

## ANNALS OF INVENTION

## THINKING IN THE RAIN

An artist takes on the umbrella.

## BY SUSAN ORLEAN

The Steve Hollinger experience can be described most simply as multimedia. For one thing, it includes olfactory surprises. My apartment was right above Steve's for several years, and on a regular basis he would call to warn me about odors that might waft their way from the second floor, where he lived, to my apartment on the third. Once in a while, the warning was about something he'd be cooking, but often it was more unexpected; he would call to say that he was going to be using turpentine, or linseed oil, or exotic solvents, or some kind of stinky paint, and wanted to make sure that the smell wouldn't drive me crazy. Other calls were about surprising noises: "I'm going to be using a table saw to cut up some ammunition boxes, so I hope it's not too loud," or "I'm drilling through some chunks of cement, so let me know if it bothers you."

One day last year, Hollinger walked around his neighborhood carrying another one of his surprises. The neighborhood is Fort Point Channel, a cluster of decommissioned factory buildings in downtown Boston which now house hundreds of artists, so it is commonplace to see residents kitted out in attire not sold at Talbots, carrying objects that appear extraterrestrial. Even so, Hollinger attracted attention. He had spent the previous month mostly locked in his apartment, furiously teaching himself the principles of aerodynamics, the physics of hydrology, and the basics of how to operate a Singer sewing machine, and he was at last testing what he had been working on—a reimagined, reinvented umbrella, with gutters and airfoils and the elegant drift of a bird's wing. "I knew I was on to something," he says now. "I was hardly outside for five minutes before someone stopped me and said, Where can I get one of those?""

Hollinger is not, per se, an umbrella man; he is a sculptor who makes assemblages out of found materials. They are

often kinetic and frequently reference other media: a solar-powered flip-book movie of Hollinger doing a war dance, which you view through a prism in a large cement block, or perhaps a series of photo emulsions peeled off Polaroids showing trees being immolated in a nuclear test in the nineteen-sixties, or twenty-five atomshaped spheres made of photo-sensitive tape, suspended between sheets of plate glass and a frame of barn wood. His sculpture has been displayed widely and is well respected, but it is his work as an inventor that pays most of his bills. He grew up in suburban Connecticut, but both his parents are artists, and bohemian enough to have found his unusual interests-breaking thermometers in order to add to his collection of mercury, for instance—the sign of a lively mind. He went on to study computer programming at SUNY Albany. When he graduated, in 1984, he worked first at Telex, a computer company in North Carolina, and then at Wang Laboratories, in Massachusetts, developing imaging-technology software. In 1989, he decided to become an inventor.

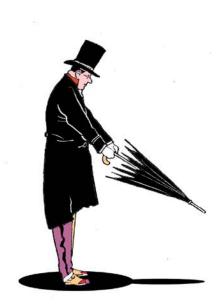
His first product was a program called PosterWorks, which allows images as large as five hundred feet by five hundred feet to be produced, in sections, on an ordinary printer. In other words, if you had PosterWorks and enough paper and tape, you could enlarge a snapshot to about the size of a cruise ship. Hollinger's invention was released at a time when most billboards were still painted by hand, so it was genuinely revolutionary and wildly successful, especially among commercial users: many movie posters, including the original "Terminator" poster, on Hollywood Boulevard, were printed using PosterWorks. In short order, Hollinger invented a light pen for drawing on computer screens; software for turning videos into thumb-operated flip books; perforated paper to print flip books; and programs that could turn any

photograph into either a paint-by-number or a connect-the-dots image. The inventions—and, in particular, Poster-Works—covered the down payment on his Boston loft, helped him publish a book about his father, the painter Morton Hollinger, and gave him fifteen years of steady income that he lived on while working on art, writing, community

your information printed so small that the card would appear to be blank except for a little black dot. Hollinger microprinted some business cards for himself, and when I visited him recently he fished one out of his wallet for me. Since it looked like a plain card with an almost indiscernible freckle in one corner, I asked him to explain what the value of

them as dysfunctional objects that might benefit from being reinvented. Stephanie Walker, who was then the director of the gallery, was watching the umbrella massacre with him. Knowing the way Hollinger's mind works, she wasn't surprised when he emerged a month later with a new vision for an umbrella and a patent application covering dozens of me-







Imperfect though umbrellas may be, they do have staying power: they have existed in nearly the same form since 1000 B.C.

projects, and more inventions, including the umbrella.

