

5 Angels of Bataan

POW nurses who
bravely carried on

18 Disney's Magic

He was a pioneer
of the imagination

24 Tico Way

Experience a jungle
paradise in Costa Rica

30 The Norman Invasion

Bringing culture
to a backward island

BOSS

CONNECTING TO INDUSTRY

REFLECTIONS ON GLASS

An ancient yet modern marvel,
the transparent material always
remains at the surface of things

FALL/WINTER 2013

ASIA/PACIFIC – SPRING/SUMMER 2013



The Right Connection™



OUR WEBSITE IS YOUR 24-7-365
CONNECTION

TO THE LATEST SAFETY & TECHNICAL INFORMATION.

Dixon on the web is one more important way we deliver outstanding service and support to you.
We're "always on" at dixonvalve.com – your source for information, insights and answers.

Dixon: The Right Connection for service, safety and quality.



Call: 877-963-4966

The Right Connection™

dixonvalve.com

BOSS

FALL/WINTER 2013
ASIA/PACIFIC –
SPRING/SUMMER 2013



FEATURES

10 REFLECTIONS ON GLASS

Glass is everywhere in our lives—from windows to dishes to optical fibers—and its manufacture has remained largely the same since ancient times.

By Alan Feiler

18 PIONEER OF THE IMAGINATION

Walt Disney pulled magic out of men and machines. He knew he had to keep innovating to survive.

By David Holzel

24 THE TICO WAY

With its lush tropical jungle and amazing array of wildlife, Costa Rica offers an affordable paradise for travelers of all interests.

By Georgia de Katona

30 WILLIAM THE CONQUEROR

The 1066 invasion of England marked the birth of today's royal line—and the English language.

By Eugene Finerman

DEPARTMENTS

5 PROFILE

Angels of Bataan

8 BUILDING CHARACTER

Taking Trust and Honesty Into the Classroom.

16 FACTS & FIGURES

World Glass Industry Stats

23 THE DIXON DRILLER

34 KEEPING IT SAFE

Don't 'Run It Till It Drops'

36 HEALTH & FITNESS

Strike Back Against Stroke

38 INVENTIONS

Hitting the Mark



NOT WORTH THE WAIT

The importance of making the most out of any opportunity—and the best of a bad situation—was a lesson that was driven home to me with this issue’s article, “The Angels of Bataan” (p. 5). A group of young nurses, caught in circumstances beyond their control, did not sit back and wait for things to change before they got to work. Instead, even as POWs living in grim conditions, they set about caring for the sick and making life better for their fellow prisoners.

We would be wise to follow such an example in business and in life. When bad things start happening, some people just sit back passively and wait for something to change. Others take action to make the most of the situation. Walt Disney (“Pioneer of the Imagination,” p. 18) did not give up when circumstance were difficult. William, the Duke of Normandy, refused to back down when denied the promised throne of England (“William the Conqueror,” p. 30).

Most of us know people—and businesses—who seem to land on their feet despite daunting obstacles, while others are left behind.

Perhaps making something happen is more important than waiting for something to change.

Thanks for reading,

Dick Goodall

BOSS

FALL/WINTER 2013

ASIA/PACIFIC – SPRING/SUMMER 2013

Publisher
Dixon Valve & Coupling Company

Editor
Sue De Pasquale

Editorial Board
Richard L. Goodall, CEO, Dixon
Bob Grace, President, Dixon
Taylor Goodall, Vice President,
Distribution, Dixon
Scott Jones, Vice President, Sales &
Marketing, Dixon
Hazen Arnold, Vice President, Dixon
Mark Vansant, Vice President, Dixon
Joseph Dawson, Marketing Manager
Bill Harr, Global Marketing Director
Karen R. Hurless, Advertising &
Communications Manager

Editorial & Design
Clipper City Media

Director of Custom Media
Jeni Mann

Art Director
Cortney Geare

Please submit address changes and requests for new subscriptions to:
Clipper City Custom Media
Attn: Rochel Ziman
rziman@clippercitymedia.com
11459 Cronhill Drive, Suite A
Owings Mills, MD 21117
410-902-2308
Fax: 410-902-2338

BOSS is produced three times a year by Dixon Valve & Coupling Company and Clipper City 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. Copyright 2013, all rights reserved. Reproduction of any part of *BOSS* without written permission is prohibited.

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

Email questions or comments about *BOSS* to:
boss@dixonvalve.com

JOIN US!



The Angels of Bataan

Amid the horror of war in the Pacific, a group of POW nurses bravely carried on

> Even as bombs began falling on Manila in December 1941, the women who served as part of the U.S. Army Navy and Nurse Corps in the Philippines continued caring for their sick and dying patients.

In the years that followed, these World War II nurses endured the most trying of conditions. At times they had no hospital buildings and no hospital beds, only vine-stuffed mattresses laid out on jungle floors. There were bombs and air raids and gunfire. They suffered from malaria, beriberi, dengue fever, malnutrition, starvation and a host of other conditions that sapped their energy and strength. And even after they were captured by the Japanese and forced to live in internment camps, these nurses continued taking care of the thousands of sick and injured.

Upon their liberation in February 1945, the 78 nurses returned home, heralded as the “Angels of Bataan and

Corregidor,” and awarded Bronze Stars for their service. Yet for decades their story went largely untold.

“They were the largest group of women POWs in the history of [the United States]. But there was so much going on—the events at Pearl Harbor, the war in Europe—that their story has been swallowed up,” said Elizabeth Norman, author of *We Band of Angels: The Untold Story of American Nurses Trapped on Bataan by the Japanese* (Pocket Books, 1999), in a *New Hampshire Sunday News* interview in 1999.

And yet the influence the women had on their colleagues and patients was nothing less than extraordinary, according to U.S. Army surgeon John R. Bumgarner, who served in Bataan with them. “One of the most remarkable things coming out of our experiences in Bataan was the presence and

performance of the Army nurses,” Bumgarner wrote in his 2004 memoir, *Parade of the Dead*. “In retrospect I believe that they were the greatest morale boost in that unhappy little area of jungle called Bataan. I was continually amazed that anyone living and working in such primitive conditions could remain as calm, pleasant, efficient and impeccably neat as those remarkable nurses.”

Perhaps the greatest irony of their story is that many of these nurses were initially drawn to the Philippines by the promise of living and working in an exotic island paradise. Surrounded by palm groves and white gardenias, with weekends spent sunning at the beach club and dancing under the stars, the Americans stationed in the Philippines had a great life.

All that changed when the Japanese bombed Pearl Harbor on December 7, 1941, and began their attack on the Philippines. The Army

Freed after three years of imprisonment as POWs, a group of U.S. Army nurses climb into trucks on Feb. 12, 1945, as they leave Manila to head home to the United States. They sport new uniforms, given to them to replace their worn-out clothing.





