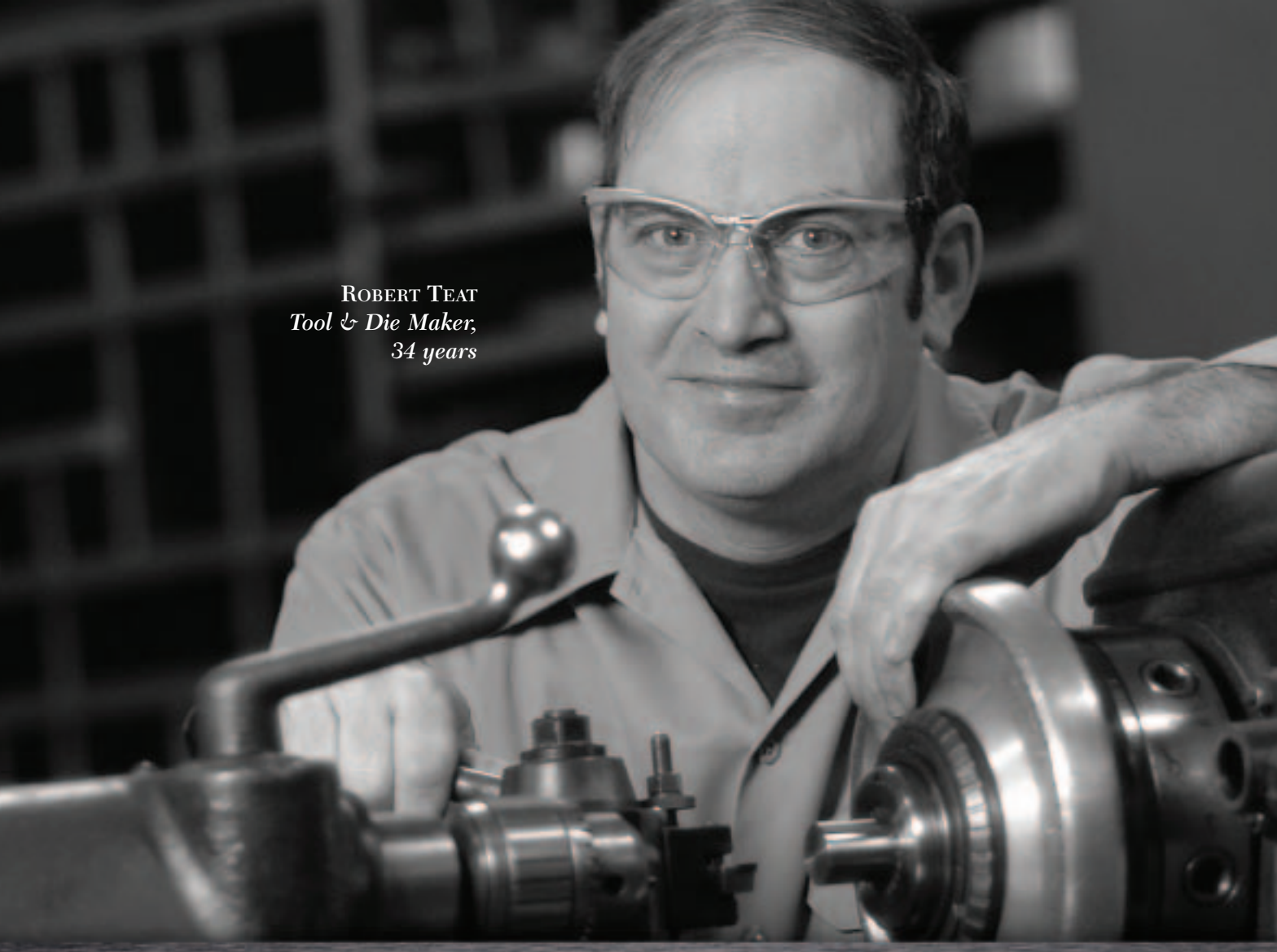
BOSS

CONNECTING TO INDUSTRY

Festive Fireworks

The colorful pyrotechnics that inspire 'oohs' and 'aahs' require craftsmanship, precision—and creativity

FALL/WINTER 2010
ASIA/PACIFIC – SPRING 2011



"PRODUCT DESIGN IS A NEVER-ENDING PURSUIT AT DIXON. IT'S WHAT WE DO TO IMPROVE PRODUCT FUNCTIONALITY, DURABILITY AND

VALUE.

I TAKE THAT RESPONSIBILITY SERIOUSLY."

DIXON

The Right Connection™

dixonvalve.com

BOSS

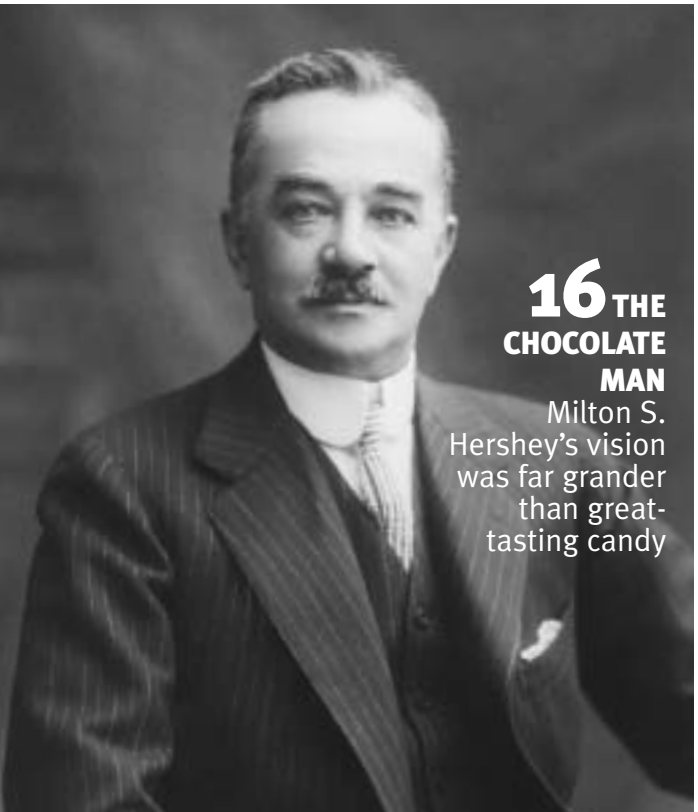
FALL/WINTER 2010
ASIA/PACIFIC – SPRING 2011

departments

on the cover

Fireworks, manufactured in Canada, light up the night sky in Manila during the World Pyro Olympics.

features



Success That's Truly Sweet

MILTON S. HERSHEY, who is featured in our biography section this issue, was not only a terrific businessman; he was a caring and charitable person. Through hard work and perseverance, he hit upon the recipe for making an affordable chocolate bar that the public adored—an innovation that earned him millions of dollars. Mr. Hershey went on to invest much of his wealth in bettering society—by establishing a model company town and a school for orphan boys, among other things. I am struck by his words: "What good is one's money unless one uses it for the good of the community and humanity in general?"

Those of us in business who adhere to the principles of character (Respect, Responsibility, Caring, Citizenship, Trustworthiness and Fairness) can only look at his story and wonder what more we could do for our employees, customers and community.

Success seems to follow those who truly believe in doing the right thing. Most of us will never be in the position to make the lasting difference that Mr. Hershey did. But we can, as individuals, be more successful by concentrating on others by providing the best workplace possible, as well as superior products and service.

I hope you enjoy this issue of *BOSS* magazine—and please let us know how we can improve. Your business is appreciated and our team will continue to work hard to provide the best products and service.

Thanks for reading.

Dick Goodall

BOSS

FALL/WINTER 2010
ASIA/PACIFIC – SPRING 2011

Publisher
Dixon Valve & Coupling Company

Editor
Sue De Pasquale

Editorial Board
Richard L. Goodall, CEO
Louis F. Farina, Senior Vice President, DVCC
Douglas K. Goodall, President, DVCC
Bob Grace, President, Dixon
Taylor Goodall, Vice President, Distribution, Dixon
Scott Jones, Vice President, Sales & Marketing, Dixon
Mark Vansant, Vice President, Dixon
Joseph Dawson, Vice President, Dixon Specialty Hose
Karen R. Hurless, Advertising & Communications Manager

Editorial & Design
Alter Custom Media
www.altercustommedia.com

Art Director
Kim Van Dyke

Copy Editor
Chris Zang

Please submit address changes to:
Alter Custom Media
Attn: Kara Snyder
1040 Park Ave., Suite 200
Baltimore, MD 21201
443-451-6024
Fax: 443-451-6025

BOSS is produced three times a year by Dixon Valve & Coupling Company and Alter Custom Media. The acceptance of advertising does not constitute endorsement of the products or services by Dixon Valve & Coupling Company. The publisher reserves the right to reject any advertisement that is not in keeping with the standing or policies of Dixon Valve & Coupling Company.

Dixon Valve & Coupling Company
800 High St.
Chestertown, MD 21620
877-963-4966
Fax: 800-283-4966
www.dixonvalve.com

E-mail questions or comments about BOSS to: boss@dixonvalve.com

Being Basically Honest

BY MICHAEL JOSEPHSON

After a workshop, a fellow said, "I don't always play by the rules or tell the truth and some of the things you said made me a little uncomfortable. But I realized I'm 'basically' honest. Isn't that enough?"

I don't think so.

What does it really mean when someone declares that they're "basically honest"? I think it means that they are willing to be honest unless it costs too much. They're willing to be honest as long as they get what they want. In the end, I think it means "being honest enough." It reminds me of a cartoon where one man is talking about another: "I admire honesty, but his insistence on being scrupulously honest is really annoying."

People who are content being basically honest are admitting that, when the stakes are high enough, they're willing to be dishonest. Doesn't that mean they're basically dishonest?