He loved all his inventions equally, although some were more practical than others. A few years after PosterWorks, Hollinger invented a system for animating three-dimensional objects using nothing but mirrors and lights. The prototype animated a human head, making it appear to talk and roll its eyes by using a spotlight to illuminate, in succession, one of ten little clay heads mounted in a box and having each image bounce off mirrors set at precise distances. He got it to work, as he says, "like a charm," and was so excited about it that when he finished the prototype he invited his friends over to celebrate. At the party, someone pointed out that there was no actual use for the invention, a consideration that had flitted through Hollinger's mind while he was working on the device but hadn't hovered long enough to discourage him. Around the same time, he developed a program for microprinting—that is, shrinking text and images to a nearly atomic level, so that you could have, say, a business card with all

such a card would be. He studied it for a moment and said, "The only people who would be able to read your card would be people who owned microscopes." Then he grinned and added, "I guess it would be a very selective thing."

Hollinger's umbrella project, which is at the other end of the usefulness spectrum from micro-printing, was set in motion in November of 2004, on a particularly lousy, wet day in Boston. Hollinger was walking through downtown on his way to the Chase Gallery to install his sculptures for a solo show. Ahead of him on the sidewalk was a man fighting with a tattered umbrella, which was funnelling rain onto the man's back rather than shearing it away from him. The futility and anguish of humankind's relationship with the umbrella stuck in Hollinger's mind. Later that afternoon, at the gallery, he watched as the wind punched umbrellas sideways and then bounced them off cars parked along Newbury Street. He had always liked umbrellas, and often sketched them, because he found them aesthetically interesting, but this was the first time that he considered chanical improvements. "I know how much he hates inefficient, bad design," Walker said recently. "And during that storm we were talking about how crazy and wasteful it was that umbrellas don't work well. So for him to invent a new umbrella made sense. I could really see him doing something like that." Walker is passionate about Hollinger's sculpture. "The first time I saw Steve's art work was the week I was getting married," she said. "I thought it was so amazing—so complex and sensitive and deep that I said to myself, If I meet this guy, I'm not going to get married!"

This was not the first time a Hollinger had responded to great need. In the late nineteen-sixties, the Catholic Archbishop of England dropped by to see Hollinger's father in his office in Portchester, New York. Morton Hollinger is an accomplished artist—he studied with the Italian artist Louis Di Valentin—with a long record of shows and awards. He also has a day job as the owner of a mail-order clerical-attire company. The Archbishop had come by to discuss bishops' clothing with Hollinger. A few years

before, Hollinger had made a splash in the business by figuring out how to make priestly garments less punishing. "They were so hot and uncomfortable," Morton Hollinger explained to me. "The priests were really suffering." He had responded by inventing and patenting two improvements on required clerical attire: a shirt to replace the bulky dickey and collar worn by the Christian Brothers order, and the Perma-tach, a much more comfortable banded-collar shirt for priests. "The priests really went for it," Morton said. "That's how it works with inventions. First comes the need, then come the resources. That's what I told Steve. With the umbrella, there is a need."

Imperfect though umbrellas may be, Lthey do have staying power: they have existed in nearly the same form since 1000 B.C., appearing in ancient Egypt, Greece, and China. Over the next few thousand years, umbrella design evolved: palm-leaf canopies were replaced with oiled silk, and then cotton, and then microfibre; whalebone and wood ribs gave way to steel and flexible fibreglass; stationary wooden shafts were updated to pencil-thin metal telescoping ones. But the need—or, at least, the impulse—to improve upon them has been around for almost as long. The United States Patent and Trademark Office, which, for patent purposes, groups umbrellas in Class 135—with tents, crutches, canes, and walkers—has more than three thousand active patents on umbrella-related inventions, including a weather-forecasting umbrella; one with a rain-measuring device; a luminous umbrella; a combined pet leash and umbrella; a strap-on umbrella for the pet; a mysterious and evil-sounding "multi-component electric stunning umbrella"; and Patent No. 20030155465, "a flying machine using umbrella-type devices."

