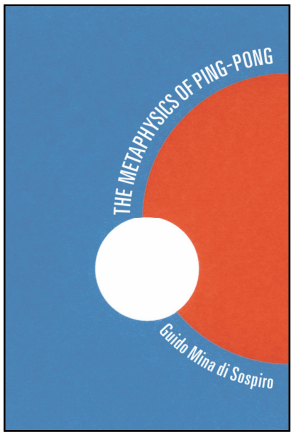

An Excerpt from

The Metaphysics of Ping Pong

Table Tennis as a Journey of Self-Discovery

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Taken from Chapter Two: The Sandwich Revolution

Table tennis began as a diversion for the upper class in Victorian England to mimic lawn tennis. Some say that, at first, players used books as rackets, others cigar-box lids with balls made of cork or solid rubber. Later, the rackets became drum battledores. Due to the lack of control, table tennis – or whiff-whaff, Gossima, ping-pong – at this stage was hardly a sport. 1900, however, was a seminal year, as the hollow celluloid ball was introduced. Hardbats became the typical racket – the same bats used by Miller, Schoenberg and Gershwin, among millions of others – and the game remained virtually unaltered for over half a century, dominated by European and American players. Then, at the 1952 World Championships in Bombay, Asia entered the scene. After training behind closed doors, Japan's least talented player on the team, bespectacled and unassuming Hiroji Satoh, unveiled his secret weapon: the sponge racket, – a wooden blade covered on both sides in thick foam. It was formidable.

First of all, it made no sound when it hit the ball, which in itself was very disorienting. There was 'ping' on one side of the table, but no 'pong' on the other. But most of all, it produced unprecedented amounts of spin and speed: the ball would sink into the foam and be catapulted back. No conventional hardbat player could cope with this, and Hiroji Satoh won the World Championship.

What radically changed the sport for good, ushering in a long period of dominance by Asian players, occurred in 1954, in London, with Ichiro Ogimura's triumph as he won both the men's singles and team titles at the World Championship. It was the first of five straight championships he won in the men's team competition. During his career, Ogimura

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captured twelve world titles in singles, mixed doubles and team competitions. All Japanese team members by then were playing with foam-covered rackets, the same sponge racket that had been pioneered by Satoh. Until the early 1950s, the game had consisted of low parables with the ball just clearing the net and landing on the deep end of the table. Speed and placement were of the essence. The topspin movement was already utilised, but mainly to make the stroke more precise and consistent. The new racket revolutionised all this. Topspin would no longer be a stroke stabiliser, so to speak. It instantly became the chief ingredient of the offensive game.

It took twenty years for tennis to copy this stroke. The Swede Björn Borg was the first player who adopted topspin consistently with both forehand and backhand. And here's a great paradox, and of an historical nature to boot: a game born to mimic lawn tennis had suddenly revolutionised its nature and, in fact, become the inspiration for tennis. It was tennis, now, that was mimicking table tennis, but the result wasn't nearly as spectacular. The table tennis topspin is a far more devastating stroke than its tennis counterpart. The ball is much smaller and lighter, so a much higher number of rotations can be impressed on it with a well-executed spin – of any sort, not just topspin.

In 1977 the double-strung tennis racket was introduced, the so-called spaghetti racket. It was of normal size, but double-strung with ten main strings and five cross-strings. It could place thirty to sixty per cent more spin on the ball, and the spin was also unpredictable. As a table tennis player, this would be music to my ears, but the United States Tennis Association argued that the racket would change the basic nature of the game – and banned it.

Tennis remains a sport that favours the players' physical stature and power. It missed its chance to evolve and become a more sophisticated game, unlike table tennis.

Indeed, table tennis had changed for ever. The two S's, Spin and Speed, had taken over. Gone was the Euclidean age of the hardbat, with very predictable trajectories and bounces – both on the table and off the racket – and never-ending rallies. Table tennis had become at once cerebral and snappy, something like a four-dimensional puzzle that one has to solve with no time to think about it.

The marriage between speed and spin was nothing short of alchemical. This may sound vague, but laboratories in Japan and China have been studying spin for the last few decades. In particular, they've been concentrating on the relative law of spin and speed.

A spinning ball in motion has a circumferential speed as well as a linear speed of the motion of its centre. These two speeds add up, and the ball may show the characteristics of *either* speed *if* it plays a leading role. When circumferential speed is higher than that of the ball centre, the trajectory is governed mainly by spin. When it is lower, it is speed that provides the main influence. And when the two speeds are approximately equal, the trajectory is influenced by both factors. *That* is the alchemical marriage of spin and speed, resulting in a ball that, as it accelerates on impact, may 'kick' up or 'dip' down, sometimes skipping to the side, too, if sidespin has been added to the stroke.