After all, how many times do you get to lie before you are a liar? How many times does someone get to lie to you before distrusts sets in? A former presidential press secretary told a university audience that he believed in always telling the truth to the press. "That way," he said, "they will believe you when you have to lie." Honesty isn't just an illusion created for public relations. The best liars rarely lie.

That's the secret of their success. They may be basically honest, but they're not trustworthy.

Reprinted from, You Don't Have to Be Sick to Get Better. *Josephson Institute of Ethics. ©2001 www.josephsoninstitute.com. Permission given by the Josephson Institute of Ethics.*

Tormented Flag Bearer

Immortalized in an iconic photograph, Ira Hayes didn't embrace fame's salute

BY MARIA BLACKBURN

Ira Hamilton Hayes never wanted to be a hero. The quiet, self-effacing young man was loyal to his family and his fellow U.S. Marines, proud to serve his country during World War II, but was not the type of person to seek recognition.

If an Associated Press photographer named Joe Rosenthal hadn't snapped an image of 22-year-old Hayes and five other soldiers raising a U.S. flag on the island of Iwo Jima on Feb. 23, 1945, few people outside of Hayes' family and friends would know who he was today.

But in 1/400th of a second, the time it took to capture the photograph, Hayes' life changed forever. The photo taken on top of Japan's Mount Suribachi landed on the front page of newspapers around the world and became a national symbol of victory and hope. Hayes embarked on a 33-city war bond tour with Rene Gagnon and John Bradley, the two other men in the photo who survived the battle, and was heralded by throngs of Americans and paraded before reporters and photographers who chronicled his every move. The photo of the six men struggling against the wind to raise the flag adorned a U.S. postal stamp, was memorialized in dozens of books and movies and today stands frozen in time in bronze as the Marine Corps War Memorial in Arlington, Va.

The photo made Hayes famous. He spent the 10 years after it was taken trying to live it down.

All he did was help erect a flag on top of a hill. How could he feel like a hero when the 36-day battle resulted in more than 26,000 Allied casualties, including the deaths of 5,931 Marines, Hayes wondered?

"Most of our buddies are gone," he told *The New York Times* in August 1946, on the first anniversary of the victory over Japan. "Three of the men who raised the flag are gone. We hit the beach on Iwo with 250 men and left with 27 a month and a half later. I still think about that all the time."

A Pima Indian, Hayes was born Jan. 12, 1923, on the Gila River Indian Reservation in Sacaton, Ariz., and raised in a one-room adobe hut. Nine months after the attack on Pearl Harbor, Hayes left school to enlist in the Marines. He was 19.

The fighting on Iwo Jima was brutal. Two out of three Americans who fought in the battle were killed or wounded. Hayes and the other soldiers in the photo were just following orders to run a telephone line up the mountain and replace the flag another team had raised earlier in the day with a larger one. It was an easy, 40-minute climb

and there was no enemy fire.

"We were just there," John Bradley told one of his children in *Flags of Our Fathers*, by his son James Bradley (Bantam Books, 2000). "We put a pole up and someone snapped a picture."

But the photo became a national sensation. Once they were identified in the photo, Gagnon, Hayes and Bradley were dismissed from battle so they could return to the U.S. to raise money for the war. "It's funny what a picture can do," Hayes wrote home to his parents. All of a sudden, they were celebrities, lauded by the title "hero" at every turn.

Hayes, whose culture discouraged individuals from seeking recognition, was so tortured by the "hero" title that he drank to excess. In May 1945, a superior officer attending a re-enactment of the flag raising at Soldier Field in Chicago saw that Hayes was so drunk he couldn't even stand on his own. He ordered the young soldier to rejoin his unit in the Pacific.

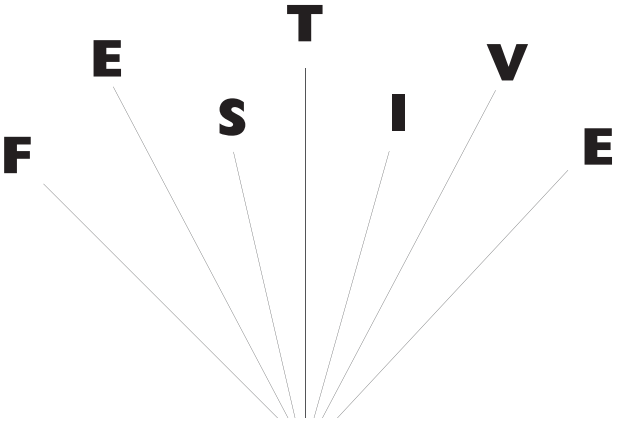
Once the war ended, Hayes tried to put the photograph behind him. He returned home and got a job as a day laborer, only to be sought out by photograph-seeking tourists and greeted by fellow Pimas as "Iwo Jima hero!" He continued to drink heavily.

Distressed that one of the dead men in the photograph had been mis-identified, Hayes took action. Five months after he came home, he walked off the reservation and hitchhiked more than 1,300 miles in three days to Weslaco, Texas, the boyhood home of his friend Harlon Block. Belle Block had always recognized her son in the photo, but the man had been identified by the U.S. Marines as Hank Hansen. Hayes confirmed to Ed Block that it was his son Harlon in the photo. "It did not seem right for such a brave Marine as your son not to get any national recognition," Hayes wrote to Belle Block. Two years later, the Marines wrote to the Blocks, confirming the military's mistake.

However, the journey gave Hayes little peace of mind. During the next decade, his life was marked by more than 50 arrests for drunkenness, many of which made the papers. "His attitude was not bitterness, but some hurt that I couldn't sort out," Pauline Bates Brown, a caseworker for the U.S. Indian Service, told James Bradley. On Jan. 24, 1955, Hayes was found dead. He had wandered outside after an all-night card game and passed out. His death from overexposure and alcohol at the age of 32 came almost 10 years after he was photographed raising the flag on Iwo Jima.

Hayes was buried at Arlington National Cemetery. Some people might have called him a hero, but he would have been unlikely to agree.

"People referred to us as heroes. We certainly weren't heroes and I speak for the rest of the guys as well," John Bradley told his son James in *Flags of Our Fathers*. "The heroes of Iwo Jima are the guys who didn't come back."



fireworks

BY MARIA BLACKBURN

THE COLORFUL PYROTECHNICS THAT INSPIRE 'OOHS' AND 'AAHS' THE WORLD OVER REQUIRE CRAFTSMANSHIP, PRECISION—AND CREATIVITY

JOHN CONKLING HAS seen millions of fireworks in his day.

He's shot off Roman candles and twirled glowing sparklers at backyard picnics. He's watched in delight as yellow double rings and red hearts illuminated the sky the night before his daughter's wedding. And he's marveled at thousands of aerial shells exploding and spraying peonies, crackling crossettes and glittering golden comets across the night sky.

For Conkling, the former technical director of the American Pyrotechnics Association, it doesn't matter whether he's watching a small display by a group of hobbyists or a million-dollar extravaganza by one of the world's top fireworks companies. When he watches a fireworks display, he always sees the same thing: "Chemistry," he says.

Indeed, aerial fireworks are more than just a collection of colored lights and sounds. They get their entertainment value from a series of reactions that occurs when one combines basic chemical elements in a cardboard tube or sphere, ignites them, and shoots them up into the air where they explode.

"No one enjoys fireworks more than a chemist," admits Conkling, an adjunct professor of chemistry at Washington College in Chestertown, Md., who has been working with fireworks for more than 40 years. "The average person watches a beautiful red shell burst in the air and 'oohs and aahs.' I see it and say strontium, the element used in fireworks that gives off a red light when aflame."

Since their invention in China some 2,000 years ago, fireworks have endured as a popular way to celebrate. From Guy Fawkes Day in the United Kingdom and Diwali in India, to Bastille Day in France, July 4th in the United States, Christmas in Colombia, and New Year in Asia, nearly every culture in the world uses fireworks to mark special occasions. Their appeal is universal, even primal. "When you go to a fireworks show and watch the sky exploding in colors it goes right to the very roots of the human soul," Conkling says. "There is just this fascination with fire."

Revelers celebrate the Lunar New Year in New York City, near right. Fireworks by Grucci set a world record in Dubai in November 2009, with the largest fireworks display in history, far right.

That fascination is felt deeply by professional pyrotechnicians like Joseph Domanico, a longtime member of the Crackerjacks. The mid-Atlantic region fireworks club has 300 members who enjoy legally crafting and shooting fireworks together. Domanico typically spends months drawing up plans and weeks making shells by hand for elaborate "chaos machines"—fixed set pieces festooned with fireworks. The resulting display may last just three minutes. But the effort is worth it. "Once you've smelled the smoke, you are never again free," he says.

* * * * * * * * * * * *

China is the world's largest producer and exporter of fireworks. Some 90 percent of fireworks are manufactured in China, everything from consumer firecrackers and sparklers to the powerful aerial shells only the pros can use. In 2006, China exported nearly $212 million worth of fireworks to the United States, according to U.S. trade data.

China's status as a fireworks powerhouse seems especially fitting when one considers that the Chinese invented not only fireworks, but their core ingredient: gunpowder or black powder. Legend has it that more than 1,000 years ago, a Chinese cook working in a field kitchen accidentally mixed saltpeter or potassium nitrate, charcoal and sulfur together and the mixture burned. When it was compressed in a bamboo tube, this black powder exploded with a brief golden glow, and the firecracker was born.

Explorer Marco Polo is said to have transported gunpowder with him in the 13th century to Europe, where it was used by the military. The Italians were the first Europeans to use gunpowder for fireworks and by the 1400s, Florence, Italy, was the center of fireworks manufacturing in the world. Elaborate fireworks displays quickly became a favorite method for marking religious festivals and royal celebrations around the world. Anne Boleyn's coronation in 1533 featured a fire-spewing papier-mache dragon. Shakespeare mentioned fireworks in his works and they served as inspiration to George Frideric Handel, who composed his "Music for the Royal Fireworks" in 1749.