There are so many people with ideas about umbrellas that the Patent Office has four full-time examiners assessing their claims. Totes Isotoner, which is the largest umbrella company in the country, stopped accepting unsolicited proposals several years ago. One of the problems, according to Ann Headley, the director of rain-product development for Totes, is that umbrellas are so ordinary that everyone thinks about them, and, because they're relatively simple, you don't need an advanced degree to imagine a way to redesign them, but it's difficult to come up with an umbrella idea that hasn't already been done. The three-section folding umbrella, for instance, which seemed so novel when it was first manufactured, in the nineteen-eighties, was actually patented almost a hundred years ago. Nevertheless, last year the Patent Office approved a hundred and sixty applications for Class 135 inventions; this



"If we're going to continue ignoring each other, we'll need a lot more reading material."

is about the number approved for inventions in Class 43—Fishing, Trapping, and Vermin Destroying—which includes sharper harpoons, stickier flypaper, and better mousetraps.

And still umbrellas are seriously flawed. They drip, they flip inside out, they snap in half, they poke bystanders in the eye. Their usable life span is sometimes as short as one big downpour, and then they transmogrify into unwieldy non-recyclable trash. In 2006, the design magazine I.D., the Web site Treehugger, and the Sustainable Style Foundation sponsored a contest to address what they termed "the umbrella problem," which encompassed both the poor performance of umbrellas and the issue of their afterlife. In announcing the contest, I.D.'s editor-in-chief, Julie Lasky, noted, "Umbrellas suffer from design flaws that often lead to their premature and messy deaths and unwelcome burials in landfills." The finalists in the better-umbrella category were the Pollinate Umbrella (made of recycled materials and entirely biodegradable); the Penta, which collects rain so that it can be used later to water garden plants; and the Crayella (the eventual winner), which featured easy-torepair ribs. (According to Crayella's designers, "Individuals can create microbusinesses that repair Crayellas quickly on the street, like offering a shoe-shine, and collect and repair discarded Crayellas for resale.") The second category called for "a couture garment constructed from former umbrellas." The winning entry was an evening gown made of salvaged umbrella canopies, with a fauxcorset made of discarded umbrella ribs, designed by the aptly named Rainer Wolter.

The rewards for whoever improves the umbrella are substantial. The annual retail market in the United States alone is now three hundred and forty-eight million dollars—about thirty-three million umbrellas. The rest of the world, including many cultures where umbrellas are used both as rain protection and as sun shade, consumes many millions more. Most umbrellas are manufactured in China, largely in the provinces of Guangdong, Fujian, and Zhejiang. (Shangyu, in Zhejiang province, has more than a thousand umbrella factories.) Few artisanal umbrellas are made, but Hollinger was so convinced that his design was worthy he decided that if he didn't find a manufacturer interested in licensing it he would produce the umbrella himself. His mother, Myrna, a sculptor who works primarily in the medium of dried fish, said about him recently, "Steve does have an almost magical way of thinking. But he's also very disciplined. He can really follow it through."

The Hollinger Improved Umbrella patent application 60/642,542—is teardrop-shaped: it has a rounded nose and a short tail, so it has a distinct front and back. The rounded nose and the shape of the dome optimize wind deflection around the canopy. Because it is elongated, it shields the user's legs from rain while he or she is walking. It is large, but the shape makes it narrow enough to allow umbrella-carrying pedestrians to walk side by side. A fabric gutter around the front rim captures and diverts rain so the flow off the dome doesn't land on the carrier's feet. One version of the design has a foot-long wind sock on top of the dome to release air pressure under the canopy, which makes it easier to walk into a wind. (Another version has a dozen wind socks, giving it the spikiness of a sea anemone.) The handle and the shank are wedge-shaped, so they are aerodynamic; the ribs, which are thin fibreglass, are enclosed within the canopy, so there are no eye-poking points along the edge.

The umbrella looks like a cross between a bike helmet and a sou'wester fisherman's hat—in fact, Hollinger made the pattern for his prototype using his bike helmet. His original model was made of silky black fabric with a fireengine-red underside, which he liked because even in a rainstorm it would make the user feel as though it were a really bright day. He began the project with no background in textiles, industrial design, sewing, or aerodynamics, and only a passing grasp of physics, but, as he says, "I like to learn." As he began work on the umbrella, he booked some time with the person who runs M.I.T.'s wind tunnel, for a crash course in aerodynamics, and he studied Frisbee patents, to try to understand how air moves over objects. When he was in the most intense phase of inventing, Hollinger, who lives alone but has a busy social life, cancelled all his plans and left his apartment only to go to the bookstore at the Harvard Coop, because it had good



"The first step toward enlightenment is disillusionment."

coffee as well as legal and physics textbooks that he could look at for reference.

