

Dick Drew and the Invention of Masking Tape

Dick Drew's development of the first masking tape is an example of his extraordinary gift for solving customer problems. In the early 1920s, 3M manufactured and sold abrasives

One afternoon, Drew wanted to test a new batch of sandpaper, so he visited an auto body shop in St. Paul, Minn. When he entered the shop, he heard a group of workers cursing vehemently. He asked about the problem. Two-tone cars were popular then, but the effect required workers to mask certain parts of the auto body using a combination of heavy adhesive tape and butcher paper. After the paint dried, workers removed the tape – and often peeled away part of the new paint. Their labor was undone, and costs mounted for the customer.



Drew watched as the workers began to touch up the flawed paint. He could have seen this as an opportunity to sell more sandpaper, but realized that what the customer really needed was a tape with less aggressive adhesive. Drew also realized that 3M already had several of the elements of tape making at its disposal. Sandpaper required a backing, an adhesive and an abrasive mineral. Hold the mineral and you have an adhesive tape.

Drew took his idea back to the lab. He began a long and frustrating quest for the right combination of materials to create what would become the world's first tape specifically designed for masking. Drew wrestled with the adhesive and, especially, the backing. After some time, then-President McKnight told Drew to drop the project and get back to work on improving sandpaper.

Drew agreed – for about 24 hours. Then he thought of a new way to handle the backings and went back to the lab. He threw himself into the task with renewed enthusiasm and without concern for McKnight's direction. In the middle of an experiment, a door opened and McKnight entered the lab. He looked at Drew, noted the experiment and continued walking.

Drew finally hit on the right combination of materials, and he asked McKnight to approve funding for a paper making machine needed to manufacture the new tape. McKnight considered the proposal, but demurred. Rather than give up, Drew simply applied his talent for innovation. In his capacity as a researcher, he had authority to approve purchases of up to \$100; he began writing a flurry of \$99 purchase orders and later confessed his strategy to McKnight while he was showing him the new machine.

There's no record of McKnight's reaction, except that Drew continued to work for 3M. The non-exchange between McKnight and Drew in the lab, followed by Drew's openly insubordinate purchase of the papermaker, have echoed through 3M's research operations ever since. Together, they set forth a clear ethic for managers: "If you have the right person on the right project, and they are absolutely dedicated to finding a solution – leave them alone. Tolerate their initiative and trust them." Another axiom that grew out of Drew's determination as well as that of other researchers over the years was the following: "It is better to ask forgiveness than for permission."

Patsy Sherman and the Invention of Scotchgard

Fluorochemical technology contributes to a broad array of 3M's modern day products and processes. So it may be difficult to believe that, once upon a time, 3M was all but stumped by the challenge of how to create a successful new product from fluorochemicals.

That challenge was met by Patsy Sherman, a young chemical researcher who joined 3M in 1952. Sherman was assigned to work on a project to develop a rubber material that would resist deterioration from jet aircraft fuels. As is often the case with innovative breakthroughs, Sherman failed to solve the problem assigned to her, but discovered, instead, a whole new way to put fluorochemical compounds to use. It all began with the careful attention paid by Sherman to a seemingly trivial accident.



In 1953, an assistant in Sherman's lab spilled some drops of an experimental compound on her new tennis shoes. The assistant was merely annoyed by her inability to clean off the drops – soap, alcohol and other solvents were of no avail.

But Sherman was fascinated by the amazing resiliency of the experimental compound. With the help of fellow 3M chemist Sam Smith, Sherman began to conceive of an idea that seemed unthinkable at the time – the development of a fluorochemical polymer that could actually repel oil and water from fabrics. They set to work to enhance the liquid repellency of the experimental compound, as well as to reduce its cost.

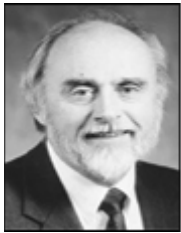
In 1956, as a result of the joint research of Sherman and Smith, the Scotchgard™ Protector was launched in the marketplace. The unarticulated need of customers for a versatile fabric and material protector had been articulated – and satisfied – at last. The broad line of successful Scotchgard™ brand products was under way.

And the Scotchgard™ brand has remained the market leader ever since – though 3M has never ceased to make innovative improvements in the product line. Fittingly, it was Smith's son, Richard – following in his father's footsteps as a 3M researcher – who enhanced the environmental performance of Scotchgard™ brand products.

