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The Gambler Who Cracked the Horse-Racing Code

By Kit Chellel
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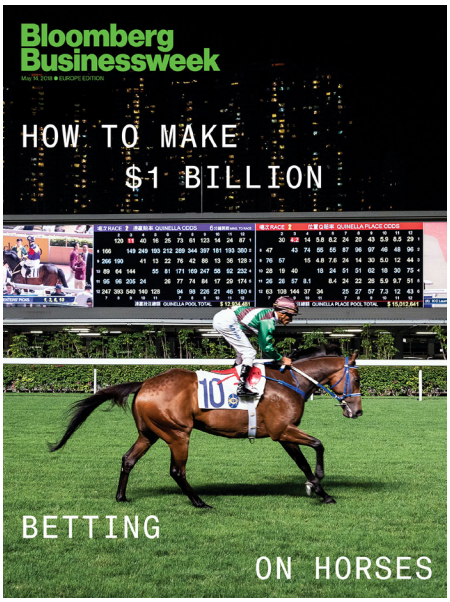
▸ **Bill Benter did the impossible: He wrote an algorithm that couldn't lose at the track. Close to a billion dollars later, he tells his story for the first time.**

Horse racing is something like a religion in Hong Kong, whose citizens bet more than anyone else on Earth. Their cathedral is Happy Valley Racecourse, whose grassy oval track and floodlit stands are ringed at night by one of the sport's grandest views: neon skyscrapers and neat stacks of high-rises, a constellation of illuminated windows, and beyond them, lush hills silhouetted in darkness.

On the evening of Nov. 6, 2001, all of Hong Kong was talking about the biggest jackpot the city had ever seen: at least HK$100 million (then about $13 million) for the winner of a single bet called the Triple Trio. The wager is a little like a trifecta of trifectas; it requires players to predict the top three horses, in any order, in three different heats. More than 10 million combinations are possible. When no one picks correctly, the prize money rolls over to the next set of races. That balmy November night, the pot had gone unclaimed six times over. About a million people placed a bet—equivalent to 1 in 7 city residents.

At Happy Valley's ground level, young women in beer tents passed foamy pitchers to laughing expats, while the local Chinese, for whom gambling is a more serious affair, clutched racing newspapers and leaned over the handrails. At the crack of the starter's pistol, the announcer's voice rang out over loudspeakers: "Last leg of the Triple Trio," he shouted in Australian-accented English, "and away they go!"

Happy Valley Racecourse in Hong Kong.
PHOTOGRAPHER: XYZA BACANI FOR BLOOMBERG BUSINESSWEEK



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PHOTOGRAPHER: XYZA BACANI FOR BLOOMBERG BUSINESSWEEK

As the pack thundered around the final bend, two horses muscled ahead. "It's Mascot Treasure a length in front, but Bobo Duck is gunning him down," said the announcer, voice rising. "Bobo Duck in front. Mascot fighting back!" The crowd roared as the riders raced across the finish line. Bobo Duck edged Mascot Treasure, and Frat Rat came in third.

Across the road from Happy Valley, 27 floors up, two Americans sat in a plush office, ignoring a live feed of the action that played mutely on a TV screen. The only sound was the hum of a dozen computers. Bill Benter and an associate named Paul Coladonato had their eyes fixed on a bank of three monitors, which displayed a matrix of bets their algorithm had made on the race—51,381 in all.

Benter and Coladonato watched as a software script filtered out the losing bets, one at a time, until there were 36 lines left on the screens. Thirty-five of their bets had correctly called the finishers in two of the races, qualifying for a consolation prize. And one wager had correctly predicted all nine horses.

"F---," Benter said. "We hit it."

It wasn't immediately clear how much they'd made, so the two Americans attempted some back-of-the-envelope math until the official dividend flashed on TV eight minutes later. Benter and Coladonato had won a jackpot of $16 million. Benter counted the zeros to make sure, then turned to his colleague.

"We can't collect this—can we?" he asked. "It would be unsporting. We'd feel bad about ourselves." Coladonato agreed they couldn't. On a nearby table, pink betting slips were arranged in a tidy pile. The two men picked through them, isolating three slips that contained all 36 winning lines. They stared at the pieces of paper for a long time.

Then they posed, laughing, for a photo—two professional gamblers with the biggest prize of their careers, one they would never claim—and locked the tickets in a safe. No big deal, Benter figured. They could make it back, and more, over the rest of the racing season.