Around 1830, Italian craftsmen realized that by adding metals that burned at high temperatures to their fireworks they could create such new effects as color and sound. They enclosed their mixes in paper shells and wrapped them in paper, glue and string. It's a design still used today. "The Chinese may have invented fireworks but the Italians perfected them," Domanico says. "They gave us color."

Fireworks were a part of the United States from the country's very beginning. In 1775, future President John Adams set the tradition of pairing fireworks and July 4 when he wrote of his vision for the country's first Independence Day celebration in 1776. "The day [Independence Day] will be the most memorable in the history of America ... it ought to be solemnized with pomp and parade ... bonfires and illuminations [fireworks] from one end of this continent to the other, from this day forward forevermore."

The illuminations on display across the continents today still have black powder at their core, but displays have gotten bigger, brighter and more elaborate. "Traditional fireworks shows were shoot them up one at a time slowly, and bore people for an hour or 45 minutes," says M. Philip Butler, a producer with Fireworks by Grucci, a Brookhaven, N.Y., company that's been in the business since 1850. "We don't do that anymore."

Thirty years ago a fireworks display might have lasted an hour. Today it is 20 minutes of nonstop pyrotechnics. Sometimes even shorter. In November 2009 in Dubai, Fireworks by Grucci set a world record with the largest fireworks display in history. The show had a $2.7 million budget and lasted just eight minutes.

* * * * * * * * * * * *

China may dominate world manufacturing and distribution of fireworks, but many countries—including Italy, Spain, Mexico and the United States—are home to companies that still make some of their own.

"It's as much about tradition and quality as it is anything else," explains Doug Taylor, CEO of Zambelli Fireworks in New Castle, Pa. The company manufactures 2 to 3 percent of the 30,000 cases of fireworks used in the several thousand shows it produces annually. Taylor buys the large majority of his company's fireworks from Chinese vendors because they are a good value, he says. But the company's

signature shell, the "star mine," is made by hand every morning by octogenarian Lou Zambelli. He uses a recipe that's been in the family for generations. "We really feel strongly that our star mines are better than what we can buy," explains Taylor.

There are two basic shapes of aerial shells: round or "Oriental"-style shells and cylindrical or Italian-style shells. An Italian shell can hold more than one effect, such as distinct bursts of red, white and blue stars that break individually as the shell rises to its peak of several hundred feet. These shells break "soft," creating asymmetrical trails of color in the form of palms and weeping willows. By contrast, round shells typically hold just one effect. These shells break "hard," forming symmetrical shapes like chrysanthemums.

No matter the shape of the shell, or the size, they are all made roughly the same way: by hand with the same techniques—and in some cases with formulas that have been used for generations.

Join the Club

FIREWORKS LAWS VARY WIDELY. In the United States, there are more than two dozen federal, state and local agencies that govern the use of fireworks. And in order to use display fireworks in the U.S., one must be a licensed professional.

How do you get licensed? Easy, says Joseph Domanico. Join a club.

"Regional and local fireworks clubs teach members about safe construction, transportation, storage and handling of fireworks," says Domanico, who is a member of the Crackerjacks, a mid-Atlantic fireworks club with some 300 members ranging from hobbyists to professionals.

In addition to providing safety instruction, clubs organize meetings and private shoots where they hold elaborate displays of fireworks that members have crafted. Clubs secure permission to fire items that may be banned by state and local laws. "They also teach you how to make fireworks safely," he says.

Club members get together at regional and national meets and spend days making fireworks and hours setting them off. "When we fire firecrackers, it's hundreds of thousands of them," says Domanico.

And they come up with some pretty creative fireworks, too. "In this country in particular, many of the innovations in the field come from not only the pros but from amateurs," says John Conkling, former technical director of the American Pyrotechnics Association. "Some people come up with some incredible devices that are spectacular."

To find a fireworks club in your area, go to the Pyrotechnics Guild International website at www.pgi.org —M.B.

To make an Italian-style single break shell, one starts with a tube of brown craft paper. At the bottom of the cylinder is a pouch of black powder. This is the lift charge. When ignited, it will propel the shell into the air. The rule of thumb is for every pound of shell, use 1 ounce of lift charge. It's a delicate balance. Too little lift charge and the shell won't rise high enough; too much and it might explode too early.

Layered into the cylinder are "stars"—small pellets of chemical mixtures that are pressed, cut or formed by coating tiny pieces of rice with a slurry of chemicals. Stars range from the size of a pea to a golf ball. The smaller the star, the faster it burns. "These stars are what make each shell burn with specific colors and effects," Conkling says. For green, pyrotechnicians add barium nitrate or barium chlorate. For purple, it's a strontium and copper compound. Other ingredients in stars may include charcoal for a twinkling effect and titanium for sparks. Copper chloride makes blue, but achieving a bright blue remains difficult because it doesn't survive well in a hot flame.

Don't ask for too many details about measurements or ingredients of signature shells like Grucci's gold split comet or Zambelli's star mine. Those are company secrets. "If you have a great shell, something you're proud of that's in your history, that recipe is well-guarded and strictly for our inventory," Butler explains.

Coarse black powder is inserted into the center of the stars to serve as the break charge, which will cause the shell to burst and the stars to be distributed once the shell reaches its maximum height. A time-delay fuse also is inserted. To ensure the shell casing is strong enough to withstand the pressure that will spread stars evenly in the sky, fireworks manufacturers wind string

Popular fireworks types

Don't know the difference between a peony and a palm? Read on to learn more about the effects made by a variety of popular aerial fireworks:

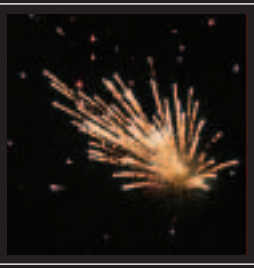
1. Chrysanthemum: A sphere of colored stars that leave a visible trail of sparks.

5. Palm: A shell that leaves a trail as it goes up, forming a tree trunk. When it reaches its apex the shell bursts open and creates the leaves of the palm.

2. Crossette: A shell containing several large stars that travel a short distance before breaking apart into smaller stars, creating a crisscrossing pattern.

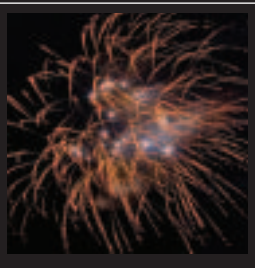
6. Peony: A loose pattern of color stars that break up and drop.

3. Diadem: A type of peony or chrysanthemum with a center cluster of non-moving stars, normally of a contrasting color or effect.



7. Salute: A flash of bright light and a loud boom.

4. Kamuro: A dense burst of silver or gold stars that leave a shiny, glittery trail. The name comes from Japanese for "boy's haircut," which is what the shell looks like when it explodes.



8. Spider: A shell containing a fast burning tailed or charcoal star that bursts hard so that the stars travel in a straight, flat trajectory before slightly falling and burning out.

More than music fills the air over Australia's famed Sydney Opera House.

around the shells or coat them in wallpaper paste and allow them to dry. The last step is to add a quick match fuse to the main fuse, which when lit will simultaneously light the lift charge and the time-delay fuse inside the firework.

Aerial shells can range in size from 2 to 16 inches in diameter. The shells you'll typically see in a professional show range from 3 inches in diameter (about half a pound or .2Kg), to 6-inch shells (about 4 pounds or 1.8 Kg).

In a multi-break shell, stars are contained in separate cardboard compartments inside the shell. These breaks may also contain sound charges, small cylinders of perchlorate mixtures, which create crackles and booms when they explode. As the time-delay fuse burns, it ignites the bursting charge in each compartment and activates the stars and sounds. In round shells, stars can be placed in a heart, smiley face or other pattern around the bursting charge, to form a specific geometric shape in the night sky. "It's all up to the imagination of the designers," says Conkling.

* * * * * * * * * * * * *

People who make fireworks could go on for hours about the artistry and traditions of their business. But safety is never far from their thoughts. Fireworks may be considered a low explosive, but they're still dangerous, even in the hands of trained professionals.

Fireworks by Grucci has suffered two major accidents during its 160 years in business. In 1929, an explosion in the company's Elmont, N.Y., factory killed two family members. And in November 1983, the company's Bellport, N.Y., plant exploded and killed two family members, injured 24 people and damaged more than 100 homes. Though the blast destroyed the factory and devastated the family, the company still managed to stage its annual New Year's fireworks displays in two New York City parks less than two months later.

Fireworks may be considered a low explosive, but they're still dangerous, even in the hands of trained professionals.

Even Chestertown, Md., headquarters to Dixon Valve and Coupling, had its own brush with disaster when the sprawling manufacturing company known as "The Defense Plant" (it produced flares, fuses for detonators and military fireworks) exploded in a flash of blinding light on July 26, 1954. The culprit? Some M-80 firecrackers that workers had been warming beneath a fluorescent light to leach away moisture. The resulting series of blasts shook the town for 50 minutes, killing 12 workers and injuring 50.

"How to do it safely, now that's the proverbial question," says Butler, of Fireworks by Grucci. "What you do is you eliminate as much risk as possible, but you can't ever reduce that to zero because of the nature of what you're dealing with."

At Zambelli's manufacturing plant, where there are 70 buildings for production and storage, fireworks production takes place in a series of small, one-story buildings made of cinderblocks reinforced with concrete. To help prevent accidental ignition, workers touch a copper plate by the front door before entering to eliminate any static electricity on their bodies. "Static electricity is just as volatile as someone lighting a match," Taylor explains. In fact, he says, in some parts of the world where static electricity is especially high on some days, manufacturers might have to forgo production because the risk is too great.

The roofs in these workshops are detached from the walls, so that they will blow upward and minimize injuries to workers in case of an explosion. In addition, some of the buildings are separated by 10-foot-high blast walls designed to help contain explosions to a small area. Production facilities vary all over the world. In Mexico and Vietnam, for example, fireworks are produced in three-sided buildings to minimize injuries to workers in case of explosions.