The angels of Bataan and Corregidor arrive at Hickam Field in Hawaii on February 20, 1945.

and Navy nurses had never trained for combat, and yet they were now in the middle of a war zone.

The nurses jumped into action, caring for the wounded amid chaos. After Clark Field in the Philippines was

bombed on December 8, U.S. Army nurse Ruth Marie Straub volunteered to help care for the casualties brought to Stotsenberg Hospital. She wrote in her diary, "The hospital was bedlam—amputations, dressings, intravenouses,



Army nurses in Santo Tomas Internment Camp in 1943. From left to right: Bertha Dworsky, Sallie P. Durrett, Earlene Black, Jean Kennedy, Louise Anchieks and Millei Dalton.

blood transfusions, shock, death ... Worked all night, hopped over banisters and slid under the hospital during raids. It was remarkable to see the medical staff at work."

The nurses were evacuated from Manila and moved to field hospital sites on the jungle peninsula of Bataan and

VEP Series

Hydraulic Quick Disconnect Couplings

For anywhere there's a need for a tough, reliable hydraulic connection!

Applications:

- High Impulse Hydraulic Applications
- Oil Field Equipment
- Construction Equipment
- Excavator Attachments
- Crane Systems

Features:

- Fully Interchangeable with Stucchi VEP/VEP-HD Series, DNP FSI/PST4 Series, Holmbury HFT-Series, Voswinkel FT Series, and Parker FET-Series
- Available with NPTF, BSPP and ORB
- Improved Connect and Disconnect Performance Up To 5,500 PSI
- Patented Valve Mechanism Optimizes Flow and Pressure Performance
- Improved Corrosion Resistance Using ROHS Compliant Trivalent Chrome Plating
- Temperature Range: -22°F to +212°F (-30°C to +100°C)



 Proudly made in the USA

Dixon Quick Coupling

2925 Chief Court, Dallas, NC 28034 • ph 877.963.4966 • fx 800.839.9022

dixonvalve.com • customer service: 877.963.4966



The Right Connection™



On February 20, 1945, these U.S. Army nurses were awarded Bronze Stars, along with promotions, by Brig. Gen. Guy B. Denit, chief surgeon.

Malinta Tunnel on Corregidor Island, caring for hundreds of patients each day in difficult conditions over the next several months. The situation worsened when the U.S. troops on Bataan surrendered to the Japanese on April 9, 1942. Some 72,000 soldiers (both U.S. and Filipino) were captured

and sent on a horrific 63-mile march up the east coast of Bataan—the Bataan Death March that left some 10,000 dead at the hands of the Japanese soldiers.

While a handful of nurses were evacuated after the surrender, most were held as prisoners of war at two

internment centers: Santo Tomas and Los Baños. The camps held civilians—thousands of Americans, British and people from other countries—who had been living and working in the Philippines when Pearl Harbor was bombed.

The nurses were held captive for almost three years—years in which they wore their uniforms and stayed busy. As Japan’s prospects in the war worsened, conditions in the camp deteriorated, with many people becoming sick owing

to lack of food and poor sanitation.

“We were scared and tired, but we kept working,” Mildred Dalton Manning, a U.S. Army nurse and prisoner of war, told the *Atlanta Journal Constitution* in 2001. “We were under terrific strain, but we just did our job even when we were weak from not eating.”

Liberated on February 3, 1945, the women returned home and were honored with medals and presidential citations, and lauded by the press as “one of the beautiful legends of the Pacific War.”

Manning, the last known surviving “Angel of Bataan,” died in March 2013 at 98. She was more practical than romantic when she considered how she survived amid such adversity.

“I had a job to do,” she told the *Trenton Times*. “I was a nurse.”

Dixon Eagle Bellows Seal Valves

Features:

- reduce fugitive emissions of toxic or regulated fluids
- minimize maintenance
- reduce life cycle costs in process plants including steam, cryogenic, heat transfer oil and vacuum systems
- available styles:
 - forged steel globe valves, welded and bolted bonnet
 - forged steel gate valves, welded and bolted bonnets
 - forged steel globe valves welded bonnet Y-pattern
 - cast steel globe valves
 - cast steel gate valves

To learn more call 800.314.9426 or e-mail eaglesales@dixonvalve.com.

Dixon Eagle

33 Plan Way - Building 5, Warwick, RI 02886 • ph 800.314.9426 • fx 401.732.2201

dixonvalve.com • customer service: 800.314.9426



The Right Connection™



A Culture of Caring

> In a fourth-grade classroom at Garnett Elementary in Chestertown, Md., three-dozen children sit clustered on a rug, their eyes trained on two men with graying hair who stand before them.

"Anthony, how about sharing the message with us this morning?" begins Bill Hollingsworth, from Dixon.

Standing up, the little boy says in a big voice, "To be honest with yourself, and with others."

"That's right!" says Dick Goodall, Dixon CEO. "So what do you think it means?"

Hands fly up in the air, and one by one the children offer their personal interpretations. "You don't ever lie," says a skinny little boy. A girl with long braids says proudly, "I have been honest before." As the conversation unfolds, the group talks about the importance of recognizing both your good and bad qualities, and of never trying to be someone you're not.

Hollingsworth and Goodall are familiar figures to these fourth-graders;

the two men have been making weekly visits to classrooms for 13 years, coaching kids on the "Character Counts" curriculum and its "Six Pillars"—trustworthiness, respect, responsibility, fairness, caring and citizenship.

They are among about 30 Dixon employees—and 130 men and women from across Kent County, Md.—who take time from their workday each week to visit classrooms in Pre-K through ninth grade to spread the word about the importance of making good decisions and living a life of integrity.

"We've always felt that a strong foundation in good values and character makes for successful individuals and organizations," says Goodall. "And in fact, we use the same Six Pillars as part of our mission/vision/values statement at Dixon."

Perhaps for that reason, it's never been a tough sell to get Dixon employees on board and involved with the Character Counts program. "If I walked into Dixon today and said, 'We don't

have time to do this,' we'd have a rebellion on our hands," he says, with a smile. "This has become a part of our culture now."

Dixon's Tom Parr, who serves on the advisory board for the Kent County chapter of Character Counts, is now in his eighth year volunteering with the program. "From a business perspective, it's so good to know that we work for a company that views itself as a part of the community and reaches back out to the community," he says. "And it's not just lip service; we are putting our people into the classroom every single week."

Parr has just returned from his first coaching session of the school year, where he worked with a ninth-grade class. He admits that he was a little nervous going in. He had previously dealt only with young students in elementary school. Could he get a group of teenagers excited about values like honesty and respect?