Benter in his office in Pittsburgh on April 2, 2018.
PHOTOGRAPHER: TOM JOHNSON FOR BLOOMBERG BUSINESSWEEK

Veteran gamblers know you can't beat the horses. There are too many variables and too many possible outcomes. Front-runners break a leg. Jockeys fall. Champion thoroughbreds decide, for no apparent reason, that they're simply not in the mood. The American sportswriter Roger Kahn once called the sport "animated roulette." Play for long enough, and failure isn't just likely but inevitable—so the wisdom goes. "If you bet on horses, you will lose," says Warwick Bartlett, who runs Global Betting & Gaming Consultants and has spent years studying the industry.

What if that wasn't true? What if there was one person who masterminded a system that guaranteed a profit? One person who'd made almost a billion dollars, and who'd never told his story—until now?

In September, after a long campaign to reach him through friends and colleagues, I received an email from Benter. "I have been avoiding you, as you might have surmised," he wrote. "The reason is mainly that I am uncomfortable in the spotlight by nature." He added, "None of us want to encourage more people to get into the game!" But in October he agreed to a series of interviews in his office in downtown Pittsburgh. The tasteful space—

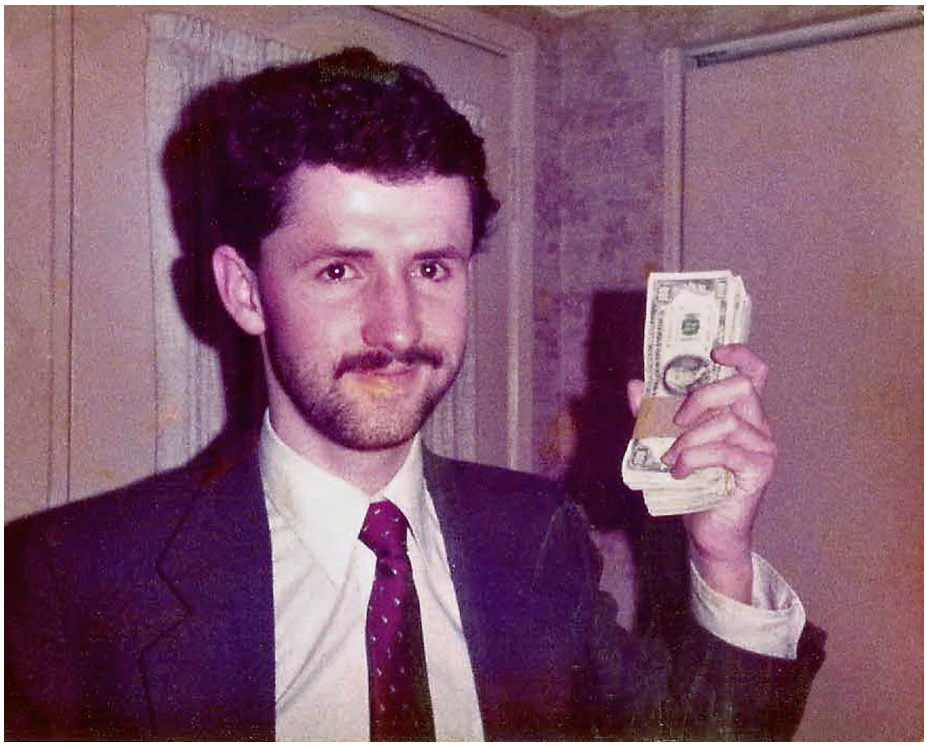
the top two floors of a Carnegie Steel-era building—is furnished with 4-foot-tall Chinese vases and a marble fireplace, with sweeping views of the Monongahela River and freight trains rumbling past.

Benter, 61, walks with a slight stoop. He looks like a university professor, his wavy hair and beard streaked with gray, and speaks in a soft, slightly Kermit-y voice. He told me he'd been driven only partly by money—and I believed him. With his intelligence, he could have gotten richer faster working in finance. Benter wanted to conquer horse betting not because it was hard, but because it was said to be impossible. When he cracked it, he actively avoided acclaim, outside the secretive band of geeks and outcasts who occupy his chosen field. Some of what follows relies on his recollections, but in every case where it's been possible to corroborate events and figures, they've checked out in interviews with dozens of individuals, as well as in books, court records, and other documents. Only one thing Benter ever told me turned out to be untrue. It was at the outset of our conversations, when he said he didn't think I'd find anything interesting to write about in his career.