On production days, workers gather the chemicals they need for that day's work from steel drums stored in separate buildings and bring them to the production building. "You try to have only exactly what you need," explains Taylor. "These processes are very regimented. We aren't adding a little bit of this and a little bit of that. We are doing things the same way they have been done for years."

A worker might produce 20 shells per hour. Once the fireworks have been made, they are kept in storage magazines—secure buildings without electricity that are isolated by earthen berms. Zambelli might keep two years' worth of fireworks on hand at a time.

Painstaking preparations for a Lake Union Fourth of July celebration in Seattle, Washington, above left. Fireworks light up the night sky as the *Queen Mary II* departs on her maiden world voyage from Auckland City, above right.

Fireworks storage is controlled tightly by the U.S. Bureau of Alcohol Tobacco Firearms and Explosives, and manufacturers are required by law to keep a detailed inventory.

The transportation of fireworks is also heavily regulated by the U.S. government, Taylor says. "We are moving a hazardous product, just like those propane tankers you see on the highway, so we are governed by the same rules about what we can carry and what routes we are allowed to take." In some cities, such as New York, Pittsburgh and Detroit, fireworks trucks are met at the city limits by police and escorted to their launch site.

* * * * * * * * * * * *

Although the gunpowder at the heart of fireworks hasn't changed, there have been a number of advances in the field during the last 20 years, including the creation of brighter colors and patterns. The advent of firing shells by computer instead of by hand has made a big difference in the sophistication of displays and the ability to set them to music, Taylor says.

"Probably the biggest distinction between what fireworks were 30 or 40 years ago and today is the technology that permits us to choreograph the shells down to one one-hundredth of a second," Taylor says. Instead of having someone walk around a line of tubes buried in the ground and light fuses by hand to fire shells, electrical signals fire the shells, allowing technicians to precisely match the burst in the air to a particular note or notes in the music playing. "Our designers will spend between two and three hours designing for every minute of a show."

Companies are constantly coming up with new designs that leave crowds cheering for more. In 2002, Fireworks by Grucci invented a new shell called a "rumble digit," for a piece called *Transient Rainbow* that was commissioned by New York's Museum of Modern Art. Each rumble digit was embedded with a computer chip to control the exact timing of its firing. When Grucci fired more than 1,000 of these shells into the air and they exploded, they created a dreamy rainbow of light over the East River.

The effect had never been done before and has yet to be repeated. "It was probably 35 to 40 seconds worth of fireworks with a $140,000 budget," Butler says. "So you can imagine we don't do it very often."

Despite recent technological advancements, fireworks manufacturers still haven't figured out how to triumph over a barrier that has kept displays from going off as planned for years: weather. Excessive winds, drought conditions and heavy rain all can get in the way of a holiday fireworks spectacular by creating concerns about spectator safety, accidental fires and lack of visibility.

But even meteorological obstacles can sometimes be surmounted. Conkling tells the tale of a 1998 display in Orlando, Fla., that brought together some of the best companies in the business to celebrate the 50th anniversary of the American Pyrotechnics Association. "Hurricane Jacques was about to come ashore, and the following night's program had already been cancelled," says Conkling, who was the group's executive director at the time. But the rain and wind held off so the 30-minute show could go on as planned.

The display was spectacular. "The finale was unbelievable and contained hundreds of salutes," says Conkling.

The show wasn't just beautiful, it was powerful. "Hurricane Jacques made a U-turn that night and never made it ashore," the chemist says.

Maybe it was a simple change in weather. Or maybe not, says Conkling, with a twinkle in his eye. "To this day, I think the shock wave from the finale overwhelmed the hurricane and caused it to change direction."

FACTS AND FIGURES

Here's the chemistry behind some favorite fireworks effects:

Symbol	Name	Fireworks Usage
Al	Aluminum	A common component of sparklers, it produces silver and white flames and sparks.
Ba	Barium	Creates green colors in fireworks, and it can also help stabilize other volatile elements.
C	Carbon	One of the main components of black powder, which is used as a propellant in fireworks.
Ca	Calcium	Used to deepen fireworks colors, and calcium salts produce orange fireworks.
Cl	Chlorine	An important component of many oxidizers in fireworks. Several of the metal salts that produce colors contain chlorine.
Cu	Copper	Produces blue colors in fireworks.
Fe	Iron	Makes sparks. The heat of the metal determines the color of the sparks.
K	Potassium	Helps oxidize fireworks mixtures.
Li	Lithium	A metal used to impart a red color to fireworks.
Mg	Magnesium	Burns a very bright white and is used to add white sparks or improve overall brilliance of a firework.
Na	Sodium	Imparts a gold or yellow color to fireworks.
O	Oxygen	Fireworks include oxidizers, which are substances that produce oxygen in order for burning to occur. The oxidizers are usually nitrates, chlorates or perchlorates.
P	Phosphorus	Burns spontaneously in air and makes some glow in the dark effects.
S	Sulfur	A component of black powder that is found in a firework's propellant/fuel.
Sb	Antimony	Creates firework glitter effects.
Sr	Strontium	Strontium salts impart a red color to fireworks and strontium compounds stabilize fireworks mixtures.
Ti	Titanium	Can be burned as powder or flakes to produce silver sparks.
Zn	Zinc	A bluish white metal used to create smoke effects.

Source: *Phantom Fireworks*

THE Chocolate MAN

BY SUE DE PASQUALE

"I have always worked hard, lived rather simply, and tried to give every man a square deal."

MILTON S. HERSHEY, 1938

IN A CAVERNOUS hall at the World's Columbian Exposition of 1893 in Chicago, Milton S. Hershey stood transfixed. Planners of the exposition, which celebrated the 400th anniversary of Columbus' discovery of America, had pulled out all the stops, erecting a "White City" of gleaming alabaster marble buildings. It was here that millions of visitors from all over the world would get their first taste of Cracker Jack and Pabst beer, their first ride on a Ferris wheel, and the rollicking experience of attending Buffalo Bill's Wild West Show.

But Hershey was drawn to the Palace of Mechanic Arts, where J.M. Lehmann of Dresden, Germany, had erected a small factory that transformed raw cocoa beans into chocolate bars. At 36, the soft-spoken Hershey had built a highly successful caramel company in his native Lancaster, Pa. But now, intoxicated by the rich smell of cocoa, and the mesmerizing rolling, mixing, squeezing and molding that turned beans into delicious candy bars, Hershey decided to change the course of his confectionery zeal.

"The caramel business is a fad," he would say later. "But chocolate is something we will always have."

Hershey ordered every last piece of Lehmann's equipment, and when the exposition ended on Oct. 30, the machinery was all loaded up on a train and shipped to Lancaster, where Hershey established a small chocolate-making factory.

During the next decade, the slightly built man with the bushy mustache and the unflagging work ethic would create a brand that would make his name synonymous—all over the country and eventually around the world—with delicious, affordable milk chocolate.

But Milton S. Hershey's vision was far grander than great-tasting candy. In the rolling rural hills of Lebanon Valley, Pa., he dreamed of creating a company town where factory workers and their families could own homes and live happily on tree-lined streets, with parks, good schools and cultural attractions. His dream included a place where orphaned boys could find comfort, education and the stability he had dearly craved as a child.

Today, more than a century after M.S. Hershey first began carving out streets and building homes and factory buildings, the "great American place" that he envisioned continues to flourish as idyllic Hershey, Pa.—"Chocolatetown, U.S.A."

BORN ON SEPT. 13, 1857, Milton Snavely Hershey spent much of his young childhood on the move, as his father, Henry, chased one moneymaking venture after another. Eloquent, well-dressed and a dreamer, Henry Hershey was sure that he, and by extension his son, was destined "to do big things."

Veronica "Fanny" Snavely was her husband's opposite. Short, hard-working and practical, from a Mennonite family with means, she was at first smitten by Henry and his grand plans. But it wasn't long before she grew resentful of his get-rich-quick schemes that never panned out. Time and again, the

Snavely family would swoop in to provide financial rescue. When Milton's little sister Sarena died from scarlet fever at age 4, Fanny rejected Henry for good (though the two never officially divorced). Milton, who attended seven different schools, was never a good student; he quit school at age 12. He was briefly apprenticed to a local printer but after purposely dropping his hat in the printing press, he was let go.

Fanny eventually moved with Milton to a small house in Lancaster, where the 15-year-old took on his first paying job: at Royer's Ice Cream Parlor and Garden. Just half a block from City Hall, it was a popular spot for pretty girls, ambitious men and famous visitors.

It was here, at the side of Joseph C. Royer, that Milton first developed his passion for making candy, pleasing customers and doing honest business, notes biographer Michael D'Antonio in *Hershey*. At 19, Milton was ready to go off on his own, and the 1876 Centennial Exposition in Philadelphia served as the perfect launching point. More than 180,000 people would visit the exposition and many would find their way to M.S. Hershey's Spring Garden Confectionary Works, just blocks away. His soft chewy caramels made with milk were an immediate hit.

Despite a promising start, business eventually went badly, due to slow payments from wholesale customers and tight credit from his main sugar supplier. Milton dismantled the business and spent a few years traveling with his father and working at candy businesses in Denver and Chicago before returning east to open a candy shop in New York City. This venture also failed—primarily because Henry had persuaded his son to invest in making and selling cough drops. The project sent Milton into debt and eventually drove him out of business.

Finally, at age 28 and back in Lancaster, Milton found success. By adding more milk to his caramels, he created a creamy candy that wouldn't stick to the teeth. Locals bought the candy up, and a British importer passing through town placed an order for a huge shipment. Working night and day with his mother, aunt and others, Milton filled the order, shipped it off to London and then held his breath. The check from the importer arrived just days before the bank was to foreclose on Milton's bank note. "When I opened my mail and saw that, I just went round in circles," he would later say.