He knew what he thought the umbrella should be—a sleek, convex curvebut making it was tricky. Fabrics that seemed umbrella-like were often too thick for him to sew, and the material he liked the most, a luminous yellow rubbery synthetic, got stuck to his sewing machine. The hems of the different sections didn't seem to match up, no matter how many times he measured them. He ripped apart a score of umbrellas to cannibalize their ribs and stems. He threw out countless botched efforts but kept tracing the shape of his bicycle helmet on sheets of fabric, pinning them, stitching them, stretching them over the salvaged frames. "When I thought I had finally worked

out the design, I was so excited!" he told me. "I drove over to my best friends' house that night, had them sign a nondisclosure agreement, and showed them the umbrella."

As he was telling me this, Hollinger fiddled with his bike helmet, which still had the paper-pattern shapes taped to it from its use as an umbrella template. At the time, we were in Hollinger's loft, which has brick walls and a huge picture window. It is minimally decorated in a conventional sense, but Hollinger has pieces of art (his own and friends') everywhere, and long shelves lining one side of the loft are loaded with material that he has collected either for use in his sculpture or simply because he liked it: empty an-

chovy tins, magic lanterns, porcupine quills, a spider in formaldehyde, antique hypodermic needles, rusty things that he has salvaged from Boston Harbor, an aluminum prosthetic leg with interesting-looking joints, leaves, spider webs, wooden explosives boxes, a preserved two-headed bird with three eyes ("a real prize," he said), and an extensive collection of old cloudy glass bottles.

The cumulative effect of all this is somewhat baroque. By contrast, Hollinger's own affect is sunny and collegiate. He is small and slim, with mad-scientist dark hair and eyebrows, fine features, and a charming smile. He could be one of Groucho Marx's best-looking relatives. He is forty-six years old and is invariably dressed in jeans, a T-shirt, some sort of unbuttoned plaid shirt, and sneakers. He does not spend all his time in front of the computer; he camps and hikes and keeps a banged-up motorboat in a marina in South Boston. While cruising in Boston Harbor a few years ago, he came upon an abandoned military base on an obscure island, and he is working on an art piece documenting the vegetation creeping back over the military compound. He started a free film series in the neighborhood, which is held in a park across from his apartment. (The movies are projected on a sheet of canvas.) He knows nearly everyone in the area, in part because he's very friendly and in part because he has been involved in community organizing and negotiation with the city to build more parks nearby and to preserve Fort Point Channel's historic character. He has also just written a screenplay called "The Ruby and the Prism," about an inventor named Frank who travels to Antarctica after a painful divorce in order to unravel some family secrets. Hollinger sometimes refers to a painful breakup in his own past, but the most explicit parallel between the screenplay and his life is, of course, Frank's profession. Hollinger plans to patent at least two of the inventions that Frank uses in the screenplay. He says he thinks it would be great to have them hit the market just as the movie is released.

As soon as Hollinger finished building a model of his umbrella, he filed a patent application. (Since applications take as long as three years to process, inventors approach manufacturers well before a patent has been granted or denied.)

He contacted Totes and Tumi—both companies declined to pursue it-and HandsOnToys, which is based in Lawrence, Massachusetts, outside Boston. HandsOnToys, or HOT, looked at the prototype and told him that it wanted to license the umbrella. The connection with HOT isn't as unlikely as it might seem: one of the company's founding partners, Arthur Ganson, is an old friend of Hollinger's and, more significant, also a sculptor and inventor. Ganson invented HOT's first product, Toobers and Zots, which are moldable foam tubes. That invention came about because, one day at a street festival, Ganson, who was slightly inebriated, saw someone carrying a long, skinny, squiggly balloon and thought that it was some kind of bendy foamand a really neat toy. When he sobered up, he realized his error but decided to go ahead and invent moldable foam tubes. In 1994, the first year that Toobers and Zots were on the market, HOT sold nearly four million dollars' worth of them. It sold ten million dollars' worth the second year.