Benter grew up in a Pittsburgh idyll called Pleasant Hills. He was a diligent student and an Eagle Scout, and he began to study physics in college. His parents had always given him freedom—on vacations, he'd hitchhiked across Europe to Egypt and driven through Russia—and in 1979, at age 22, he put their faith to the test. He left school, boarded a Greyhound bus, and went to play cards in Las Vegas.

Benter had been enraptured by Beat the Dealer, a 1962 book by math professor Edward Thorp that describes how to overcome the house's advantage in blackjack. Thorp is credited with inventing the system known as card counting: Keep track of the number of high cards dealt, then bet big when it's likely that high cards are about to fall. It takes concentration, and lots of hands, to turn a tiny advantage into a profit, but it works.

Thorp's book was a beacon for shy young men with a gift for mathematics and a yearning for a more interesting life. When Benter got to Las Vegas, he worked at a 7-Eleven for $3 an hour and took his wages to budget casinos. The Western—with its dollar cocktails and shabby patrons getting drunk at 10 a.m.—and the faded El Cortez were his turf. He didn't mind the scruff. It thrilled him to see scientific principles play out in real life, and he liked the hedonistic city's eccentric characters. It was the era of peak disco, with Donna Summer and Chic's Le Freak all over the radio. On a good day, Benter might win only about $40, but he'd found his métier—and some new friends. Fellow Thorp acolytes were easy to spot on casino floors, tending to be conspicuously focused and sober. Like them, Benter was a complete nerd. He had a small beard, wore tweedy jackets, and talked a lot about probability theory.



In 1980s Las Vegas, Benter made about $80,000 a year as a member of a professional blackjack team.
SOURCE: BILL BENTER

In 1980 he'd just applied for a job as a night cleaner at McDonald's when his buddies introduced him to the man who would change his life. Alan Woods was the leader of an Australian card-counting team that had recently arrived in Las Vegas. Woods was then in his mid-30s, with a swoop of gray hair and cold blue eyes. Once an insurance actuary with a wife and two kids, he'd decided one day that family life wasn't for him and began traveling the world as an itinerant gambler.

Woods impressed Benter with his tales of fearlessness, recounting how he'd sneaked past airport security in Manila with $10,000 stuffed into his underwear. Most appealing, he pursued the card counter's craft with discipline. His team pooled its cash and divided winnings equitably. Having more players reduced the risk of a run of bad luck wiping out one's bankroll, and the camaraderie offset the solitary nature of the work. Benter joined the squad.

Within six weeks, he found himself playing blackjack in Monte Carlo, served by waiters in dinner jackets. He felt like James Bond, and his earnings grew to a rate of about $80,000 a year. Benter abandoned any idea of returning to college. When his mother's friends in Pittsburgh asked how his studies were going, she told them, "Bill's traveling right now."

Alan Woods (shown in an undated photo) gave Benter the idea to bet on horses in Hong Kong. The two later had a bitter falling-out.
SOURCE: DR. JOHN SIMON

Benter and his teammates got a house in the Vegas suburbs, living like geeky college fraternity brothers. Woods strictly forbade drinking on the job, so the men would wait until after their shifts to knock back beers and trade stories of scrapes with casino security, who were constantly on the lookout for card counting. Bull-necked pit bosses patrolled the floors. A suspicious player would be told to leave or, worse, backroomed: interrogated in a dingy office. There were rumors of counters being beaten and drugged. Benter thought the treatment was unjustified. He wasn't a cheat. He just played smart.

After a couple of years, Benter was playing quietly at the Maxim one day when a meaty hand descended on his shoulder. "Come with me," said a burly guy in a suit. In the back, Benter was shoved into a chair and told to produce some identification. He refused. The guard walked out, and an even more menacing guy walked in: "Show me your f---ing ID!" Benter got out his wallet.

Afterward—it was probably 1984—Benter, Woods, and some of their partners earned a place in the Griffin Book, a blacklist that a detective agency circulated to casinos. On top of the indignity of having their mug shots next to hustlers and pickpockets, the notoriety made it almost impossible for them to keep playing in Vegas. They needed to find another game.

Woods knew there were giant horse-betting pools to tap in Asia—and that the biggest of all was run by the Hong Kong Jockey Club. Begun in 1884 as a refuge for upper-crust Brits who wanted a stretch of England's green and pleasant land in their subtropical colony, the club changed over time into a state gambling monopoly. Its two courses, Happy Valley and Sha Tin, were packed twice a week during a racing season that extended from September to July. Hong Kong's population was then only about 5.5 million, but it bet more on horses than the entire U.S., reaching about $10 billion annually by the 1990s.