Over the next five years, Lancaster Caramel Co. would see tremendous growth. Hershey might well have ridden the caramel train to riches—were it not for that fateful trip to the Columbian Exposition.

AT 40, DESPITE HIS BUSINESS success, M.S. Hershey longed for a soul mate. In 1897, while passing through Jamestown, N.Y., on business, he found her. Catherine Sweeney, 25, was the daughter of Irish Catholic immigrants. Witty and flirtatious, "Kitty" captured his heart immediately and the two began a long-distance courtship. Within a year, Milton brought her home to Lancaster as his wife. Kitty shared her husband's Progressive ideals and encouraged him over the next few years as he sold his caramel business for $1 million (worth $26 million today) to finance his dream for "Chocolatetown."

Milton chose an isolated area in Derry Church, Pa., surrounded by dairy farms and close to railway lines. He hired an architect to create the town grid, and soon began laying trolley lines and building homes and the chocolate factory.

There was only one problem. Hershey had not yet perfected the process for mass-producing tasty milk chocolate with a shelf life; the chocolate he sold locally turned rancid quickly, limiting how far it could be shipped.

It would be a race against time. Even as the factory walls went up, Hershey and his team sequestered themselves on his homestead, experimenting 16 hours a day to find the right formula. One breakthrough came when they switched to using skim milk from local Holsteins, reducing spoilage. Then came the big break: On his first day in Hershey's employ, chemist John Schmalbach introduced the idea of using liquid condensed milk. Hershey had the winning recipe he so vitally needed.

In June 1905, Hershey opened his expansive new plant—18 buildings, with six acres of floor space. The factory uti-

Left: The Hershey Chocolate Corporation office building in Hershey, Pa.; a street light at the corner of East Chocolate Avenue and Cocoa Avenue in downtown Hershey. Far left: Label, Club Cocoa, 1915-1920.

lized an assembly line approach (similar to that made famous by Hershey's friend Henry Ford) and efficiently moved supplies and products by spurs that connected to nearby railroad lines. Hershey had found the formula for producing high-quality chocolate at low cost: Americans could afford a five-cent candy bar and Hershey's chocolate bars flew off the shelves. In the factory's first year, net sales of Hershey's chocolate topped $1 million.

Meanwhile, Hershey's factory town (officially named "Hershey" in 1906) flourished from the start. Hershey encouraged homeownership. His Hershey Trust offered terms that made it easy for workers to afford their slice of the American dream. And Hershey didn't skimp on small-town amenities. He provided a public library, a gymnasium, golf courses, company-sponsored sports teams—even a 150-acre park with a band shell, a zoo and a sprawling swimming pool. Because all of these amenities were subsidized by Hershey's company, residents enjoyed property taxes that were half that of other American cities.

Hershey's financial success allowed him to build a stately mansion, where he enjoyed relaxing with Kitty. But the couple's loving marriage was marred by a sad reality. The youthful Kitty suffered from a debilitating illness (today, writes D'Antonio, believed to be advanced syphilis) that left her increasingly weak and unable to bear children.

Hershey might well have ridden the caramel train to riches—were it not for that fateful trip to the Columbian Exposition.

So, at age 53, Milton Hershey created the family he and Kitty could never have, by establishing a home for orphan boys on the hill overlooking town. The Hershey Industrial School, which included a series of small cottages overseen by married couples, was aimed at preparing needy, wayward boys for jobs in industry or agriculture. Discipline was strict, but Milton was a frequent and benevolent presence.

On Nov. 13, 1918, Milton secretly placed all the Hershey Chocolate Co.'s stock into a trust to benefit the industrial school, effectively ensuring his legacy. The stock at the time was worth more than $60 million ($855 million today). Coca-Cola would be sold a year later by its founder for $25 million ($310 million today). The move was an unusual one, since it effectively made the school the majority owner of a wildly successful company and all its enterprises—including Hershey's amusement park, factories and a department store.

The trust effectively solved the problem of what would happen to his fortune, notes biographer D'Antonio. In Hershey's words: "I never could see what happiness a rich man gets from contemplating a life of acquisition only, with a cold and legal distribution of his wealth after he passes away. After all, what good is one's money unless one uses it for the good of the community and humanity in general?"

MILTON HERSHEY WOULD LIVE to 88, outliving by decades his beloved Kitty, who died in 1915. In the years after her death, Milton turned to Cuba, where he replicated his Pennsylvania utopia with a sugar factory, railway, town and school near Havana.

The Hershey Chocolate Co. survived the world sugar crisis of 1921 and the Great Depression, and flourished during World War II, when Hershey's chocolate became a staple of U.S. troops' rations.

Milton S. Hershey succumbed to pneumonia on Oct. 13, 1945. Some 10,000 people came to pay homage. Today, Hershey's "Chocolatetown" remains a tranquil spot for its 13,000 residents. Hersheypark, popular for its roller coasters and other rides, draws millions of visitors a year. And the Milton Hershey School, now a co-ed boarding school for needy children of all backgrounds, serves 1,800 students. With a staggering $6 billion in assets, it is one of the wealthiest schools in the world.

Like the milk chocolate that financed his vision, Milton S. Hershey's legacy is surely a sweet one.

DO YOU KNOW THE WAY TO Santa Fe?

With its stark beauty, rich ancient history, spicy cuisine and outdoor adventures, northern New Mexico offers rich opportunities for travelers of every stripe. BY GEORGIA DE KATONA

IT'S AUTUMN, YOU'RE ITCHING TO TRAVEL, AND YOU WANT TO GO SOMEPLACE DIFFERENT AND INTERESTING.

Where can you go that's easy to get to but feels exotic?

How does this sound: A place with stark beauty, huge contrasts between tall peaks, rivers, streams and desert floors, and which offers brilliant skies and lush trees, modern art, adobe buildings and ruins of ancient civic complexes? Need more? Satisfy your appetite in world-class restaurants where the cuisine matches the ethnic complexity of the communities they're in. Practice your photography amidst the light this region is famed for. Test your lung capacity on the countless high-altitude mountain biking and hiking trails. Join the chase team in a mega hot air balloon event. Ride the tallest tram in the world to watch a magenta sunset. Catch some incredible world music (folk music performed by indigenous players) at one of several intimate venues.

Point your wagon toward Santa Fe, New Mexico, and all of the above is within your reach.

It matters little if you're a history buff, an adrenaline junkie or a buffet style traveler wanting a little bit of everything. Visitors to northern New Mexico quickly discover that it is quite easy to pack as little, or as much, into the sun-filled days as your temperament can stand.

There's a funny saying on a T-shirt here that sums up the prevailing vibe:


SANTA FE

Carpe Mañana. Technically it means "seize tomorrow," but here in the land of mañana, what it really means is "not today." Your lesson from this is not to get so wrapped up in your list of things to see and do that you miss the chance to do what the locals love—slow down. Smell the air. Sit on a bench. Lie on a rock. Let yourself unwind … even if your next activity is full throttle.

Autumn is the time of year locals wish they could keep secret. The weather is temperate and the crowds decrease drastically—save for the throngs at the Balloon Fiesta (more on that at right).

The state's famous green chiles are harvested in the southern part of the state and shipped to the cities where they're roasted in parking lot corrals, creating aromas that tingle your nose and pique your appetite. Aspen trees show their magnificent, gilded colors in the mountains, and evenings are cool and crisp. The ethereal light the state is so famous for is in its full glory. The truth is, in a region with four seasons, autumn is the standout.

The modern history of the state starts at the point of Spanish arrival in 1540, though the indigenous people who came to be grouped under the term "Pueblo" had been in the region for centuries. Unlike American Indian people in other regions, most of the tribes in New Mexico remain on their ancestral lands. There are no fewer than seven distinct native languages spoken in the state.

Established as the capital by Don Pedro de Peralta in 1610, Santa Fe is the oldest capital city in North

Clockwise: Visitors explore the Tent Rocks National Monument, 40 miles west of Santa Fe; hand-woven rugs are plentiful at markets throughout the region; the historic Santa Fe Train Depot; adobe buildings, made from sun-dried earth, have proven particularly durable over the millenia.

Albuquerque Adventures

Fly into Albuquerque's airport, pick up the mandatory rental car, and set out for some local adventures before heading north to Santa Fe.

If you come in early October, by all means go to the Albuquerque International Balloon Fiesta (www.balloonfiesta.com). Arriving with thousands of people at the crack of dawn to watch the Mass Ascension of hundreds of hot air balloons in every imaginable shape and color is an experience you're not likely to forget. With a bit of planning you can get an insider's experience of the fiesta by joining a balloon chase crew and be a part of the launches, retrievals, nighttime "glows" and more (www.balloonfestivalvolunteerchasecrew. com).

For a bird's-eye view of Albuquerque, the towering Sandia Mountains on the east side of town, and remarkable views of the mesas to the west, hop on the world's longest (and certainly one of the tallest, whew!) tram, the Sandia Peak Tramway (www.sandiapeak.com). There's a restaurant atop 10,378-foot Sandia Peak serving lunch and dinner, and some nice hikes to enjoy while you're up in the clouds. Often you'll be able to watch hang gliders launching off the western edge.

For an up close and personal view of the art of ancestral Puebloan cultures, do the easy day hike at the Petroglyph National Monument on the western edge of town (www.nps.gov/petr/index.htm). The place is loaded with thousands upon thousands of fascinating petroglyphs (rock carvings), many of whose meanings are utterly unknown. If you've got a full day to spend exploring, drive out to Chaco Canyon and roam around some of the most incredible ruins in the country. Chaco Canyon was built by the Anasazi people, now commonly referred to as Ancestral Puebloans, between 800 and 1100, and the buildings that remain are remarkably complex and intricate examples of architectural masonry. There are ample sights to see along the main loop in the park as well as several longer hikes to more remote ruins. It'll take you two to three hours each way from Albuquerque to reach the park. Be sure to use the driving directions on the website (www.nps.gov/chcu/index.htm)—your GPS won't work, really.—**GDK**

Santa Fe, the City Different

Celebrating its 400th anniversary through 2009-2010, Santa Fe is a gem of a city. Many head straight here and base all of their activities from the cozy historic district downtown.

