet just near the rim to collect their ball, obviously the turf is far from perfect.

I am not portraying the green's apocalypse; I am just substantiating the reasons why Golfers had seen their putting worsening when on 1990 the larger ball became the standard, with a serious consequence though: the tolerance putting angle had become sensibly smaller, making putting definitely tougher; tolerance angle is the angled direction a ball may take, departing from centerline, but still entering the hole, it is variable: the longer or the faster the putt, the smaller the angle, since 1990 even smaller for the same distance.

When I started golfing, 1983, in a match, it was almost offensive not to give a putt inside the grip (about 35 cm.), today, on the smallest slope, it's not advisable to bet on the holed putt. Discussions always started from the hole become too small, on the contrary, it is the American ball that is too big for which the "swing by" make that ball circle the entire hole's rim without falling in, at a tolerance angles that would have holed the smaller old ball.

The golf ball "swing by" is a dynamic photocopy of the one used by space probes sent into deep space, the Force type is different, up there is big planet's Gravity, down here is the friction force between the hole's rim and the ball's curvature that continuously 'pushes' the ball preventing its fall inside the hole.

When a ball takes an angled direction relatively to the ball-hole center line, figure below, it would continue past the hole but for the hole's rim that 'sucks in' the ball; so angled, the hole's rim through Gravity Force try to make the ball falling in, but the ball's inertia due to its speed tries to continue running on its direction; for a certain speed-angle-gravity combination, a fight will start: gravity pulls the ball in, ball's inertia to continue straight pushes so hard against the hole's rim that the friction keeps the ball from descending too much, that makes the ball circling on the rim, but not for ever, two endings: the continuous slow descending of the ball

toward the hole's bottom makes the ball gaining a little speed, when this augmented speed is stronger than the gravity pull, the ball escape the hole, when it is not enough, the ball falls into the hole. This is also the reason why sometimes we see the ball almost falling in, then climbing up again and finally escaping the hole.

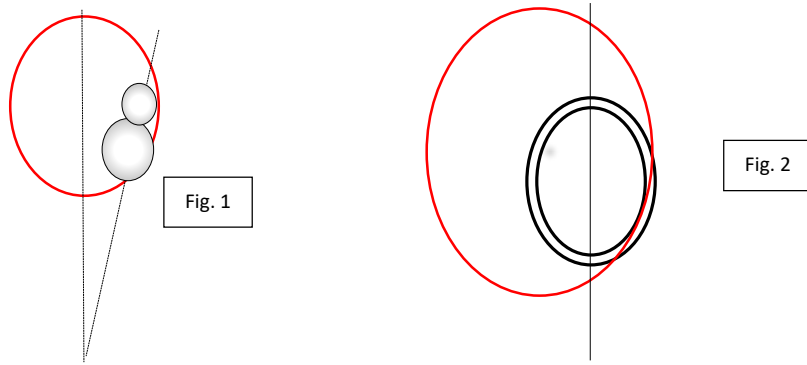


Fig. 1, from any distance or ball's speed there is a maximum tolerance angle that still lets the ball to fall in the hole.

From a 3 meters' distance with an angle X (let's say 5°) the smaller old ball falls in; on the same line, the larger today ball would rim the hole escaping.

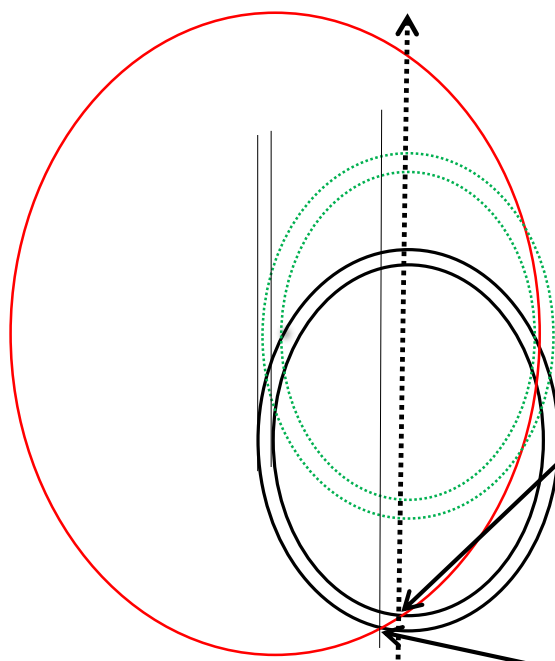
Fig. 2, Red circle is the hole rim, the two concentric rings are the old and new ball aligned on the same trajectory.

Putting the two balls from the same point and the same speed, it is wide clear that the old small ball falls in the hole while the large ball rims the hole, falling in or escaping depends only on the speed-angle-gravity combination described above.

These are the reasons why today, since 1990, putting has become tougher to the limit of unfairness for we Golfers who need not to be ranked by ability, we only ask a fair challenge in all golf departments, today putting is out of the choir.

Old/new ball diameter's difference is 1.52 millimeters; it's hard to believe that such a small measure succeeded in creating a huge problem, 10 times bigger than itself while talking of the hole's diameter. In next page the demonstration of how much the actual hole diameters penalizes all Golfers.

Notice that hole's enlargement does not at all eliminate hole's rimming, its need arises from the too small tolerance angle created by the larger ball that, today, humiliates players who do not give 35 cm. putts anymore because the chances to miss the hole are still pretty high. The real reason is to reestablish the old tolerance angle so that putting will be once again a fair challenge, not the too often actual scary action.