Hong Kong racing uses a parimutuel (also known as "totalizer") system. Unlike odds in a Vegas sportsbook, which are set in advance and give a decisive edge to the house, parimutuel odds are updated fluidly, in proportion to how bettors wager. Winners split the pool, and the house skims a commission of about 17 percent. (After costs, the Jockey Club's take goes to charity and the state, providing as much as a tenth of Hong Kong's tax revenue.) To make money, Benter would have to do more than pick winners: He needed to make bets with a profit margin greater than the club's 17 percent cut.

He went to the Gambler's Book Club, a Vegas institution, and bought everything he could find on horses. There were lots of "systems" promising incredible results, but to him they seemed flimsy, written by journalists and amateur handicappers. Few contained real math. Benter wanted something more rigorous, so he went to the library at the University of Nevada at Las Vegas, which kept a special collection on gaming. Buried in stacks of periodicals and manuscripts, he found what he was looking for—an academic paper titled "Searching for Positive Returns at the Track: A Multinomial Logit Model for Handicapping Horse Races." Benter sat down to read it, and when he was done he read it again.

The paper argued that a horse's success or failure was the result of factors that could be quantified probabilistically. Take variables—straight-line speed, size, winning record, the skill of the jockey—weight them, and presto! Out comes a prediction of the horse's chances. More variables, better variables, and finer weightings improve the predictions. The authors weren't sure it was possible to make money using the strategy and, being mostly interested in statistical models, didn't try hard to find out. "There appears to be room for some optimism," they concluded.

Benter taught himself advanced statistics and learned to write software on an early PC with a green-and-black screen. Meanwhile, in the fall of 1984, Woods flew to Hong Kong and sent back a stack of yearbooks containing the results of thousands of races. Benter hired two women to key the results into a database by hand so he could spend more time studying regressions and developing code. It took nine months. In September 1985 he flew to Hong Kong with three bulky IBM computers in his checked luggage.

The Hong Kong that greeted Benter was a booming financial center, with some of the most densely populated spaces on the planet. The crowded skyline that had recently inspired Ridley Scott's dystopian megacity in Blade Runner seemed to sprout towers weekly.

Benter and Woods rented a microscopic apartment in a dilapidated high-rise. Warbling Cantonese music drifted through stained walls, and the neighbors spent all night shouting in the hall. Their office was an old desk and a wooden table piled high with racing newspapers. If they went out at all, it was to the McDonald's down the street.

Benter struggled to stay ahead of a statistical phenomenon called gambler's ruin.

Twice a week, on race days, Benter would sit at the computer and Woods would study the racing form. Early on, the betting program Benter had written spat out bizarre predictions, and Woods, with his yearlong head start studying the Hong Kong tracks, would correct them. They used a telephone account at the Jockey Club to call in their bets and watched the races on TV. When they won, there were satisfied smiles only. They were professionals; cheering and hooting were for rubes.

Between races, Benter struggled to make his algorithms stay ahead of a statistical phenomenon called gambler's ruin. It holds that if a player with limited funds keeps betting against an opponent with unlimited funds (that is, a casino, or the betting population of Hong Kong), he will eventually go broke, even if the game is fair. All lucky streaks come to an end, and losing runs are fatal.

One approach—familiar to Benter from his blackjack days—was to adapt the work of a gunslinging Texas physicist named John Kelly Jr., who'd studied the problem in the 1950s. Kelly imagined a scenario in which a horse-racing gambler has an edge: a "private wire" of fairly reliable tips. How should he bet? Wager too little, and the advantage is squandered. Too much, and ruin beckons. (Remember, the tips are good but not perfect.) Kelly's solution was to wager an amount in line with the gambler's confidence in the tip.

A staff Christmas party in 2000. Benter hired anyone – coders, academics, journalists – who could improve his algorithms.
SOURCE: BILL BENTER

Benter was struck by the similarities between Kelly's hypothetical tip wire and his own prediction-generating software. They amounted to the same thing: a private system of odds that was slightly more accurate than the public odds. To simplify, imagine that the gambling public can bet on a given horse at a payout of 4 to 1. Benter's model might show that the horse is more likely to win than those odds suggest—say, a chance of one in three. That means Benter can put less at risk and get the same return; a seemingly small edge can turn into a big profit. And the impact of bad luck can be diminished by betting thousands and thousands of times. Kelly's equations, applied to the scale of betting made possible by computer modeling, seemed to guarantee success.