Santa Feans take their food seriously and you'll quickly understand why. Traditional Northern New Mexican food means red or green chile on top of enchiladas, rellenos, steaks, eggs, huevos rancheros, posole. If you're squeamish about spice, order it on the side, but do try it. Spanish food is well-represented here, as is contemporary cuisine that melds the tastes of Latin America, Asia and North Africa. There are too many worthwhile restaurants to list here. Grab a city guide or ask a local and *Buen provecho!* (enjoy your meal!).

Santa Fe's historic downtown is delightfully walkable. Art galleries, shops, restaurants, a theater and several museums dot downtown and the bustling Guadalupe District, just southwest of downtown. A walk up famed Canyon Road will take you past every possible variety of art gallery (housed in thick-walled adobe buildings), plus several restaurants. If you're game for a big walk, head to upper Canyon Road toward the Randall Davey Audubon Center and Sanctuary (nm.audubon.org/center) located at the end of the road. En route you'll pass through overhanging trees and adobe homes tucked behind thick walls. Many of these complexes have been inhabited by the same families for generations.

An autumn visit to the Santa Fe Ski Basin will take you up into the gorgeous changing colors of the aspen trees and a variety of fantastic day hikes for all fitness levels. The main ski lift runs at certain times during the fall, allowing you to take the easy route up and the leisurely route down (www.skisantafe- .com for lift schedules and trail maps). Ten Thousand Waves, a traditional Japanese spa offering hot tubs and massage treatments, in addition to beautiful lodging, is on the road to the ski basin. A soak under New Mexico's big skies in hot water is a fine way to end any day (www.tenthousandwaves.com).

Bandelier National Monument is an easy day trip from Santa Fe and showcases the cliff-dwelling habitations of Ancestral Puebloans who built the canyon complex between 1150 and 1500 CE (www.nps.gov/band/index.htm). Visiting Bandelier will take you through the hill town of Los Alamos, home of Los Alamos National Laboratory and the atom bomb. The Bradbury Science Museum offers a fascinating look into the work of the lab and the history created when Robert Oppenheimer moved his development team to this remote location to work on the "A Bomb" (www.lanl.gov/museum).

If you're one of the many who can't imagine going anywhere without getting in a round of golf, you'll be relieved to know the Marty Sanchez Links de Santa Fe course is highly rated (www.linksdesantafe.com/msl_home.htm) and there are several excellent courses at nearby resorts on the Pueblos (Indian reservations).—**GDK**

Clockwise: Downtown Santa Fe is a shopper's paradise; The Santa Fe Opera's dramatic adobe theater blends harmoniously with the high desert landscape; Marty Sanchez Links de Santa Fe, an 18-hole public golf course, is set against a backdrop of magnificent mountain ranges; downtown Santa Fe offers a wide variety of art galleries.

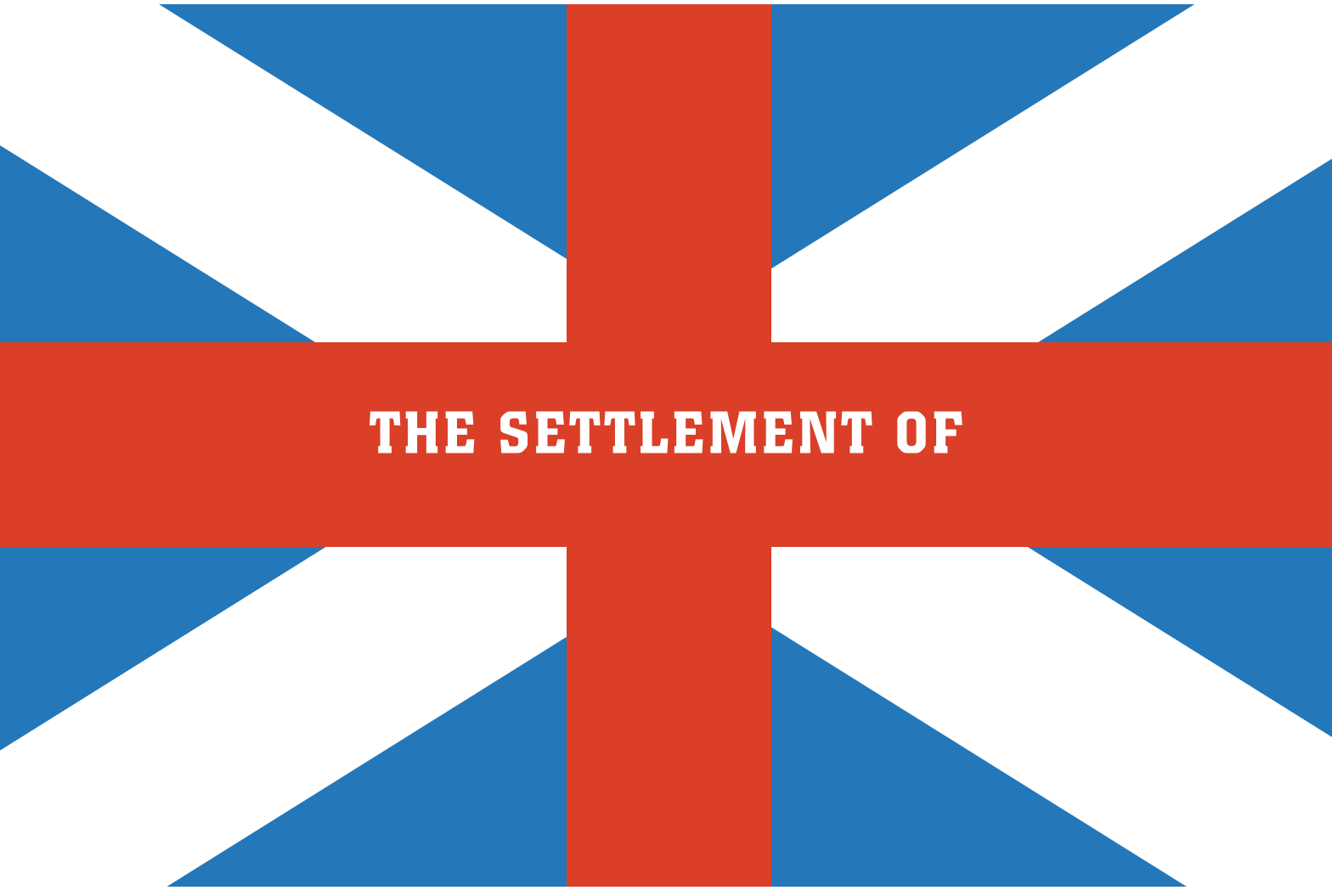
America. The Palace of the Governors (built in 1610) on the town's central plaza remains open to the public today and is a must-see for any first-time visitor wanting to get a feel for the area's history.

Surprisingly enough to most visitors, the famed "Pueblo Style" adobe and adobe-like buildings in Santa Fe's downtown don't represent a ubiquitous traditional style. Instead, they are the conscious efforts of some notable Anglos—like architect John Gaw Meem—who made Santa Fe their home in the early 20th century and realized that the town needed to capitalize on the regional building style to remain a distinctive tourist destination. The plan worked; the Pueblo Revival style, or Santa Fe Style, is one of the most recognizable in the country.

The people in the area are often referred to as a tri-cultural mix of Native, Hispanic and Anglo, but that trio doesn't quite represent the complex reality. Hispanics whose families have been here for generations have been joined by Latin American Hispanics from every nation south of the U.S. border. "Anglos" is a term once commonly used for anyone who wasn't Hispanic or native including, interestingly, African-Americans and Asians. German Jewish merchants who moved into the area with the expansion of the railroads in the late 1800s added another fascinating and enduring ethnic component. Today, Santa Fe has a vibrant international community with people from all over Africa, Asia, India and Europe adding to a region that continues to write its own rules.

Artists and bohemians like Georgia O'Keeffe, D.H. Lawrence and Mabel Dodge Luhan started arriving in the early 20th century, driven from the East Coast by strict social hierarchy and rigid rules of conduct. What they found here was a centuries-old crossroads where the locals were accustomed to folks of all stripes wandering through or settling in. In times long past those travelers might have been Comanches or Aztecs. That they became paler and arrived in cars in more recent times isn't really all that odd in the scheme of things. It's the nature of this place to fold newcomers in—or, as the saying goes, if those folks just aren't "right" here, to spit them back out.

A visit to New Mexico isn't like going anywhere else in the United States. It feels foreign yet familiar. The spirit of the Wild West is alive and well here and it feels really good.



THE SETTLEMENT OF AUSTRALIA

BY EUGENE FINERMAN

Established in the late 1700s as a penal colony for Britain's outcasts, Australia was built on cheap convict labor

In 1606, Dutch explorer Willem Jansz discovered a large landmass south of New Guinea. From his tentative exploration, he found nothing to merit further interest. The land was swampy, and the natives poor and hostile. It would be another 36 years before the Dutch ventured a second expedition to this land. Abel Tasman sailed along the western and southern coasts of what proved to be a very large island. He found the lands there to be arid and uninhabitable. Yet, however dismal, this territory required some designation on maps. So cartographers gave it the generic name of Terra Australis, the Latin for land of the south.

Not until 1770 did anyone bother to explore the east coast of Australis. British explorer James Cook found its land to be surprisingly habitable. The climate was temperate and the soil seemed arable. Eastern Australis could provide the basic requirements of a European colony. Claiming the land for Great Britain, Cook named the territory New South Wales. So Britain now had a distant island that offered a meager sustenance—and that proved exactly what Britain wanted.

In politics and science, 18th-century Britain certainly was in the forefront of the Enlightenment. But that energetic progress did not extend to British justice. There the gallows was the usual recourse, dispatching thieves as well as murderers. Still, there was some leniency in the system. Shoplifters, poachers, prostitutes and debtors really did not deserve to hang. For stealing food, seven years in prison was sufficient retribution.