- Red circle = hole's rim
- Two black concentric circles = old and new ball aligned on the same direction
- Two dotted green circles = ball's run progression
- Two thin parallel lines to the left = visualization of ball's diameters difference
- Black dotted vertical arrow = ball's run direction
- Thin vertical line left of direction arrow = visualization of ball/rim contact points difference
- Small ball/rim contact point
- The two rim's contact points happens in two different positions; their distance is much larger than the two diameters difference. Continuing their run, green circles, the smaller old ball falls in the hole while the larger ball is still partially outside the hole thus rimming the hole.
- Large ball/rim contact point

The ball diameters differ by: $42.67 - 41.15 = 1.52$ millimeters, since the above figure shows a rim's contact points difference of about the double it may be assumed at a value $1.52 \times 2 = 3.04$ mm.

That value has to be an assumed one because all involved parameters are absolutely variable since we are talking of millimeters as the reference measure. A hole cut precisely differs from a hole cut in a hurry, surely by a couple of millimeters, let's forget of a 5 days old hole and its rim conditions, the same size difference happened and will happen again for the ball diameter, so it is absolutely unworthy to calculate that distance; by the way on which one of the above parameters? We are not talking of the Master.

Returning to the figure above: an old and a new ball so aligned, will see the old ball fall in and the large ball rimming the hole; **to have both balls fall in the hole, THE LARGER BALL HAS TO RUN 3 millimeters INSIDE THE SMALL BALL. This makes the half right of the hole 3 mm. smaller for a new ball = 5.6% smaller.**

All this is due to the interference between a horizontal circle (the hole's rim) and two vertical circles (ball's running equators), a nightmarish inconclusive calculation to forget forever, let just proportionate the new hole diameter not according to the ball's diameters but to the 'dynamic' new ball's diameter, the one that restrict the hole by 5.6% if we want to hole in both balls tangentially, that is, touching the lateral internal side of the hole.

The proportion to restore the old ball/actual hole proportion is the following: $D = \text{diameter}$; actual hole D , 108 versus old ball D , 41.15 = new hole D versus new ball dynamic D ($42.67 + 3.04$), so:

$108 : 41.15 = \text{New hole } D : (42.67 + 3.04) >>>> (108 * 45.71) / 41.15 = \mathbf{119.97}$ millimeters is the new hole proportionated diameter, obviously rounded to **120 millimeters**.

While it is understandable a filter to separate the best from the good Professionals, for we Golfers at least the restoration of the old tolerance angles is an absolute priority because of our lesser ability but mainly because of the local turf conditions of the greens, far from disastrous but even more far from Augusta's greens. Turf's uneven surfaces and the grassy carpets not exactly a billiard table, makes putting too often an unfair challenge; an added difficulty: living actual hole unchanged, would not separate the best from the good, would only advantage or disadvantage a player not for his ability, but only at random.

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A system that lets players control by themselves their pace of play; I created it in 2007 and had been used at my former Golf Club for almost 5 years; then, with the economic crisis, it had been considered, by Golfing Authority as well, a disturbing issue for the golfers' peace of mind, so it had been dismissed.

On each tee of every hole there is a clock that AT EACH FLIGHT'S ARRIVAL ON EACH AND EVERY TEE DISPLAYS THE FLIGHT'S START TIME OF ITS FIRST HOLE, PROVIDED THE FLIGHT KEPT THE EXPECTED PACE OF PLAY.

Example: flight number 5 starts at 10:00, plays at the expected pace of play, climbing on 2nd tee, that clock is exactly indicating 10:00; maintaining the expected pace of play, it will read 10:00 all the way, till replacing the 9th flag.

As soon as the flight slows down its pace of play on the 6th hole, on the 7th tee those players would read 10:05 should they be 5 minutes late. Seeing the delay, they accelerate gaining 2 minutes over the expected pace of play, on 8th tee the clock would read 10:03 etc.

A fast flight, the first, would see the clock's dials move backward; started at 10:00 and gaining 2 minutes a hole, they would read on successive holes: 9:58, 9:56; 9:54, etc.

Each clock will read in real time if players are on time or ahead of it, rarely, or behind it, too often, saying exactly how many minutes they are out of time.

What are they for?

1st to shorten actual biblical time for a round

2nd to make visible the trend of the player's pace of play, so preventing accumulated unrecoverable delays, urging them to recover every single lost minute or, for the very few rocket players, to slow down their pace to reduce the stress caused by supposed undue waiting caused by the flight ahead

3rd to have all players on the course perfectly aware of their position, so being able to discern when to feel pressed by the players behind because of their own slow pace or to ignore them because the players behind are too fast; to discern also if the players ahead are disappearing over the horizon because the flight ahead is too fast, ignoring them or they are too slow and they must accelerate their own pace of play.

There are too many things that slow down the pace of play, it must be considered that Golfers play mainly in flights of 4 players, this means that any few lost seconds are multiplied by a 4 factor, let's consider a 5 seconds longer routine for each shot. At the end of an average 90 shots round it means: 90 shots by 5 seconds by 4 players = 1800 seconds = a 30 minutes longer round.

Ball's search is considered a justified delay on next tee only, because it must be reasonably recovered along the prosecution of the round, in a maximum of three holes.

A persisting delay with no reasons is considered UNJUSTIFIED delay.

How to recover a delay: seldom it will be necessary to speed up a 'normal' routine shot, provided the delay is not too big.

It suffices to never let the delay on a single hole exceed the 3 minutes for a ball search, even one unwarranted minute must put a bit of a hurry on the walking pace of the next hole; never accelerate a NORMAL routine.

Have a good game and STOP THE CLOCK, at very least, do your best to freeze those dials at your first hole starting time or immediately bring them back as soon as they get past it.