If, that is, the model were accurate. By the end of Benter's first season in Hong Kong, in the summer of 1986, he and Woods had lost $120,000 of their $150,000 stake. Benter flew back to Vegas to beg for investment, unsuccessfully, and Woods went to South Korea to gamble. They met back in Hong Kong in September. Woods had more money than Benter and was willing to recapitalize their partnership—if it was renegotiated.

"I want a larger share," Woods said, in Benter's recollection.
"How much larger?" Benter asked.
"Ninety percent," Woods said.
"That's unacceptable," Benter said.

Woods was used to being the senior partner in gambling teams and getting his way. He never lost his temper, but his mind, once set, was like granite. Benter was also unwilling to budge. Their alliance was over. In a fit of pique, Benter wrote a line of code into the software that would stop it from functioning after a given date—a digital time bomb—even though he knew it would be trivial for Woods to find and fix it later. Woods would keep betting algorithmically on horses, Benter was sure of that. He resolved that he would, too.

Benter's Las Vegas friends wouldn't stake him at horse racing, but they would at blackjack. He took their money to Atlantic City and spent two years managing a team of card counters, brooding, and working on the racing model in his spare time. In September 1988, having amassed a few hundred thousand dollars, he returned to Hong Kong. Sure enough, Woods was still there. The Australian had hired programmers and mathematicians to develop Benter's code and was making money. He'd moved into a penthouse flat with a spectacular view. Benter refused to speak to him.

Benter's model required his undivided attention. It monitored only about 20 inputs—just a fraction of the infinite factors that influence a horse's performance, from wind speed to what it ate for breakfast. In pursuit of mathematical perfection, he became convinced that horses raced differently according to temperature, and when he learned that British meteorologists kept an archive of Hong Kong weather data in southwest England, he traveled there by plane and rail. A bemused archivist led him to a dusty library basement, where Benter copied years of figures into his notebook. When he got back to Hong Kong, he entered the data into his computers—and found it had no effect whatsoever on race outcomes. Such was the scientific process.

Other additions, such as the number of rest days since a horse's last race, were more successful, and in his first year after returning to Hong Kong, Benter won (as he recalls) $600,000. The next racing season, ending in the summer of 1990, he lost a little but was still up overall. He hired an employee, Coladonato, who would stay with him for years, and a rotating cast of consultants: independent gamblers, journalists, analysts, coders, mathematicians. When the volume of bets rose, he recruited English-speaking Filipinos from the ranks of the city's housekeepers to relay his bets to the Jockey Club's Telebet phone lines, reading wagers at the rate of eight a minute.

A breakthrough came when Benter hit on the idea of incorporating a data set hiding in plain sight: the Jockey Club's publicly available betting odds. Building his own set of odds from scratch had been profitable, but he found that using the public odds as a starting point and refining them with his proprietary algorithm was dramatically more profitable. He considered the move his single

most important innovation, and in the 1990-91 season, he said, he won about $3 million.

The following year the Hong Kong Jockey Club phoned Benter at an office he'd established in Happy Valley. He winced, remembering the meaty hand of the Las Vegas pit boss on his shoulder. But instead of threatening him, a Jockey Club salesperson said, "You are one of our best customers. What can we do to help you?" The club wasn't a casino trying to root out gamblers who regularly beat the house; its incentive was to maximize betting activity so more revenue was available for Hong Kong charities and the government. Benter asked if it was possible to place his bets electronically instead of over the phone. The Jockey Club agreed to install what he called the "Big CIT"—a customer input terminal. He ran a cable from his computers directly into the machine and increased his betting.

If everyday bettors found out that foreign computer nerds were siphoning millions, they might bring down the system

Benter had achieved something without known precedent: a kind of horse-racing hedge fund, and a quantitative one at that, using probabilistic modeling to beat the market and deliver returns to investors. Probably the only other one of its kind was Woods's operation, and Benter had written its code base. Their returns kept growing. Woods made $10 million in the 1994-95 season and bought a Rolls-Royce that he never drove. Benter purchased a stake in a French vineyard. It was impossible to keep their success secret, and they both attracted employees and hangers-on, some of whom switched back and forth between the Benter and Woods teams. One was Bob Moore, a manic New Zealander whose passions were cocaine and video analysis. He'd watch footage of past races to identify horses that should have won but were bumped or blocked and prevented from doing so. It worked as a kind of bad-luck adjuster and made the algorithms more effective.