The problem was that the prisons were teeming with these petty criminals. Britain could make better use of them by transporting them to its far-flung colonies. There, the felons could labor on government projects or be sold as indentured servants, working as slave labor for the length of their prison sentence. The American colonies had served as a useful dumping ground for these criminals. Indeed, Georgia had been founded expressly as a penal colony. However, since 1775, those colonies proved completely uncooperative with any

British explorer Capt. James Cook (1728-1779) was the first to explore the east coast of Australia. He claimed the land for Great Britain and named the territory New South Wales.

British policies. With America lost, Britain found a use for New South Wales.

On Dec. 6, 1786, the British government authorized an expedition to establish a penal colony in Australis. Under the command of Arthur Phillip, a captain in the royal navy, 11 ships—known in Australian history as the "First Fleet"—departed from Britain on May 13, 1787. On board were 772 prisoners (including 189 women), 247 marines as guards, and supplies to sustain the colony for its first year. Sailing around Cape Horn and through the Indian Ocean, the fleet reached New South Wales on Jan. 18, 1788. They first landed at an inlet called Botany Bay but the site lacked a source of fresh water. Sailing a short distance north, the fleet found a more promising site for settlement. Phillip named it after Britain's home secretary: Lord Sydney.

Sydney was not anyone's idea of Eden. The immediate area offered little in the way of food or building materials. Phillip rued: "No country offers less assistance to first settlers." Hungry, the colonists were depending on the arrival of the Second Fleet. Its six ships arrived a year later, but brought more prisoners rather than supplies. Worse, the conditions on that fleet were so wretched that 267 prisoners had died on the voyage, and 486 of the 750 survivors were sick. The Second Fleet also carried a new company of guards who were to be permanently stationed in the new colony. Ironically, these soldiers, the New South Wales Corps, were no better than the convicts. Many of the guards had been "recruited" from military prisoners; their officers were the rejects from more reputable regiments. Australia was as much an exile for them as the convicts.

Each year brought another cargo of prisoners, but by the fourth year the new farms of Sydney were capable of

Dixon Down Under

Dixon Valve and Coupling Company is well represented in Australia. The company got its start in that region in 1996 with the acquisition of the Australian-based Minsup, or Mining Supplies Co. Dixon's headquarters is located in Adelaide, and the company has six branches throughout the country. Since 2007, Australia also has served as the home base for Dixon Asia Pacific, which includes India, China and the Greater Singapore Region (GSR).

Below: The area named for Britain's home secretary Lord Sydney, which offered so little to its first settlers, is today home to the sprawling and prosperous Sydney Harbour.

sustaining the colony. Sydney itself was developing from a prison camp to a proper British town. Among the convicts were carpenters and brickmakers, and they could rent their skills to the highest bidder. Indeed, any prisoner with education or a marketable talent could negotiate his role in the fluid society of Sydney.

George Howe, a convicted shoplifter, had worked as an apprentice printer. Arriving in Sydney in 1800, he was the official government printer by 1801. Two years later, he published the first newspaper in Australia: the *Sydney Gazette and New South Wales Advertiser*. All the while, Howe was still a convict; he would not be officially pardoned until 1806.

The settlement soon grew beyond the immediate vicinity of Sydney. By 1813, New South Wales covered southeastern Australia, an area 150 miles long and 50 miles wide. As part of their pay, the officers of the New South Wales Corps received large and usually the best tracts of land. This made them Australia's aristocracy, and they very much acted the part. Convicts worked as serfs on their masters' estates. This medieval system was especially brutal on Tasmania, then known as Van Diemen's Land.

The harsh servitude did incite some convicts to escape; the vast and unexplored outback offered a haven to the fugitive and outlaw. Most convicts, however, endured their punishment because the government offered them hope. Unlike in Britain, the penal system in the Australian colonies was lenient. Few convicts served their full term. Good behavior would reduce a sentence by half. Australia also pioneered the parole system, where convicts—although still under sentence—earned increasing degrees of freedom. The country needed settlers, not a caste of embittered pariahs. These rehabilitated individuals—emancipists as they were called—were welcomed and enfranchised citizens in Australia.

By the 1820s, Britain was ready to settle the rest of the continent. A penal colony called Brisbane was established 700 miles north of Sydney. Around it grew the future territory of Queensland. To establish a British presence on the west coast of Australia, the army built a base and named it after a city in Scotland: Perth. To turn the camp into a town, convicts provided the labor.

In 1834, the British government authorized the foundation of a new colony: South Australia. It was founded by free settlers, and its charter forbid the use of penal labor, making South Australia distinct among the continent's colonies. New South Wales itself had become so large that administrative efficiency required it to be divided into several territories; its southern lands were organized as the colonies of Tasmania and Victoria. By the end of the 19th century, Australia had become seven self-governing colonies. Each had a bicameral legislature and any free man or emancipist had the right to vote—in Queensland so could women. In 1900, the colonies agreed to a federation and merged into one nation: the Commonwealth of Australia.

The deportation of convicts had ended in 1868. British public opinion, reflecting Victorian sensibilities, now opposed the practice; and the flourishing colonies no longer needed cheap convict labor or coerced settlers. But those shackled men and women were the founders of Australia: 162,000 of them had been transported there. Today, the Commonwealth has a population of 22 million. Four million of them are descended from those convicts—the First Families of Australia—and it is a matter of pride.

Beyond Capacity

The manufacturer knows best, in terms of how products should be used

BY PHIL KIMBLE

Mining, whether it's for coal, copper, gold or anything else, is a hazardous occupation. Collapsing ceilings, explosions and methane gas are just a few of the hazards miners face every day. Even the equipment necessary to work a mine is dangerous to use or be around. The Mine Safety and Health Administration (MSHA) establishes standards for procedures and practices to ensure the safety of the men and women working in mines. Mine owners are required to conform to these regulations and when an accident happens, an MSHA visit is sure to follow.

An MSHA inspector was touring a mine after a recent accident. This mine, as well as the company that owned the mine, had a stellar safety record. In fact, the MSHA inspector could not find any previous significant safety violations for this mine or any of the other mines operated by this company. Because the accident resulted in a fatality from a disconnected airline, the inspector was determined to get to the root cause.

Poring over his notes, equipment specifications, product brochures and catalogs from various manufacturers that supply products used in the mining industry, the inspector set about writing his report. His report cited the owners of the mine to be in violation of regulation CFR 57.14205, which states, "Machinery, equipment and tools shall not be used beyond the design capacity intended by the manufacturer where such use may create a hazard to persons." His contention, based upon warnings and statements in the coupling manufacturer's product literature, was the use of combination nipples for compressed air (in this case 4 inches)—which exceeded the manufacturer's design capacity for this product.

The mine owner did not take this news, or the substantial fine that accompanied it, very well. Not only did the mine owner decide to fight the citation, it sued MSHA and the state's Department of Business and Industry. Their suit, based upon their longevity of "safe" use of combination nipples in all of their mines and their impressive safety record in general, cited the use of combination nipples for compressed air as an industry standard.

After all of the testimony was heard from both sides, the citation was upheld and the suit was dismissed. In essence, the ruling decreed that the manufacturer is responsible for making recommendations on the performance specifications of its own products. The mine's assertion that it had a safe history of using combination nipples in compressed gas applications was not relevant.

When designing any system, always use the STAMPED acronym (Size, Temperature, Application, Pressure, Ends, Dixon). Just because something has been used a certain way for a long time without any problems doesn't mean it's a safe practice. There may be factors at work or parameters that one is unaware of that would deem a product unsafe in certain situations. Always consult the manufacturer for recommendations. It's the manufacturer's product and the manufacturer has the final say as to how its products are to be used.

THE DIXON DRILLER

"Published once a moon since 1932"

NOVEMBER 2010

To read The Dixon Driller on a monthly basis, visit our website: www.dixonvalve.com

TRIVIA Did you know that...

Teflon® is the slipperiest substance in the world.
Microsoft made $16,005 in revenue in its first year of operation.
Oil tycoon John D. Rockefeller was the world's first billionaire.
The search engine Google got its name from the word googol', which refers to the number one with a hundred zeros after it.
Reno, Nev. is actually west of Los Angeles, Calif.
The symbol on the 'pound' key (#) is called an octothorpe.
A group of frogs is called an army.
There are 365 steps on the front of the U.S. Capitol Building—one for every day of the year.
The bark of an older redwood tree is fireproof.
'Evian' spelled backward is 'naive'.
The word 'set' has more definitions than any other word in the English language.
Tug of War was an Olympic event between 1900 and 1920.
The Stanley Cup originally was only 7½ inches high.
There are three golf balls sitting on the moon.
A group of kangaroos is called a mob.
Salmon can jump as high as 6 feet.
-40 degrees Celsius is equal to -40 degrees Fahrenheit.
www.nicefacts.com

ON THE LIGHTER SIDE

A young boy and his dad went out fishing one fine morning. After a few quiet hours out in the boat, the boy became curious about the world around him. He looked up at his dad and asked "How do fish breathe under water?"

His dad thought about it for a moment, then replied, "I really don't know, son."

The boy sat quietly from another moment, then turned back to his dad and asked, "How does our boat float on the water?"

Once again his dad replied, "Don't know, son."

Pondering his thoughts again, a short while later, the boy asks "Why is the sky blue?"

Again, his dad replied. "Don't know, son."

The inquisitive boy, worried he was annoying his father, asks this time "Dad, do you mind that I'm asking you all of these questions?"

"Of course not son." replied his dad, "How else are you ever going to learn anything?"

I went to the store the other day. I was only in there for about five minutes, and when I came out there was a motorcycle cop writing a parking ticket. So I went up to him and said, 'Come on buddy, how about giving a guy a break?'