Rustam Booz and Andrew Farrar, who are also principal partners in HOT, were not actively looking to enter the rain-gear business, but they have a keen appreciation of serendipity. Besides Ganson's accidental invention of Toobers and Zots, they have profited greatly from another bit of chance. In 1999, they were débuting the Wiggly Giggly Ball, a toy for toddlers that made weird, funny noises when it rolled. They had registered late for the Atlanta Gift Show and, as a result, were relegated to the pet section—seemingly a disaster, until pet-toy buyers passing their booth happened to take note of the Wiggly Giggly and thought it might appeal to dogs. The next thing Booz and Farrar knew, they were selling two million Wiggly Giggly balls a year for pets, and had been offered eight million dollars to sell the product outright. The company now makes thirty different toys. The most popular product is Floam, a craft material made of small plastic beads suspended in a gluey medium. HOT first sold Floam via infomercials, then began distributing it through stores, where it has gone on to make a hundred million dollars worldwide.

"Floam opened our eyes to the directresponse marketing world," Farrar told me. "The direction we're going in now is to do research-and-development and licensing, not the manufacture of toys. So the product matters less than the process of marketing it. We've known Steve for a long time. He brought the umbrella to us, and it seemed like a good fit. We have very high hopes for it."

Not long ago, I joined Hollinger at a meeting with Booz and Farrar to see how the umbrella was progressing. It was a bitterly cold day, and the HOT office, in an old mill building, was drafty, although a fake fireplace made of Wiggly Giggly balls gave it a cozy feel. The meeting was supposed to include an unveiling of the first manufactured prototype of the umbrella, but the prototype, which had been made in Shangyu, had been waylaid en route from China by U.S. Customs, and wouldn't arrive in Massachusetts for a few more days. There were plenty of other umbrella issues to discuss, but, as we sat down, Hollinger excitedly announced that he had another invention he wanted to talk about—one of the products he'd written into "The Ruby and the Prism." "It's a complete redesign of a camping tent," he said. "It will be double-walled, and it'll have a layer of low-pressure gas or air between the two walls, so it'll always be warm. It could even be filled with argon, and you'd create a vacuum so that the temperature would remain constant."

Farrar had been writing the meeting agenda on a whiteboard. He turned to Booz. They exchanged a tiny look, and then Farrar said to Hollinger, "We'd be very interested."

"It will definitely work," Hollinger said.

"It could even have an application as refugee housing," Booz added.

They talked about the tent for a moment, and agreed that Hollinger would show them his material once he had filed his patent application. Then they discussed the umbrella and talked about two possible competitors: the new Senz, an asymmetrical umbrella designed by Dutch university students that was just being marketed in the United States by Totes; and the Fanbrella, which folded into a flat tube.

"Speaking of which, where are we with names for our umbrella?" Booz asked. Hollinger showed them a list of

names he had considered—Sou'wester, Windwalker, Stormwalker.

"I also have a possible patent for a golf umbrella called the Forewind," he said.

"Sounds too much like 'foreskin,'" Farrar said.

They talked for a moment about the two marketing approaches they were considering—through television infomercials and through high-end designers. The infomercials would appeal to people who want to buy something clever and useful, but the simple beauty and elegance of Hollinger's design would also appeal to the fashion world. Farrar mentioned that he had a friend who might be able to get them a meeting with a prominent designer, and that if she liked the umbrella she might be persuaded to do a version for the fashion market, which would be sold through her line of clothing. Booz mentioned the name Bella Brella. He said, "It has a nice ring to it."

"I like Forewind," Hollinger insisted.

"I think the name Bella Brella is killer," Booz said. "You'd get noticed. But what you really want is to have rain break out at the U.S. Open and then have everyone open one of the umbrellas—*Poof! Poof! Porf! Perfect.*"

They spent a while discussing the international patents they'd applied for, the fact that they were hoping to get the umbrella to magazine editors by this spring, and a meeting they were having the next week with J. D. Ma, who is based in suburban Chicago and works as a liaison between American companies and Chinese factories. "I've heard horror stories about some Chinese agent who was knocking off the products he was representing," Hollinger said, looking worried.

"J.D. is a good guy," Booz assured him. "We were introduced to him through Floam."