The computer-model crowd spent nights in a neighborhood called Wan Chai—a honey pot of gaudy bars and topless dancers that's been described as "a wildly liberated Las Vegas." Moore favored Ridgeway's pool bar, where he'd start fights and boast about his gambling exploits. Woods didn't drink much, but he enjoyed ecstasy, and he could be found most nights in Neptune II, a neon dungeon full of drunk businessmen and much younger women.

Benter was a more reserved presence. He could often be seen sitting at the end of a bar, engaged in quiet conversation. Over time an aura built up. To the small group of insiders who knew that software had conquered Happy Valley—perhaps a dozen people—Benter was the acknowledged master. Even Woods (in an interview he later gave to an Australian journalist) admitted that his rival's model was the best. But the two men couldn't resolve their differences. When Benter saw his old partner in Wan Chai, he would smile politely and walk away. They'd gone 10 years without speaking.

Throughout 1997 a shadow loomed over Hong Kong. After 156 years of colonial rule, the British were set to hand the territory back to China on July 1. There

were news reports of Chinese troops massed at the border, and many islanders feared it would be the end of Hong Kong's freewheeling capitalism. China tried to reassure residents that their most treasured customs would be protected. "Horse racing will continue, and the dancing parties will go on," said Deng Xiaoping, the former Communist Party leader.

Benter faced an additional and more peculiar anxiety. A month before the handover, his team won a huge Triple Trio jackpot. They were in the middle of an epic winning season, up more than $50 million. The Jockey Club normally put Triple Trio winners in front of the TV cameras to show how, for example, a night watchman had changed his life with a single bet. This time, nobody wanted to tout that the winner was an American algorithm.

The club had come to see the syndicates' success as a headache. There was no law against what they were doing, but in a parimutuel gambling system, every dollar they won was a dollar lost by someone else. If the everyday punters at Happy Valley and Sha Tin ever found out that foreign computer nerds were siphoning millions from the pools, they might stop playing entirely.

Benter had his Big CIT privileges revoked. On June 14 one of his phone operators called the Telebet line and was told, "Your account has been suspended." Woods was also blocked. Club officials issued a statement saying they had acted to "protect the interests of the general betting public." Benter flew back to Vegas, as he did every summer, to think about his next move. He reread the club's statement. Phone betting was out—but nowhere did it say he was prohibited from betting altogether. He got an idea. As in his blackjack days, it would require a low profile.

Woods sent his girlfriends directly to the racetrack with bags full of cash

One Friday evening that autumn, after the handover of the territory to China, Benter paid for a hotel room in Hong Kong's bayside North Point district. He made sure to get a space on the ground floor for easy access. He had helpers haul in laptops, a 50-pound printer, and stacks of blank betting slips. On Saturday morning—race day—they checked the internet connection and put a "Do Not Disturb" sign on the door.

At 1:45 p.m., 15 minutes before the first race, the laptops received lines of bets from Benter's Happy Valley office. The printer began to suck in blank tickets and churn them out with black marks in the relevant betting boxes.

Eight minutes to starting pistol. Benter grabbed a pile of 80-odd printed tickets and a club-issued credit voucher worth HK$1 million and bolted for the door. Across from the hotel was an off-track betting shop. It was loud and smoky inside, and he found an automated betting terminal free at one side of the room. Two minutes to go. He started feeding in tickets, one after another after another, until the screen flashed a message: "Betting closed."

Benter hurried back to the hotel room to see which wagers had hit. At 2:15 p.m. the laptops downloaded the next package of bets from the office. Time to go again. Simultaneously, other teams hired by Benter were doing the same in different parts of Hong Kong.

Benter's solution to the phone ban was time-consuming and required him to manage teams of runners, who risked being robbed. But it was almost as profitable as his old arrangement. The club continued to exchange his cash vouchers for checks, and no one came to shut him down. Woods kept betting in a slightly different manner, sending members of an extended roster of Philippine girlfriends directly to the racetrack with bags full of cash.

Publicity is a hex for professional gamblers. That fall an increasingly erratic Moore drew more attention to algorithmic betting, first by bragging to the local press—who nicknamed him the "God of Horses"—and then by fatally overdosing on sleeping pills.

Afterward, Hong Kong's tax authority began to investigate the Woods syndicate. By law, gambling winnings were exempt from taxation, but company profits weren't. The question was whether the syndicates had moved beyond conventional betting and started behaving like corporations. The implications would be dire if the Inland Revenue Department decided to tax profits retroactively. When agents asked Woods for a list of his investors, he fled to the Philippines.