He ignored me and continued writing the ticket. So I called him a stupid idiot. He glared at me and started writing another ticket for having bald tires!

Then I really got angry at him. He finished the second ticket and put it on the car with the first. Then he started writing a third ticket!

This went on for about 20 minutes. The more I abused him, the more tickets he wrote. I didn't care. My car was parked around the corner.
(http://www.funnyandjokes.com)

Dates in History

1900
On November 22nd, the first car to be produced under the Mercedes name is taken for its inaugural drive in Cannstatt, Germany. The car was specially built for its buyer, Emil Jellinek, an entrepreneur with a passion for fast, flashy cars.

2004
On November 30th, after winning 74 straight games and more than $2.5 million—a record for U.S. game shows—Jeopardy! contestant Ken Jennings loses.

1940
On July 18, Franklin Delano Roosevelt who first took office in 1933 as America's 32nd president, was nominated for an unprecedented third term. Roosevelt would eventually be elected to a record four terms in office, the only U.S. president to serve more than two terms.

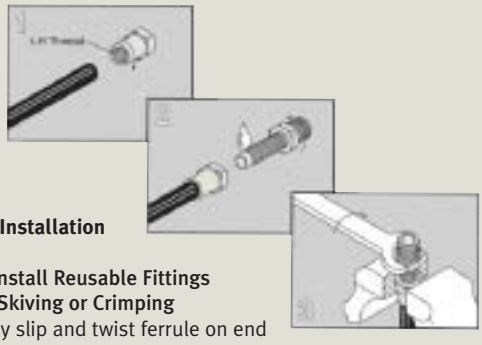
(http://www.history.com)

PRODUCT SPOTLIGHT

Dixon Brass offers over 110 reusable fittings in 10 different series. All reusable fittings are of heavy duty construction and intended for air and water service. Reusable fittings are recommended for rubber covered hose only.

Brass is the standard material offered however, series 180, 182 and 183 are also available in 303 stainless steel.

Hands and a wrench are all that is necessary to perform a field installation that achieves a 250 PSI working pressure for sizes "through" hose I.D.s.



Product Installation

How to Install Reusable Fittings without Skiving or Crimping

1. Simply slip and twist ferrule on end of hose which has been trimmed flush. No skiving necessary.
2. Apply a drop or two of lubricant to fitting before inserting the stem into the ferrule.
3. Turn reusable fitting into ferrule. Hose is expanded inside ferrule for perfect fit.

Sleep Interrupted

Surprisingly common, nighttime sleep apnea can cause serious long-term health problems

BY MARIA BLACKBURN

Ramsey Flynn has struggled with insomnia since childhood. As a weatherman in the Air Force, he relished working the overnight shift and once went five days without sleep. For the last few decades he has regularly awakened in the middle of the night to write for a few hours. "Night became a great time for me to sort through issues and work out problems," the 53-year-old journalist says. When anyone would question his irregular sleep habits, Flynn would respond by joking, "Real men don't need sleep."

But more recently, Flynn started to realize that sleep was no longer a laughing matter. Every afternoon he grew so tired that he felt like he was in a fog. And his snoring was so loud that his wife and teenage boys told him it sounded "almost supernatural."

In spring 2008, Flynn went for a sleep study at the Johns Hopkins Sleep Disorders Center in Baltimore. There, he slept overnight in a lab, as sensors collected data including his heart and breathing rate, oxygen levels, duration and depth of sleep and the number of times he awoke during the night. He expected to be told that insomnia was the culprit. Instead Flynn was diagnosed with obstructive sleep apnea.

At night while he slept the muscles in the back of his throat relaxed to the point that they obstructed his airway—blocking the passage of air. This occurred multiple times throughout the night. Not only was sleep apnea making Flynn's sleep quality terrible, it could have lasting effects.

"The denial of oxygen could last for long periods," says Flynn. "In the short term, obstructive sleep apnea has been linked to memory loss. Over time it has been deemed to cause brain damage."

That's not all. A recent study published in the *American Journal of Respiratory and Critical Care Medicine* found that obstructive sleep apnea more than doubled the risk of stroke in men and increased the danger of stroke in women. Previous studies have linked sleep apnea to a wide range of health

problems including cardiovascular disease, hypertension and diabetes. Apnea affects 10 to 20 percent of adults, an estimated 12 million Americans. It can occur in both children and adults, but is more common in men and in people who are overweight.

Many people with sleep apnea—as many as 90 percent—don't even realize they have it.

"Most people with sleep apnea are unaware of what they are doing at night," explains Dr. Nancy Collop, a pulmonologist who directs the Johns Hopkins Sleep Disorders Center. "Sometimes they will wake up because they are snoring. Really what they notice is that they don't sleep well and they aren't sure why. The reason for this is that by the time they are actually conscious and awake, the problem is gone. Many of the people we see who end up being diagnosed with apnea come in because their bed partner brings them in."

There are two kinds of sleep apnea: obstructive, which is the most common; and central sleep apnea, in which the brain temporarily stops sending signals to the muscles that control breathing. Treating mild sleep apnea can be as simple as telling a patient to lose weight. Other treatments include surgery to trim the soft palate or wearing a special dental appliance that keeps the teeth opposed and opens up the back of the throat. The most effective way to treat the disorder is with a continuous positive airway pressure or CPAP machine, which a patient wears to bed at night.

"What a CPAP does is very simple," Collop says. "Think about the leaf blower you use to blow leaves off your driveway, which works by creating an air flow. You just take that and put it in a box with a pressure device and you pressurize the air that's going into a patient's nose as part of a sealed system. The patient wears a mask and that pressurized air goes into their nose and down into their lungs and that constant flow of air prevents their throat from closing up."

Almost everyone who has obstructive sleep apnea can be adequately treated with a CPAP, says Collop. There's only one problem: compliance. "Lots of people don't like to wear them so we get about a 50 percent rate among people who use them," she says. "People don't like the annoyance of having to wear this mask at night and take this machine with you when you travel. But it's really only a treatment if you have it on your face and it's turned on and delivering pressure."

Within days of first using the CPAP, Flynn noticed that his sleep quality improved and his daytime sleepiness began to disappear. His family reports that his supernatural-sounding snoring is a thing of the past as well. "My wife absolutely swears by the CPAP," Flynn says. "She says it's a godsend."

Spark of Ingenuity

The modern match has a poisonous history

BY LISA DE NIKE

In the first book of the Bible—Genesis—God shows his power and love for the universe by proclaiming, "Let there be light."

It seems certain that some of the earliest mortals on Earth—the cavemen that anthropologists call "Neanderthals"—felt almost godlike when they stumbled across the fact that rubbing two dry sticks together brought to life an important form of light: fire. The ability to control that element put early humans in command not only of light, but also—more practically speaking—of the ability to cook food and to stay warm during the winter months.

Today, of course, we use a handy little tool called "matches" to conjure a flame in little more than the blink of an eye.

How, though, did we go from frantically rubbing two dry twigs together in a desperate wish for light and heat to being able to casually call up a tiny blaze with the scratch of a match?

Historians tell us that the ancient Chinese—who also gave us noodles and paper—are credited with inventing an early form of the match (which they called "fire inch-sticks") in or around A.D. 577. In the midst of a war between the Northern Zhou and Chen dynasty armies, housewives trapped inside city walls and without many sources of kindling figured out how to saturate dry pinewood sticks with sulfur, which burst into flame when ignited by another fire, allowing them to share fire, keep warm and cook food.

The history of the modern match doesn't show much progress until the late 17th century. That was when famed chemist and physicist Robert Boyle, best known for "Boyle's Law" (pressure times volume equals a constant for an ideal gas) had an idea: He dipped a small piece of wood in sulfur, and coated a small piece of paper with phosphorus.When he dragged one across the other, it sparked a flame.

It was an interesting experiment, but no one pursued it further until almost more than a century later (1826-27) when John Walker, an English apothecary and chemist, invented the very first friction match. He coated the end of wooden sticks with a mixture of potassium chlorate, antimony sulfide, starch and gum and let them dry. When drawn across a hard surface, they sparked a fire.

Walker was smart enough to know that he had a moneymaker on his hands, but he was in such a rush to sell his "Congreves" (named after a rocket invented in the early 1800s) that he rushed to sell them without taking out a patent to protect his intellectual property. As a result, Samuel Jones, who knew a good opportunity when he saw one at one of Walker's demonstrations, patented the invention in his name, and renamed them "Lucifers."

Lucifers quickly became immensely popular, though they apparently smelled absolutely foul. That problem was tackled in the early 1830s by a French chemist named Charles Sauria, who—cleverly, he thought—added white phosphorus to the recipe to negate the disgusting odor. There was only one downside: White phosphorus is highly poisonous, and sickened many of those who worked in the factories that manufactured the matches. As a result, several countries actually passed laws prohibiting the use of the poison in these products.

In 1910, the Diamond Match Co., headquartered in Ohio, substituted sesquisulfide for the dangerous white phosphorus and patented this first non-poisonous match. Today, around the world, people use more than 500 billion matches a year.

SCOTT JONES,
Vice President
Sales & Marketing
21 years

"ON-SITE PLANT SURVEYS FOR CUSTOMERS, THAT'S MY JOB...
DETERMINING THE BIG AND LITTLE ADJUSTMENTS THEY CAN MAKE TO

IMPROVE

THEIR EFFICIENCY AND SAFETY.
I TAKE THAT RESPONSIBILITY SERIOUSLY."

DIXON

The Right Connection™

dixonvalve.com

GOING GLOBAL w/UPS

International shipping has its risks.

Help reduce them by shipping with UPS.

And watch your business grow.

This is no time to take chances. Help reduce paperwork and the risk of errors with UPS Paperless™ Invoice, an industry first process. And minimize delays with more customs offices around the world. Ship with confidence. Ship globally with UPS.

Go international with confidence.
Find out more at ups.com/whiteboard

WHAT CAN BROWN DO FOR YOU?®