People who go around trying to invent something fall on their tails. The best inventions come from people who are deeply involved in trying to solve a problem.

- Howard Head

The Story of Howard Head

How One Man Reinvented Two Industries

Nothing marks the spot. No notebook logs the moment. Nobody even remembers the conversation. All we know is that at some point during a train ride from Vermont to Maryland, Howard Head made a boast that was to lead him to revolutionize not just one industry, but two.

It was the spring of 1947 and Howard Head was an engineer for the Martin aircraft company. Needing a break from work, he joined a few friends for a week of skiing.

By the end of the week, Howard Head was ambivalent about the sport.

On one hand, there was nothing like the feeling of sailing over the snow. On the other hand, he could not deny that his performance was less than stellar.

He fell a lot.

On the way home to Maryland, Howard Head stayed up with a group of friends in their coach aboard their train. Eventually, the topic of their performances came up.

Not willing to shoulder all of the blame for his poor performance, Head explained that, while he was undoubtedly a bad skier, his long, heavy hickory skis hadn't done him any favors.

He then boasted that he could make a better ski out of aluminum, fiberglass, and other aircraft materials.

Back at the office, Head began to chew on the problem. He started doodling. He conducted some quick stress analyses of both hickory and aluminum. It soon became clear that, theoretically at least, he could build an aluminum ski that was as strong as one made from wood but would be both more flexible and weigh only half as much.

By August, Head was feeling confident enough about his ideas to tap into his savings, quit his job, and set up a small workshop. He then spent the next 5 months designing and manufacturing 6 sets of skis.

These skis were different from anything that had been seen before on the slopes. Instead of being wooden planks, they were elegant composite structures of aluminum, plywood, and honeycomb plastic.

Certain he had revolutionized the industry, Head returned to Stowe that winter to meet with several ski instructors. After spending a few minutes discussing his new skis with them, one of the instructors picked up a ski and flexed it to test its camber.

It broke.

The instructor then picked up another ski and proceeded to break it as well. Within minutes, all of Head's beautiful new skis lay in pieces in the snow.

So Howard Head went back to the drawing board.

Howard Head spent the rest of the winter and spring refining and modifying the design and, by the end of the

year, he had built — and seen destroyed — more than 18 pairs of skis. However, in the process he had also created a ski that could not be broken.

But that wasn't enough.

Head then spent two more years, and another 20 pairs of skis, developing a running surface that would remain clean of snow. In the process, he also added metal edges to his skis to make them easier to use under icy conditions.

The years of work finally paid off in the spring of 1950. By the point, Head had created a ski that was stronger, faster, and easier to use than anything else on the mountain.

In fact, they were such an improvement over the state of the art that they earned the nickname of "cheaters."

However, Head realized his work was not yet done. He knew that amateurs would be most likely to buy his skis if they saw them being used by instructors, the ski patrol, and other professional skiers. As a result, Head spent the next 9 years improving his skis and, by 1959, had created a ski that was adopted by most of the racers in the sport.

The result was that Howard Head sold 56,000 pairs of skis in 1961 sold Head Ski to AMF in 1969 for $16 million. Head's take from the sale of Head Ski to AMF was $4.5 million.

But that's not the end of the story. Planning on living the lifestyle of a retired multi-millionaire, Head bought a large home in a Baltimore suburb. Needing something to do for exercise, Head built a tennis court in his back yard and took $5,000 worth of tennis lessons.

But there was a problem.

Howard Head was a crummy tennis player.

In fact, the only way his instructor would agree to continue giving him lessons was if he agreed to buy a ball machine and practice every day. Head did as he was told and bought one from the Prince manufacturing company.

Ever the engineer, Howard Head grew curious about how the machine worked, so he took it apart. Upon examining the machine, Head was impressed with the ingenuity of its design but found it to be full of bugs. He called the company and ended up driving up to the company's offices in Princeton, New Jersey to present them with his suggestions for improving the machine.

After working with them over the course of a year, and making a few more trips up to their facilities, Head bought 25% of the company and was appointed both chief design engineer and chairman of the board. The Prince ball machine soon captured half of the market.

But Howard Head was still a crummy tennis player.

The improved ball machine didn't improve his game significantly. Instead, it just allowed him to scatter even more balls around the court.

However, Head once again refused to accept sole responsibility for his performance. Instead, he again blamed his equipment and not himself for his poor performance.

Retreating to his basement workshop to analyze the problem, Head quickly determined the reason he was such a "scatterball" was that the racket would twist in his hands if he did not hit the ball within the racket's tiny "sweet spot." Head then spent the next two years experimenting with ways to increase the size of the racket's sweet spot.

But nothing worked.

One night, after months of wrestling with the problem, Howard Head went to bed as usual and awoke from a dream with the insight he needed.

He had to make the head of the racket bigger.

Head knew from his familiarity with physics that, due to something called the polar moment of inertia, a small increase in the width of the racket would result in a dis-

proportionately large increase in the size of the racket's sweet spot. A racket that was just 2 inches — or 20% — wider than usual would be 40% more resistant to twisting.

Howard Head quickly made a prototype of his wider racket and found that it was indeed a significant improvement. The racket was much more stable than his old wood model and his game improved immediately.

After making a few more tweaks to his design, Head took the idea to the Prince board in 1975.

While they were skeptical, the prototype convinced them to invest in the development of what was to become known as the Prince tennis racket. Head spent the next year improving the design and proving it was patentable.

Remembering the Head ski did not take off until it was made suitable for instructors and professionals, Head spent the next years developing rackets that were suited for the pros. The result was numerous stories of rejuvenated careers, dramatic upsets, and jumps in the rankings by players who used Prince rackets.

This publicity was soon augmented by the word of mouth advertising of amateurs who were saying things like "I'm getting more balls back," "I don't have to be as careful," and "I am beating people I never beat before."

Prince tennis rackets were soon adopted by more than 700,000 players and grabbed 13% of the market in less than 4 years.