Benter continued to operate his in-person betting scheme through the turn of the millennium, with his model expanding to track more than 120 factors per horse, but the logistics were proving a grind. He felt disconnected from his gambler friends in Wan Chai—a nocturnal clique of geeks and rogues. He had started mixing with a more professional crowd, adopting their dress code of smart suits and ties, and he'd taken a more active role in the local Rotary Club chapter. Benter embraced its motto of "Service Above Self," giving millions of dollars anonymously and visiting impoverished schools in China and refugee camps in Pakistan. For the first time, he thought seriously about quitting and moving back to the U.S. If it all has to end, he thought, I've had an incredible run.

It was then, in November 2001, that he decided to have a final punt on the Triple Trio. Benter had avoided major prizes since 1997 for fear of angering the Jockey Club's management, but this jackpot was too big to resist. Wagering on it was something of a lark, albeit an expensive one: He spent HK$1.6 million on the 51,000 combinations. If he won, he decided, he would leave the tickets unclaimed. Club policy in such cases directed the money to a charitable trust.

At its most intricate, Benter's model tracked more than 120 variables per horse.
Photographer: Xyza Bacani for Bloomberg Businessweek

After Bobo Duck, Mascot Treasure, and Frat Rat romped across the finish line—and then days turned into weeks, with no one collecting the prize—Benter was unprepared for the level of mounting public interest. "The ghost of the unclaimed $118 million Triple Trio," wrote the racing columnist for the South China Morning Post, "is still banging around like an unwanted poltergeist." Outlandish theories spread across Hong Kong. One held that the winner had watched the final leg and died of shock.

Finally, Benter sent an anonymous letter to the Jockey Club's directors explaining his intentions. But the organization never shared it with the public. (Club spokeswoman Samantha Sui told Bloomberg Businessweek, "We are not in a position to disclose or comment on matters related to specific customers due to privacy and confidentiality concerns.") At the time, head of betting Henry Chan told the Morning Post that there was no way of knowing who the ticket holder was. "Although this is bad luck for one winner," he said, "it means there will be a lot of winners through the charities."

Later in 2001, without any warning, Jockey Club officials lifted the telephone betting ban. It was as if Benter's gift had appeased the gambling gods. The club also bowed to public pressure and allowed customers to wager over the internet from their homes. Benter opted to move back to Pittsburgh, where he continued to bet. He didn't want to spend his whole life in Hong Kong.

In Manila, Woods lived like a hermit, bingeing on drugs for days at a time, waited on by young women he hired to keep him company. He employed gamblers remotely in Australia and Hong Kong, but he was a difficult boss; he accused staff of stealing, and once he made everyone take IQ tests before telling them all how much smarter he was. Woods started calling himself Momu—short for "master of my universe."

"I find the real business world to be a lot more difficult than horse racing"

In December 2007 he sent a letter to Business Review Weekly, an Australian magazine, asking to be considered for its rich list. "I had planned to delay my hope for inclusion until I could make it into the top 10," he wrote. "However, as of today, it does not appear I will live long enough." Woods had been diagnosed with cancer. He came back to Happy Valley for treatment; the Hong Kong Sanatorium & Hospital was within sight of the racetrack. He spent his final days beating his friends at a Chinese card game known as chor dai di and died on Jan. 26, 2008, at 62.

Interviews with Woods's friends, employees, and other sources indicate he had amassed a fortune of A$900 million (then about $800 million). Mike Smith, a former Hong Kong policeman who knew Woods, wrote about him in his book In the Shadow of the Noonday Gun: "He left a very simple will that pretty much summed up his lifestyle. Assets: A$939,172,372.51. Liabilities: A$15.93."

Woods left the bulk of his estate to his two children in Australia and gave token sums to various ex-girlfriends, including a Filipina who said he'd fathered her child. A wake was held in a bar at the Happy Valley racetrack and attended by

an eclectic crowd of gamblers and hustlers. To the last, Woods never believed that Benter had won the 2001 Triple Trio and given up the jackpot.

"Gambling," Benter told me in his Pittsburgh office, "has always been the domain of wise guys from the wrong side of the track." Perhaps more than anyone else, Benter has changed that perception—within the tiny population of people who gamble for a living, that is.