As it turned out, Parr needn't have worried. Wisely, he and his Dixon

partner kicked off the day's discussion by turning to the news: NASCAR driver Clint Bowyer had just been accused of intentionally spinning out in order to help his teammate, resulting in a \$300,000 fine against his racing team.

"This issue pretty much engaged all the students and everybody started talking," says Parr. Some students felt that the racer was justified and that he acted selflessly to help his teammate. Others argued that his actions violated the spirit of the sport.

"We didn't arrive at a right or wrong answer," Parr says. "But the discussion provided an excellent opportunity to get them all thinking, which is exactly what we want children to do."

Dixon's Jenna Leckrone, who coaches a class of seventh-graders, also refers to issues in the news that kids can relate to. "They get most fired up when we talk about handling situations where someone has 'done you wrong,' at least in your mind," she says. "That generates a huge discussion and sometimes it gets heated." As talk turns to retaliation, Leckrone guides them through the pros and cons of different personal responses.

Leckrone finds it most rewarding, she says, "when kids who initially want to retaliate change their mind and see that standing up for yourself and remaining true to your character is actually a stronger comeback than retaliation."

Both Leckrone and Parr say that the lessons they share each week—about



Some 30 Dixon employees volunteer each week to spend time in classrooms as coaches for the Character Counts curriculum.

setting goals and going after them, for instance, and about being honest with yourself when you've made a mistake—can't help but spill over into their own lives. "Sometimes I'll be doing something and I'll think twice, asking myself, 'Is this what I'd want one of my Character Counts students to do?'" says Leckrone. "It definitely makes us better people. We're giving ourselves a lesson at the same time we're teaching the children."

Longtime fourth-grade teacher Joanne Coveney, from Garnett Elementary, sees a significant benefit to the Character Counts program. She says her students always looked forward to their Monday visits from Goodall and Hollingsworth.

Like other Dixon coaches, the two men make it a point to attend school concerts, field days and classroom parties. "We want to let these children know that we care about them—because

we really do," says Goodall. He notes that some of the kids he encounters aren't fortunate to have positive male role models at home. "Bringing more men into the school has proven very positive, according to the teachers at Garnett Elementary, and the principal," he says.

Back in Coveney's classroom, the lesson is winding down and the fourth-graders have queued up in two lines to practice their handshakes with Hollingsworth and Goodall. Before they begin, Goodall makes a query:

"Who's a winner?" he asks with enthusiasm. In unison, a chorus of young voices shouts back, "I'm a winner!"

Suitably encouraged, the children begin filing up to greet the two Dixon visitors.

"Good morning, Mr. Hollingsworth! My name is Henry!" says one little boy, as he pumps the man's hand and offers a large smile.

The next young man looks to the floor when it's his turn. Hollingsworth gently reminds him, "Remember to look me in the eye."

Before they depart for the morning, Goodall and Hollingsworth end with a familiar refrain. "What kind of day are you going to have?" they ask. "Terrific!" the children shout back. And then from the Dixon men: "Who makes it that way?"

"I do!" the children recite, with grins. They pause a beat, then add, "If it's going to be, it's up to me!"

Goodall, left, and Hollingsworth, right, surrounded by their Garnett Elementary students.





REFLECT

An ancient yet modern marvel, the transparent material always remains at the surface of things

BY ALAN H. FEILER

TIONS ON GLASS

LOOK AROUND. Glass is everywhere in our lives, and its utilitarian and creative purposes are endless: It preserves our food and beverages, provides our drinking vessels (which aptly enough are called glasses) and dishes and cookware, helps improve our vision (also called glasses), protects our buildings and vehicles from external intrusions and threats, preserves our photographs and artistic treasures, and greatly assists our scientific endeavors (test tubes, microscopes, telescopes, etc.). And glass optical fibers enable us to take endless reams of data from across the globe and transmit them at the speed of light, via the Internet.

In addition, glass allows us to actually *see* ourselves. After all, what would our lives be like without mirrors? And cameras? Try video-chatting without glass.

Plus, there are centuries of fine artisans and craftsmen who have taken different forms of glass and created spellbinding and exquisite treasures that illuminate the imagination, inspire and fill the human spirit and transcend the centuries.

Today, the countries that are the world's leading exporters of glass—which annually is a \$75 billion

international industry—are the United States, France, Belgium, Japan, India and Germany. Not surprisingly, North Americans, Europeans and the Chinese are the greatest consumers of glass, accounting for three-quarters of the global demand.

Among the world's leading glass manufacturers are China's Jiangsu Farun Group, France's Compagnie de Saint-Gobain, Asahi Glass of Japan, Pilkington of Great Britain and Guardian Industries of the U.S. Other major glass companies are Schott AG in Germany and Corning, Owens-Illinois and PPG Industries in the U.S.—which are among 1,500 American glass outfits with an estimated combined annual revenue of approximately \$25 billion.

Not too shabby for an ancient yet modern material that people generally tend to think of as greatly fragile, highly vulnerable and rather disposable. Glass has been compared to human nature. "People are like stained glass windows," suggested the late Swiss-American psychiatrist and author Elisabeth Kübler-Ross. "They sparkle and shine when the sun is out, but when the darkness sets in, their true beauty is revealed only if there is a light from within."

Today, the countries that are the world's leading exporters of glass—which annually is a \$75 billion international industry—are the United States, France, Belgium, Japan, India and Germany.



52.1.93. Collection of The Corning Museum of Glass, Corning, New York, gift of Arthur A. Houghton, Jr.



Left: The Morgan Cup. Roman Empire, first half of the first century AD Opaque white over translucent deep blue glass; blown and cased; carved, ground and polished. Right: A hand-colored engraving, which appeared in *The Universal Magazine* (London, 1760), depicts the manufacture of crown glass by blowing (left) and plate glass by casting (right). Glass workers were susceptible to cataract caused by the glare of the furnace.

Glass manufacturing evolved in Venice during the time of the Crusades (middle to late Middle Ages), and in the late 13th century an elaborate guild system was established there for glassworkers.

REFLECTING ON GLASS'S ORIGINS

Glass exists in nature, most often in the form of obsidian, which is created during volcanic eruptions, notes David Whitehouse, a senior scholar at the Corning Museum of Glass in Corning, N.Y. "People, however, have been making glass for more than 4,000 years," he adds.

Historians believe that obsidian was used by societies around the world during the Stone Age for the manufacturing of cutting tools. Archaeological evidence shows that glass was first made in Mesopotamia (today's Iraq and coastal northern Syria) as beads during the third century BCE. Egypt, Syria and other Mediterranean countries were glassmaking centers in the centuries before Christ, and priests and ruling classes considered glass to be as valuable and prestigious as jewelry.