A few days later, the prototype was cleared through customs and arrived in Massachusetts. Hollinger told me that he was going to ask Booz if he could come see it—a formality that surprised me, but once an inventor licenses a product he or she often has little to do with it. In this case, Booz and Farrar have kept Hollinger quite involved. After he saw the umbrella, Hollinger wrote me an e-mail, saying, "My opinion: on the up side, it looks attractive (maybe more elegant than sleek), on the down side—it needs a lot of work. . . . Over all, I was pretty happy—mainly from just seeing it as coming to some kind of reality."

Ifinally saw the Hollinger Improved Umbrella the following week, at the meeting Booz and Farrar had with Ma, in his Chicago office. The umbrella was Ma's first foray into the rain-gear world. One of his companies, SLIS, Inc., oversees the production of many of HOT's toys, including the entire Floam



"As you can see, this stimulus package also includes babes."

line (Floam, Floambots, and Floamies). Ma's other company, Really Useful Products, makes his own line of novelty pens, party string, casino-chip key chains, and all manner of lighted objects (including safety wands, blinking-shamrock bracelets, and miniature reading lights that clip onto your ear). Ma is a tall, genial man with an explosive laugh. When Booz pulled the umbrella out of his hand luggage, Ma took one look and roared, "Oh, the shape is there! I feel confident!"

He held the umbrella open over the conference table. It was made of shiny black fabric with a pale-yellow underside, shaped like a dewdrop, with a high dome and an elongated tail. The factory had tooled the handle wrong, so it was attached backward, and the stays were twisted, and there hadn't been enough time to finish the grip, so there was only a nub of white plastic where a soft foam cushion would eventually go, and the handsome brass button, which was supposed to go on the hub on top of the dome, was missing; a work in progress, for sure, but you could still see in it the hand of an artist sketching a pleasing shape that could skim through the wind, raindrops skidding off it.

Ma twirled the umbrella in his hand, and it dipped and fluttered. "I think this is for fashion people," he said, cheerfully. "This is for New York people."

"We'd like it to be for one in ten people," Farrar said.

Over the next few weeks, Booz and Ma went to Shangyu to visit the factory, to insure that it made the necessary changes to the prototype before producing any more umbrellas, and Farrar met with a company in New York that might work on an infomercial to launch the umbrella. They had not decided on a price, and they still had not settled on a name. In the meantime, Hollinger had been buying up all the Internet domain names they might possibly use. He was also preparing a provisional patent on his vacuum tent, and had begun work on the other invention from his screenplay—a device that could resolve images recorded in ice, based on his theory that light leaves visual information in the crystals as they form. As he explained it to me, a piece of ice could be treated with a

chemical so that it could hold an image just the way photographic paper does, so if you had a piece of ice outside that had been prepared with the chemical, you would be able to see a sort of movie of everything that had ever happened to the ice, or near the ice, or maybe everything that had ever happened, ever. "The only far-fetched part is the assumption that diffused sources of light recorded without a lens could somehow be analyzed and reconstructed," Hollinger wrote to me recently. "I'm not saying that's impossible—but that is the tough part." He was also making some new sculptures for his next solo show. His last show was called "Atomic" (each sculpture was named either for one of the nuclear tests in the nineteenfifties and sixties or for one of the islands that was used for target practice). Most of the pieces, which were constructed in old explosives boxes, moved in some way, using solar power. He said that these new pieces would be as fragile as clouds, suspended on armatures as fine as hair, and they could be moved by even the slightest breath of wind.

Hollinger told me that he was impatient to see the umbrella on the street and hoped HOT would manage to get it out by this spring, as the company was promising, but that he was busy enough to keep his mind off it and wait.

I mentioned that even though the Hollinger Improved Umbrella seemed to solve all the major umbrella problems, like wind resistance and dripping edges and snapped shanks and broken ribs, the one thing that his invention hadn't addressed was the problem of losing your umbrella. He said that someone had recently patented a two-part device that attached to your umbrella and to your key chain, and if you walked too far away from your umbrella your key chain would beep, alerting you to the fact that you had left your umbrella behind. He said that he thought it was a good invention, one he felt he couldn't improve upon. "You could try to improve your memory," he said. "Otherwise, I don't think there's anything you could do." ♦

SLIGHT HEADACHE DEPARTMENT Headline in the Palm Beach Post.

LOSS OF LIMBS IRKS RESIDENTS OF RURAL ROAD