By the time he moved back to Pittsburgh, he'd inspired others in Hong Kong to form syndicates of their own. In response, the Jockey Club began publishing reams of technical data and analysis on its website to level the playing field. With a little effort, anyone could be a systematic gambler—or mimic one. The odds boards at Happy Valley and Sha Tin were color-coded to show big swings in the volume of wagers on a horse, specifically to reveal whom the syndicates were backing.

The robo-bettors' numbers have continued to proliferate. After Woods's death, his children maintained his Hong Kong operation, but other members of the team went into business for themselves. And Benter spread the secrets of his success in various ways: He gave math talks at universities, shared his theories with employees and consultants, and even published an academic paper laying out his system. The 1995 document—"Computer-Based Horse Race Handicapping and Wagering Systems: A Report"—became a manual for an entire generation of high-tech gamblers.

Today, online betting on sports of all kinds is a $60 billion industry, growing rapidly everywhere outside the U.S., where the practice is mostly banned. The Supreme Court, however, may lift federal restrictions this year, and if it does, American dollars will flood the market, increasing liquidity and the profits of computer teams. Big names from the world of finance have taken notice.

In 2016, Susquehanna International Group LLP, an American quantitative trading company, started an Ireland-based operation called Nellie Analytics Inc., targeting basketball, American football, soccer, and tennis. Phoenix, a proprietary sports-betting company with headquarters in Malta and data-mining operations in the Philippines, won a £9 million ($13 million) investment in 2010 from a unit of RIT Capital Partners Plc, the £3 billion trust chaired by Lord Jacob Rothschild of the global banking dynasty. (RIT sold its stake in 2016 to a private buyer, quadrupling its money.) What isn't widely known is that Phoenix was founded by former employees of Woods, including his protégé Paul Longmuir.

Many of the biggest players in sports betting can trace a lineage directly to the Benter-Woods axis. For example, the Australian press has called Zeljko Ranogajec "the world's biggest punter." Today he runs a global algorithmic gambling empire, but he began his career in Las Vegas counting cards with Benter and Woods, then followed them to Hong Kong. During a rare interview in London, Ranogajec said, "A substantial portion of our success is attributable to the pioneering work done by Benter."

The Hong Kong Jockey Club now offers individual gamblers tools to help them mimic the betting patterns of the syndicates.
PHOTOGRAPHER: XYZA BACANI FOR BLOOMBERG BUSINESSWEEK

Benter has few regrets. One relates to an attempt in the early 1990s to create a model for betting on baseball. He spent three summers developing the system and only broke even—for him, a stinging professional defeat. America's pastime was just too unpredictable.

That failure, however, led to a second period of his career as lucrative as Hong Kong was. He worked with one of his baseball backers to start betting on U.S. horse racing. Parimutuel tracks are scattered around the country, and by the late 1990s it became easier to amass data on a lot of them. The U.S. business took off just as competition began eroding profits in Hong Kong. "There is a golden age for a particular market," he said, fiddling with a stack of decommissioned casino chips. "When there aren't many computer players, the guy with the best system can have a huge advantage."

In 2010, Benter married Vivian Fung, whom he'd met at the Rotary Club in Hong Kong. The couple have a young son, and Benter seems in every sense a contented man. An active philanthropist, he donated $1 million to a Pittsburgh charter school program and $3 million to a polio immunization effort in Afghanistan, Pakistan, and parts of Africa. In 2007 he started the charitable Benter Foundation, which donates to health, education, and the arts. Many of the people he meets at fundraising galas and nights at the opera have no idea how he made his money.

And how much is that—exactly? During our interviews, it was the one topic that made him visibly uncomfortable. William Ziemba, a finance professor at the University of British Columbia who studied the Hong Kong syndicates, has said that a first-rate team could make $100 million in a good season. Edward Thorp (who's still writing about gambling in his 80s) asserted in a 2017 book that Benter had a "billion-dollar worldwide business betting on horse races." When pushed, Benter conceded that his operations have probably made close to a billion dollars overall, but that some of the money has gone to partners in Hong Kong and the U.S. "Unfortunately," he said, "I'm not a billionaire."

Thirty-two years after he first arrived in Hong Kong, Benter is still betting on horses at venues around the world. He can see the odds change in the seconds before a race as all the computer players place their bets at the same time, and he's amazed he can still win. He continues tinkering with his model. The latest change: How much does moving to a new trainer improve a horse's performance?

Benter also runs a medical transcription company, but it's only modestly profitable. "I find the real business world to be a lot more difficult than horse racing," he told me. "I'm kind of a one-trick pony." —With Jonathan Browning and Giles Turner