Besides obsidian, early artisans found that natural glass was formed when lightning struck sand and the heat would sporadically

Obsidian



fuse the sand into tubes called fulgurites. These forms of glass were used for jewelry, knives, arrowheads and even currency.

Glass manufacturing is believed to have begun in South Asia around 1730 BCE. During the Roman Empire, glassmaking had many domestic and industrial uses, as evidenced by the objects that have been discovered in areas governed by the Romans. In fact, the word glass was first coined in the latter part of the Roman Empire era, with the term *glesum* originating most likely in the Roman glassmaking center in Trier (now in Germany). The Latin word stems from the Germanic term for a lustrous, transparent substance.

The Romans were the first to use glass for windows, circa 100 AD in Alexandria. They tended to use glass pebbles laid out on a wooden frame. Clear glass panes were first invented in the late third century. Subsequently, mullioned glass was used for windows among Europe's elite and well-to-do, as well as for cathedrals. (It wasn't until the 17th century, however, that glass was commonly used for windows for ordinary houses throughout Europe.)

During the first centuries of the Common Era, the art and production of glassmaking flourished. Glassmakers

devised the process of offhand glass blowing, painting and gilding, and showed how to create layers of colors on glass and cut out designs in high relief.

Glass manufacturing evolved in Venice during the time of the Crusades (middle to late Middle Ages), and in the late 13th century an elaborate guild system was established there for glassworkers. Venetian glassblowers created some of the most exquisite glass ever made, according to art historians, including cristallo glass, a transparent, virtually colorless glass that can be created in any shape and to extreme thinness.

Glassmaking became an important trade in Germany and England during the late 1400s and 1500s. In 1674, English glassmaker George Ravenscroft—who had familial ties to Venice's glass artisan community—patented a new type of glass called lead glass. In quantities of 10 to 30 percent, lead oxide was added to improve the appearance of glass and make it easier to melt in furnaces fueled by coal. This process made glass easier to manipulate and decorate, and the production of lead glass galvanized the British economy and allowed England to overtake Venice as the glass industry's capital in the 18th and 19th centuries. Lead glass proved to be invaluable to the optical community, particularly for the manufacturing of optical lenses, telescopes and microscopes.

American glassmaking originated in 1608 in the settlement of Jamestown in the colony of Virginia, and by the early 1800s, window glass—also known as crown glass—was the primary glass in demand in the United States. Glassmakers blew a bubble of glass and spun it until it was flat to create crown glass. By the 1850s, plate glass was developed for mirrors and other products. This glass was made by casting molten glass onto a round or square plate, cooling it and polishing both sides.

Clockwise from left: Mullioned window of the medieval Priori Palace; The Shard, London, the world's tallest glass building; a goblet from London's Savoy glasshouse of George Ravenscroft, 1676-1678. Colorless glass; blown, pattern-molded, applied.

DID YOU KNOW ... ?

- The blowpipe was invented around 30 BCE, probably along the Mediterranean coast. This invention was revolutionary in the history of glassmaking. The craft of glassblowing was passed down from father to son, and from master to apprentice.
- The formulas and procedures used in glassmaking were a closely guarded secret throughout history. At times, the penalty for disclosing techniques was death.
- When breaking, glass cracks at speeds of up to 3,000 miles per hour.
- The Corning Museum of Glass, in Corning, N.Y., with more than 45,000 pieces, possesses the world's largest collection of glass art.
- A modern glass bottle would take 4 millennia or more to decompose.
- Glass has the quickest turnaround of any recycled curbside product. It can be back on store shelves in as little as 30 days.
- The four sectors of the glass industry—container, flat, specialty and fiberglass—produce more than 20 million tons of glass annually, used for myriad consumer products.
- The auto industry uses an estimated 500 million square feet of glass annually. Also, 15 to 20 percent of a car's surface today consists of glass.
- The world's tallest glass building is The Shard in London, which opened in July 2012. Also known as the Shard of Glass or Shard London Bridge, the 95-story skyscraper stands 1,020 feet high and features 11,000 panes of glass.



50.2.2 Collection of The Corning Museum of Glass, Corning, New York

The Secret Behind Bullet-Proof Glass

What gives bullet-resistant glass the ability to stop bullets? While processes vary by manufacturer, the basic strategy involves layering a polycarbonate material between pieces of ordinary glass in a process called lamination. Polycarbonate is a tough transparent plastic—usually between 7 and 75 millimeters in thickness. A bullet fired at a sheet of bullet-resistant glass will pierce the outside layer of the glass, but the layered polycarbonate-glass material is able to absorb the bullet's energy and stop it before it exits the final layer.



Left: Cullet. Above: A melting tank

In the 1890s, the manufacturing of glass changed and increased exponentially. With the advent of machinery (and eventually pipelines that carry petroleum and natural gas to plants), the making of glass—for bulbs, tubing, sheet glass and many other uses—allowed for more precision and mass productivity. In 1904, the first automatic bottle-making machine was invented by Michael J. Owens in Toledo, Ohio, and by the mid-1920s a fully automatic machine to blow electric light bulbs was developed by Corning Glass Works in New York. Elias Snitzer of the American Optical Corp. invented laser glass in 1961. Two decades later, Corning Glass Works introduced transparent glass ceramic cookware.

Today, glass can be recycled to make glass for new containers, particularly when mixed with silica sand, limestone and soda ash. The recycling of glass is relatively easy because glass does not age or diminish with constant usage.

Furthermore, since the 1970s, glass has been utilized to store radioactive wastes. And glass has been used for the creation of specialty glasses, such as an infrared transmitting glass that can be used for lenses in night vision goggles.

MAKING GLASS

Generally speaking, glassmaking has remained the same since ancient times. Most glass contains three primary ingredients: silica (which is usually found in sand), soda or potash (which lowers the temperature after sand melts) and lime (which provides stability to a generally unstable combination).

After being stored in silos, prepared and mixed, the raw materials (called the batch) for glass are transported to a furnace. Cullet (recycled glass or waste glass) is added to the batch to accelerate reactions. Melting the raw materials requires temperatures of 2600 to 2900 Fahrenheit (1427 to 1593 C), depending on the composition of the materials. Particularly large quantities of glass are made in furnaces known as day tanks. Most glass, however, is made in large furnaces known as continuous tanks, where 400 to 600 tons of flat glass can be melted per day for production.

In the case of soda-lime glass—which is largely composed of silica and sodium oxide from soda ash, as well as lime and other additives, and is used for drinking bottles and windows—mass production is conducted in gas-fired units. For specialty glasses, smaller scale furnaces are used, including electric melters, pot furnaces and day tanks.





Glass blowing furnace

After the melting process, the glass is formed after undergoing homogenization and the removal of bubbles. In the case of flat glass for windows and other uses, a floating glass process is employed in which the top surface of the glass is subjected to nitrogen under pressure to obtain a polished finish. Glass for bottles and jars is produced by blowing and pressing processes.