Quite literally, the discovery of the Scotchgard protector stemmed from an accident. This led many to observe that 3M had a seeming knack of stumbling onto new products. But as 3M executive Richard P. Carlton wryly and wisely observed, "You can't stumble if you're not in motion."

As for Sherman, her subsequent career at 3M was one of constant innovative motion. She eventually became manager of 3M Technical Development, and established a continuing technical education program for 3M technical employees. She retired in 1992.

Through all her success, Sherman has retained her appreciation for the role of the unexpected in innovation. "How many great discoveries," she once asked, "would never have occurred were it not for accidents?"



Art Fry

Art Fry and the Invention of Post-it® Notes

The 3M dedication to innovation is always a team effort. Innovators learn that it's better to ask for forgiveness than for permission.

The Post-it® Note is one of the best known of all 3M products. It is used by loyal customers all over the world, many of whom declare that they can't imagine how they ever got along before Post-it® Notes were invented.

It's equally difficult to imagine a time when 3M was struggling to find a use for the repositionable adhesive that makes Post-it® Notes so versatile. But that was precisely the case back in the early 1970s – before a team of tenacious innovators at 3M created the product that permanently changed the way we communicate.

3M research scientist Dr. Spence Silver first developed the technology in 1968, while looking for ways to improve the acrylate adhesives that 3M uses in many of its tapes. In a classic case of innovative serendipity, Silver found something quite remarkably different from what he was originally looking for. He was trying to create a strong adhesive, but instead he accidentally developed a new adhesive that was even weaker than what 3M already manufactured. It stuck to objects, but could easily be lifted off. It was super weak instead of super strong. It was an adhesive that formed itself into tiny spheres with a diameter of a paper fiber. The spheres would not dissolve, could not be melted and were very sticky individually. But because they made only intermittent contact, they did not stick very strongly when coated onto tape backings.

Silver knew that he had invented a highly unusual new adhesive. Now the challenge was: What to do with it? For the next five years, Silver gave seminars and buttonholed individual 3Mers, extolling the potential of this new adhesive and showing samples of it in spray-can form and as a bulletin board.

At last, Silver found a powerful ally in Geoff Nicholson, who joined the former Commercial Tape Division in 1973. A mere two days after Nicholson began his job as new products development manager, Silver seized the initiative and made a presentation on his adhesive. Nicholson was convinced of its importance and became a champion of its use in products such as bulletin boards in the form of tiles and tapes.

But the ultimate product niche was discovered by Art Fry, a new-product development researcher who had attended one of Silver's seminars and was intrigued by the strange adhesive. Fry's intense curiosity – and penchant for practical solutions – went back to his days growing up in a small Iowa town, where he would turn spare lumber into custom-designed toboggans that sailed over the winter snows.

Many 3Mers know the famous story of how Fry came upon the Post-it® Note concept out of frustration at how his scrap paper bookmarks kept falling out of his church choir hymnal. In a moment of pure "Eureka," Fry realized that Silver's adhesive could make for a wonderfully reliable bookmark. The broader concept of the Post-it® Note soon followed, along with paper tapes and labels using Silver's adhesive.

But there remained skeptics within 3M as attempts were made to launch this new product. Engineering and production people told Fry that Post-it® Notes would pose considerable processing measurement and coating difficulties and would create much waste. Fry's response demonstrated the approach of the true innovator: "I said, 'Really, that is great news! If it were easy, then anyone could do it. If it really is as tough as you say, then 3M is the company that can do it.' "

And, of course, there was the market research which is extremely difficult with revolutionary new products. Who would pay for a product that seemed to be competing with cost-free scrap paper? Despite the initial "kill the program" efforts, Nicholson convinced Joe Ramey, the division vice president, to come with him to Richmond, Va., and walk up and down the streets on "cold" calls to see if they could sell the product. They did, and this almost-killed program was resurrected.

The result is, as they say, history. In 1981, one year after its introduction, Post-it® Notes were named the company's Outstanding New Product. Fry was named a 3M corporate scientist in 1986.

Now retired, Fry looks back on the many innovative products – such as the Post-it® Pop-up Note Dispenser and the Post-it® Flag – that have followed upon the original Post-it® Note. "It is like having your children grow up and turn out to be happy and successful," he beamed.