Both Japan and China are conducting theoretical research on spin that proceeds in conjunction with advances in science and technology. Equal attention is being paid to applied research, while quantitative research based on experimentation is being emphasised, too. Lastly, thorough investigations are being carried out with the aid of fluid mechanics, advanced mathematics, human biomechanics, artificial intelligence and material science. Not bad for a game that started as an after-dinner pastime played with books or cigar-box lids as rackets and with balls made out of cork!

But the honeymoon with spin brought about by the foam-covered rackets risked being short-lived. In 1959–60 the ITTF – International Table Tennis Federation – banned the sponge racket, and standardised the thickness of a 'sandwich' composed of an ordinary pimpled rubber, whether or not inverted, and a thinner sponge. The sandwich was a compromise between the old hardbat and the new sponge racket.

As it turned out, the honeymoon was far from over. Sandwich rubbers were very effective in imparting spin too, and table tennis has not looked back since.

The sandwich revolution has turned the game into a highly sophisticated, non-Euclidean exercise. Much of the effort goes not only in returning the ball, but in *reading* exactly what kind of spin your opponent is about to hit, and how to counter it.

How difficult could this be? Apart from the serve, which is typically, but not necessarily, short, low and slow, everything else happens very fast: blink, and you'll have missed the ball. Then there are many types of spin. The basic four: topspin, backspin and sidespin in either direction. But, more accurately, eight: topspin combined with sidespin in either direction; backspin combined with sidespin in either direction; and an *infinite* number of combinations.

Imagine a ball coming to you with backspin on it. It's flying in an almost straight line, and that is, with no parabolic curve, while it's spinning *backward*. But your opponent has also placed *sidespin* on it, fading to your right. So the ball is also spinning *sideways*. In addition to those two spins, the ball may have retained some of the spin you yourself had imparted to it with your previous stroke. So, what kind of bounce will it produce on the table? And off your racket? The combination of different spins, speeds, angles and trajectories produces infinite variations, and in order to return the incoming ball properly, you must be constantly factoring in these four variables.

The small and very light ball is capable of rotating in three different axes perpendicular to one other, as well as in two directions on each of these axes. What can I say? The mystery deepens... It's a difficult concept to visualise, and even just reading it gives a good idea of the complexity of the ball's movements in the air. In addition to these natural properties of the ball, certain players who use very specific rubbers can make it fly in zigzag patterns.

One rarely used spin, mainly in serves, is the corkscrew spin. Paradoxically, advanced players can sometimes deceive one another with a 'no-spin' ball, by faking to be spinning and hitting instead a flat ball, which will prompt the deceived opponent to treat it as if it were spinning, and return the ball either long, wide or into the net. This may seem unnecessarily complicated, but remember the pace at which contemporary table tennis rallies are played, and keep in mind the mentioned factor of the alchemical marriage of spin with speed.

The sandwich revolution quickly brought about the king of all modern table tennis strokes: a codified form of topspin, the forehand loop. The whole body participates in the loop: the knees, first bent and then straightened; the rotation of the waist; the backswing in preparation for the hit, to which the wrist also contributes; the transfer of the bodyweight from the right to the left foot; finally, after having hit the ball, the upward follow-through. The ball isn't just hit, but *brushed* upward with a very fast stroke. Thus an extremely heavy topspin is placed on it, which, owing to the Magnus effect, causes the ball to descend rapidly towards the opponent's side of the table. And, since when it touches it, it accelerates and kicks or dips, it's a devastating shot. Moreover, when the ball touches the opponent's racket, it tends to go up, thus making the return long. To counter this, the opponent has to 'close' his racket, by making it almost parallel to the table, depending on

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how much topspin it carries. But at times not even that is enough, so rather than trying to block, it's better to counter-topspin – which is easier said than done. World-class players do know how to handle incoming loops, and from time to time spectators are treated to a highly spectacular rally of loop drives.

No other sport relies so heavily on the Magnus effect, which is named after the German physicist Heinrich Magnus, who first described it in 1852. Larry Hodges, one of the leading experts on table tennis, explains it in the following layman terms: 'Imagine a ball with topspin. As it travels through the air, the forward movement of the top of the ball forces air forward (or more precisely, slows down the movement of air over the top of the ball). This causes air to be "clumped" together towards the front top of the ball, creating an area of high air density. Similarly, the backward movement of the bottom of the ball pulls air backward quickly, creating an area of low air density towards the front bottom of the ball. The high density air mass at the top of the ball forces the ball downward; the low density air mass at the bottom of the ball "vacuums" it downward. The result: the ball drops. That's what makes a ball with topspin drop. The same applies to all spins, but as the spin orientation changes, the movement of the ball changes.'