Four methods exist for the shaping of glass: blowing, pressing, drawing and casting. Blowing is conducted through the ancient practices of a blowpipe. Pressing is done by dropping a hot glob



Schott Glass manufactures the world's first borosilicate glass, Borofloat, using a microfloat process.

of glass into a mold and then pressing it with a plunger until it fills the mold. In the drawing process, molten glass is drawn in an upward fashion into a sheet through rollers, with the thickness of the sheet determined by the speed of the draw bar. Casting occurs when molten glass is poured into molds with ladles—or straight from the furnace.

from tension caused by uneven cooling. Annealing involves reheating glass and cooling it according to a planned timetable and temperature schedule.

After this long process, glass plant engineers inspect the glass by testing samples for quality and desired properties. With blown glass items, excess glass is often removed by scoring the pieces with a diamond or steel

Generally speaking, glassmaking has remained the same since ancient times. Most glass contains three primary ingredients: silica, soda or potash, and lime.

Once the form for glass is achieved, it is annealed (heated and then slowly cooled) to remove strains and stresses. This process might also include surface treatments, and coatings and/or lamination to enhance the chemical durability, strength or optical properties. If not annealed, glass may shatter

wheel, and snapping them off with sudden pressure. If glass edges are too rough, they are usually polished with abrasives or flames from a fire-polishing instrument.

After the finishing process, glass is decorated in various fashions. The etching process requires that glass be

From left to right: A vase is shaped through glass blowing; raw material that has been melted in the pot at Schott in Mainz, Germany, is rolled to flat glass.



Optical fibers



WORLD GLASS INDUSTRY STATS

- **ANNUAL INTERNATIONAL GLASS INDUSTRY REVENUE:** \$75 billion
- **LEADING GLASS EXPORTERS:** U.S., France, Belgium, Japan, India and Germany
- **LEADING SPECIALTY PRODUCTS:** Lenses, optic fibers, mirrors, glassware, TV tubes (all of which account for 60 percent of global glass revenue)
- **LEADING GLASS COMPANIES:** China's Jiangsu Farun Group, France's Compagnie de Saint-Gobain, Asahi Glass of Japan, Pilkington of Great Britain, Germany's Schott AG and Guardian Industries, Corning, Owens-Illinois, and PPG Industries of the U.S.
- **PRODUCTS IN GREATEST DEMAND:** Containers, bottling, automotive and construction industrial needs
- **VALUE OF GLASS PACKAGING MARKET:** \$35 billion
- **BIGGEST CONSUMERS:** North America, China and Europe account for 75 percent of global demand for glass.

dipped in or sprayed with hydrofluoric acid and some of its compounds etched. The surface may be frosted, rough or opaque, or it could have a translucent, smooth quality. Sandblasting can also be used to give glass a translucent design; the process involves blowing compressed air and sand against the glass while using a rubber stencil to create an image.

In addition, enamels and lusters can be applied to glass by hand painting or the process of transferring decals, or by silk-screening. When the decorations are heated, they fuse to the glass and become part of the piece. This is how many glass products—such as jugs, pitchers and lighting devices—are decorated.

A CLEAR VISION

What is the future of glass? In his book *Glass: A Short History*, David Whitehouse makes it clear that predictions aren't easy to make.

“The speed of change today makes forecasting a risky business,” he writes. “It is almost certain that new generations of glass and products that incorporate glass will appear. As scientists make increasing use of nanotechnology [the manipulation of matter on a molecular scale] to improve existing types of glass and devise new ones, the pace of change is likely to become even faster.”

The glass industry must continue to devise superior products (translation: lighter and stronger) that will appeal to the consumer base. Innovations will be needed to support the proliferation of glass products in new markets and industries, especially with the advent of the information age.

In particular, glass industry observers say, more research is needed for new glass processing technology to reduce greenhouse gas emissions, waste and energy use while increasing the productivity of glass furnaces.

Improved melting and refining processes will be necessary to alleviate environmental concerns while increasing product yield, lowering energy demands and reducing production costs. All these issues will help improve the competitiveness of glass products and create a leaner, cleaner processing system. And of course, the recycling of glass will be key to that mission.

More than 2 millennia ago, the Roman author, naturalist and philosopher Pliny the Elder observed, “*Neque est alia nunc sequacior materia aut ... accommodatior*” (Today no other material is more pliable ... or adaptable than glass).

Those words about the unique and eternal nature of glass are as true today as when they were penned during the Roman Empire. Like love and art, glass is here to stay and will remain a critical part of our lives. Just look in the mirror. ◀

GSM Ball-Joint Armor

Makes hose better!

Now available in 12" ID!

Features:

- Reduces down time with longer service life in demanding applications
- Protects hose from extreme heat, flame, abrasion, molten splash and kinking
- Applied directly over multiple wraps of insulation leaving no gap between the armor and the hose

For more information on GSM Ball-Joint Armor, call 888-226-4673. For the Right 'Flexible' Connection, it's got to be Dixon.

Dixon Specialty Products

225 Talbot Blvd, Chestertown, MD 21620 • ph 888.226.4673 • fx 410.778.1958

dixonvalve.com • customer service: 888.226.4673



The Right Connection™

PIONEER OF THE Imagination

Walt Disney pulled magic out of men and machines. He knew he had to keep innovating to survive BY DAVID HOLZEL

Whatever they were expecting as they followed the searchlights into the opulent Carthay Circle Theater, the Hollywood royalty who attended the film premiere on December 21, 1937, could not have possibly been prepared for what they saw. For 84 minutes they sat transfixed, Chaplin and Barrymore and Shirley Temple and Ginger Rogers, charmed by the songs, moved by the characters. And when the young heroine was thought to have died, there were tears shed in the sold-out, 1,500-seat movie palace. Clark Gable and Carole Lombard blew their noses.

Not a bad reaction to a cartoon.

But that cartoon was *Snow White and the Seven Dwarfs*, and there had never been anything like it. That's the way its creator, Walt Disney, wanted it. At age 36, Disney, who was already well-known for his short animations with characters like Mickey Mouse, knew he had to keep innovating and

taking risks. To do that he continually adopted new technologies and created new expectations among the viewing public. *Snow White* wasn't the first time Disney had pulled magic from men and machines, and it certainly wouldn't be the last.

Snow White was the first full-length animated film. And during the three years that went into creating it, Disney and his 600 employees confronted several questions, the answers to which would determine whether *Snow White* would be a hit or be forever known as Disney's Folly: Would an audience sit and watch a cartoon the length of a full-length motion picture? Most cartoons at the time were only seven or eight minutes long. Would animated drawings tug at the heartstrings? There was even concern that staring at animation that long would tire the eyes.

The all-star audience at the Hollywood premiere dispelled those



Walt Disney

worries, and *Snow White* set the new standard for depth and realism in animation. It also put Disney Studios—owned by Walt and his older brother Roy—in the black. They were in debt for



BROTHERS ^{IN} BUSINESS

Though Roy Disney rejected the public spotlight that his brother so adored, he played a critical role behind the scenes in creating—and building—the Disney enterprise. He was the company's first CEO and in 1945 became chairman of the board, along with Walt.

Walt Disney is shown on the beach at Waikiki playing a ukulele, while his brother and business manager, Roy, makes him the subject of a movie.

more than \$1 million, but *Snow White* took in \$6.7 million around the world by 1939 (\$505 million today), with at least \$2 million more coming from the sale of Snow White toys. This bonanza was all the more remarkable because the world was still gripped by the Depression.

In 1941, Disney acknowledged the payoff from his painstaking approach to creativity in *American Cinematographer*: “The public will pay for quality,” he said. “Our business has grown by and with technological achievements. Should this technological progress ever come to a full stop, prepare the funeral oration for our medium.”

Rise of THE Animator

Walt Disney was one of those plucky Midwestern go-getters who made their fame after the turn of the 20th century, the fourth of five children. His father, Elias—religious, taciturn, and a socialist—put his hand to a number of occupations. When his wife, Flora, gave birth to Walt on December 5, 1901, in Chicago, Elias was working as a building contractor. Walt’s parents were pioneer people of the old century, while their son was going to help define the new one.

In 1906, the Disneys moved to a farm in Marcelene, Missouri. That same year, “Humorous Phases of Funny Faces,” believed to be the first cartoon, was released. It took advantage of stop-action photography to make whimsical drawings on a chalkboard appear to change.

After Walt Disney died of lung cancer in 1966, Roy Disney put off his own retirement so that he could oversee construction of Disney World—which he would later rename Walt Disney World to honor his brother. Roy Disney served as president of Walt Disney Productions from 1966 to 1968. He retired after the opening of Walt Disney World in October 1971, and died just a short time later.

Walt remembered life on the farm with delight, but in 1910, the family was forced to sell it. Elias was ill from the effects of typhoid fever and unable to do the hard work the homestead demanded. Meanwhile the two oldest Disney boys had gone out to make their own lives. That left Walt, 9, and Roy, 17, of the Disney men.

The Disneys landed in Kansas City, where Walt discovered his love for drawing and performing. “I think Walt was an actor all his life,” Disney biographer Bob Thomas said.

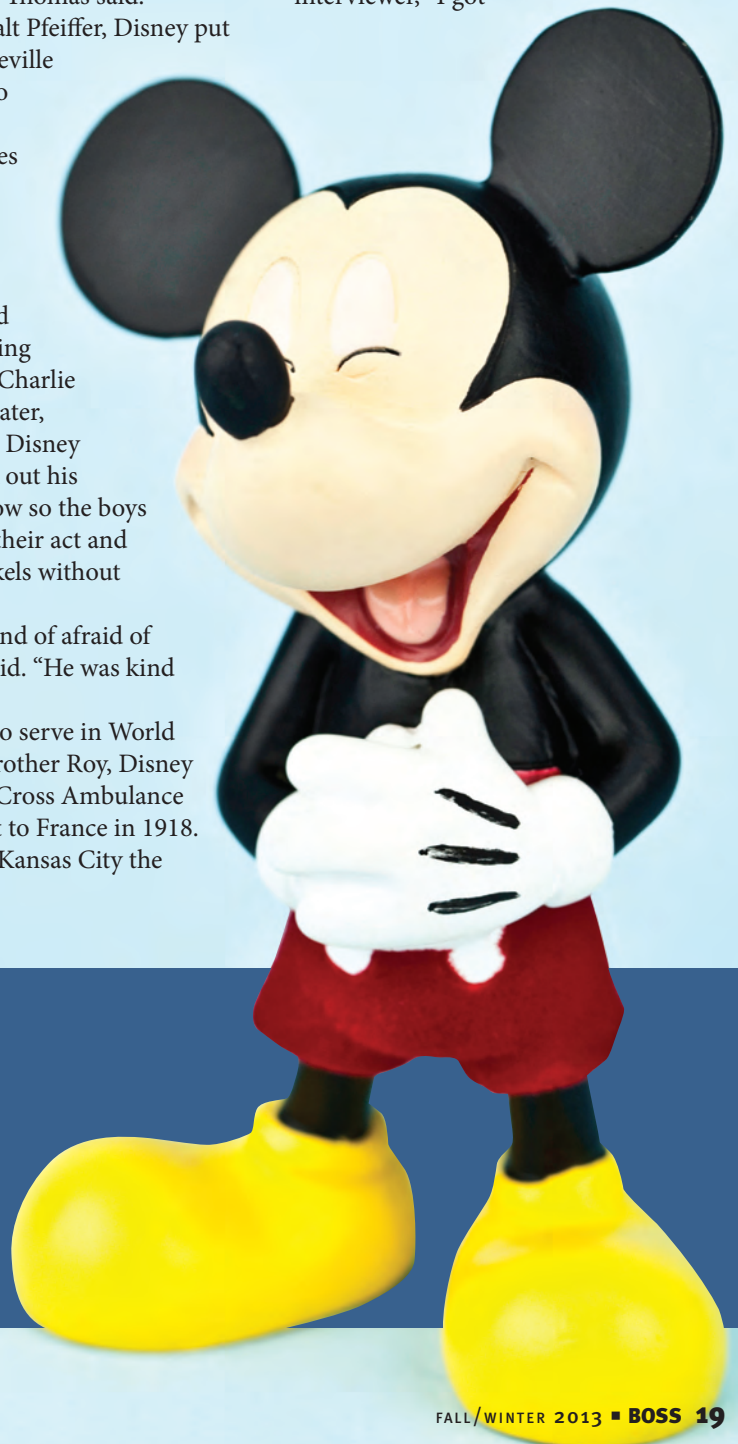
With pal Walt Pfeiffer, Disney put together a vaudeville routine. The two fifth-graders called themselves The Two Walt and went off to compete in amateur shows. The act included Walt Disney doing an imitation of Charlie Chaplin. Years later, Pfeiffer recalled Disney having to sneak out his bedroom window so the boys could perform their act and make a few nickels without Elias knowing.

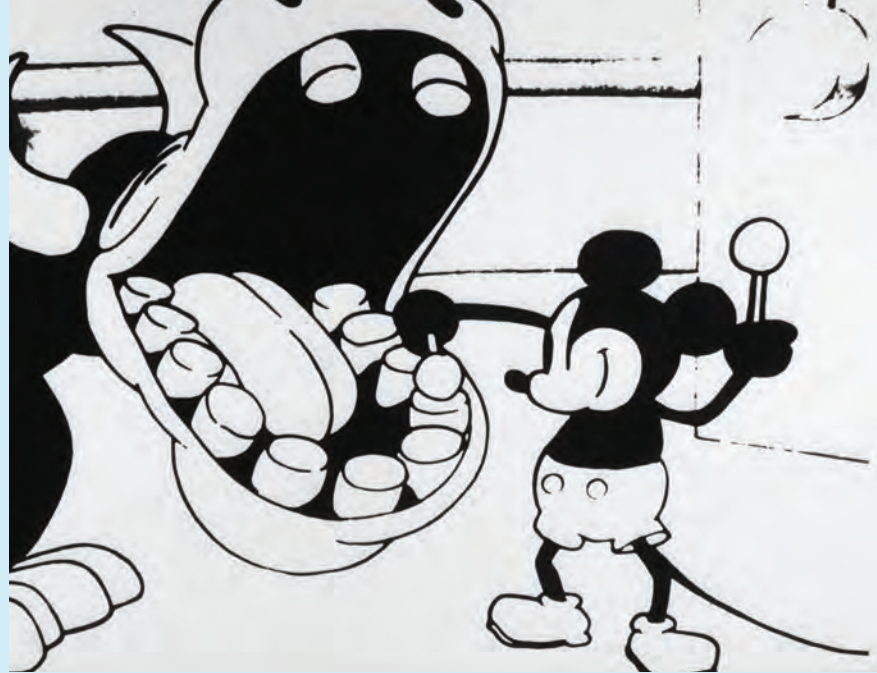
“We were kind of afraid of him,” Pfeiffer said. “He was kind of strict.”

Too young to serve in World War I like his brother Roy, Disney joined the Red Cross Ambulance Corps and went to France in 1918. He returned to Kansas City the

next year and looked for a job as a commercial artist. He wound up working for the Kansas City Film Ad Company, recently renamed when it began experimenting with animation.

Those cartoons were rough even by the standards of the day. They used paper figures with movable joints that were pinned onto a sheet. The result had a pronounced jerking motion. Disney, a born salesman, convinced his boss to let him borrow the camera to experiment. Disney later told an interviewer, “I got





From left to right: Disney's four-layer camera, an invention of the Disney studios, photographs four celluloid drawings together, giving an illusion of depth to cartoon action. *Steamboat Willie* was released in 1928.

intrigued with the mechanics of the whole thing.”

He was soon able to give his animations the feeling of continuous motion and, always ready to take a risk if it would give him the chance to fulfill his vision, decided he was ready to break out on his own. So in 1922, the 21-year-old fledgling animator created Laugh-o-gram Films. The next year, with the company sliding toward bankruptcy, he began work on *Alice's Wonderland*, in which a real-life little girl interacts with animated characters.

“It was the savior of his career, if not Laugh-o-gram Studio,” said Disney historian J.B. Kaufman.

Though Laugh-o-gram went belly-up, Disney was able to use the unfinished *Alice* as his calling card. It won him the backing of Margaret Winkler, a film distributor in New York. Now he had a way to get his creations into wide distribution, so he boarded a train to Los Angeles in July 1923 to start getting serious about cartoons.

‘Every Sprocket’

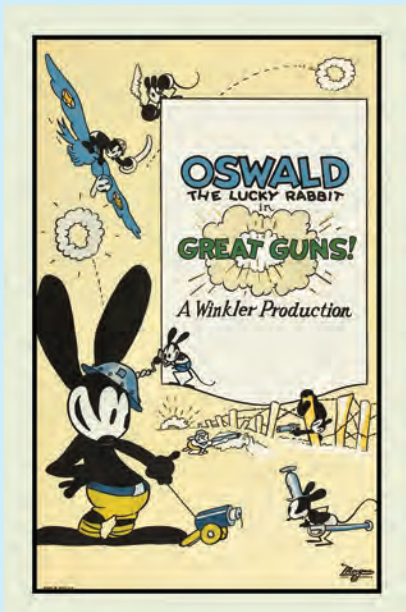
The new Disney Brothers Studio, owned by partners Walt and Roy, started cranking out *Alice* films. That was followed by another popular series, *Oswald the Lucky Rabbit*. But in 1927, the Disney brothers learned that Charles Mintz, Winkler's husband, had stolen the rights to *Oswald* and enticed most of Disney's animators away. With an air of conspiracy hanging over the studio, Walt, Roy and their wives (both brothers had married in 1925) along with one loyal animator worked in secret to produce a solid successor to Oswald that Disney would make sure he owned. The new animal was, one historian said, “Oswald with round ears.” Mickey Mouse.

The third Mickey short, *Steamboat Willie*, premiered on November 18, 1928, along with the film *Gang War*, a long-forgotten crime melodrama. What makes *Steamboat Willie* memorable is that it was the first cartoon with synchronized sound.

It was an audacious innovation because no one knew if people would accept voices coming from a drawing.

A talking Mickey was here to stay and each year saw new advances. In 1932, Disney secured the rights to exclusive use of the Technicolor process and produced *Flowers and Trees*, the first color cartoon. It won an Oscar, as did the same year's *Three Little Pigs*, whose characters were not interchangeable props for gags but distinguishable by their personalities and body language.

But Disney was thinking big. He told his staff he wanted to create something with depth. Besides, profits from shorts were small and getting smaller. In 1934, Disney and his employees began envisioning *Snow White*. As the story was embellished and refined, Disney would act it out, his talent as an actor on display.



DISNEY'S innovations

Disney was adamant that the colors in *Snow White and the Seven Dwarfs* be muted and easy on the eyes, rather than bright, like the colors of shorts. So the studio ground its own paint and had 1,200 distinct pigments. To measure colors exactly, Disney installed a spectrophotometer, one of 20 in the world at the time.

Walt Disney continued to innovate throughout his career. Disney's other firsts include:

- **1949:** Diversification into documentaries with the release of *Seal Island*.
- **1959:** America's first daily-operating monorail system, which opened in Disneyland.
- **1961:** The first regular color programming for TV, on NBC's *Walt Disney's Wonderful World of Color*. Disney used the show to promote Disneyland.
- **1964:** The development of Audio-Animatronics, a form of robotics used at Disneyland.



Customers line up to enter Disneyland in Anaheim, California, as the Disneyland Monorail passes above.

“He would recite the story to anyone who would listen and to many who had already listened,” Neal Gabler wrote in *Walt Disney: The Triumph of the American Imagination*. “Anything from a short version to the full three-hour performance.”

Disney was obsessive about his work and a perfectionist. These traits came out in the making of *Snow White* as he seemed to internalize each second of the film. He was involved “night and day, night and day,” animator Frank Thomas said. “Walt lived every sprocket hole of this film.”

In a project with a host of tough nuts to crack—more than once it was referred to as “Walt’s Folly”—the principal challenge was achieving the aesthetic depth that Disney sought. Until that time, animators suggested three dimensions by shadowing the images. Cartoons rated poorly on

proportions. Move the camera closer to a scene and the whole image gets larger, even though specific elements—the moon and a barn, for instance—are supposed to be at different distances and should change sizes at different rates.

That was no longer good enough for Disney, who wanted to achieve a higher level of realism. He solved the problem with a clunky technology already in existence—the multiplane camera—but he was the first to use it successfully. From 12 feet high, it looked down onto a succession of glass plates onto which images were painted. The image closest to the camera was the foreground; the image farthest, the background.

“The trick of the multiplane camera is movement,” Disney explained in a 1957 exhibition film about the camera.

Sliding the glass plates sideways created the illusion of horizontal

movement. Moving them closer or farther from the camera gave a feeling of depth. All this had to be done by hand. It was painstaking work, but Disney was able to achieve the effect he wanted.

To test the system, Disney produced the short “The Old Mill,” shot with the multiplane. “As the camera seemed to move through the layers or panned across them, animation gained for the first time a sense of perspective and ... three-dimensionality,” Gabler wrote.

But time was running out. Disney was on a Christmas 1937 deadline to premiere *Snow White*. To save time, animators began to cut corners by tracing the live action images they had been using as guides to make the images realistic. The studio stopped working on shorts, which it had been doing along with full-time work on *Snow White*.

All that work paid off when the movie premiered and the audience cried as Snow White ate the poisoned apple. By May 1939, *Snow White* became the highest grossing U.S. film until then. When the Academy Awards were handed out, the film received eight Oscars.

“Disney’s inspiration was not in creating Snow White but in creating her world,” film critic Roger Ebert wrote. “At a time when animation was a painstaking frame-by-frame activity and every additional moving detail took an artist days or weeks to draw, Disney

NOT-SO-GRIMM NAMES

The Grimm brothers’ fairy tale on which Disney based his *Snow White* is silent on the names of the seven dwarfs. What those names should be received the same careful scrutiny as other aspects of the film, according to Neal Gabler’s *Walt Disney: The Triumph of the American Imagination*.

Among the names considered and discarded: Cranky, Dirty, Awful, Flabby, Baldy, Deafy, Sniffy, Wheezy and Tubby.

Disney’s final lineup, in case you’ve forgotten, is Bashful, Doc, Dopey, Grumpy, Happy, Sleepy and Sneezy.

Connect and disconnect... *it's that easy!*

Rail Car Unloading Assemblies

A reliable solution for loading and unloading crude oil from rail cars.



Features:

- easy carry handle
- safe and reliable - valves will not open unless fittings are properly connected
- API configuration uses a stainless steel spring on the adapter and coupler for corrosion resistance
- tank car spanner wrench available

Material:

- robust aluminum body construction

Call or click to learn more!

Dixon

800 High Street, Chestertown, MD 21620
ph 877.963.4966 • fx 800.283.4966

dixonvalve.com
customer service: 877.963.4966



imagined a film in which every corner and dimension would contain something that was alive and moving. From the top to the bottom, from the front to the back, he filled the frame.”

It led Disney to further experimentation: With the precursor to stereophonic sound in *Fantasia* (1940). With wide-screen technology in *Lady and the Tramp* (1955). With an optical printer that allowed a combination of live-action and animated films, as in *Mary Poppins* (1964).

**WHEN HE DIED IN
DECEMBER 1966 AT
THE AGE OF 65, DISNEY
WAS DEVELOPING
EPCOT IN FLORIDA, HIS
“CITY OF TOMORROW.”**

Disney saw the coming of television and understood early that he could use the new medium to promote his movies and a new project he was developing. In 1954, he inked a deal with ABC TV to produce a weekly series called *Disneyland*. In return, ABC became part owner in the amusement park of the same name. (Four decades later, Disney would purchase Capital Cities/ABC for \$19 billion.) After Disneyland opened in 1955, Disney became financially stable for the first time. There are now Disney parks in Los Angeles, Orlando, Paris, Tokyo, Hong Kong and one planned for Shanghai.

Disney was now realizing his vision free of the limitations of the movie screen. When he died in December 1966 at the age of 65, not long after being diagnosed with lung cancer, Disney was developing EPCOT in Florida, his “city of tomorrow.”

Just as he sought to create complete worlds within his most inspired films, Disney’s last innovation (EPCOT) was to try to do the same in the real world. ◀

THE DIXON DRILLER

"Published once a moon since 1932"

WINTER 2013

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

PRODUCT SPOTLIGHT

Dixon Boss Clamps

Recommended for steam, LP gas, air, water and chemical service.*

Materials: plated iron, stainless steel, and brass

Features:

- Field attachable to hose using a torque wrench
- Available in 2-bolt type
2 gripping fingers, 4-bolt type
2 gripping fingers, 4-bolt type
4 gripping fingers, 6-bolt type
3 gripping fingers
- Comes in 2 clamp and
3 clamp styles
- Can be used on many types
of wire braid reinforced
rubber hoses

Size:
• 1/4" to 6"

Safety:

Replacement nuts and bolts are available, contact Dixon for more information. The bolts used in the Boss interlocking clamps are not standard bolts. They vary from standard bolts in their length, diameter, overall thread length and material hardness. These bolts can be retorqued, but it is not recommended that the bolts or clamps be reused, as they are designed for a single bend only. Dixon recommends using only factory supplied replacement bolts.

Torque values for clamps are based on dry bolts. The use of lubricant on bolts will adversely affect clamp performance. Do not lubricate nuts and bolts. See page 704 of Dixon Price List 2013 for the Fraction to Decimal conversion chart.

For additional questions or information, please call Dixon at 877.963.4966.

**The bolt torque must be checked prior to use and periodically during use. The nuts must be at the recommended torque in order for the clamp to function properly. Please refer to Procedure 3001 of the Coupling Procedures on the Dixon website for more information on how to properly inspect a Boss Clamp.*



TRIVIA Did you know that...

The word "lethologica" describes the state of not being able to remember the word you want.

There are only two words in the English language that have all five vowels in order: "abstemious" and "facetious."

Almonds are a member of the peach family, and apples belong to the rose family.

Pumice is the only rock that floats in water.

Your foot is the same length as

your forearm, and your thumb is the same length as your nose. Also, the length of your lips is the same as the index finger.

Men's shirts have the buttons on the right while women's shirts have the buttons on the left.

The markings that are found on dice are called "pips."

If a park statue of a person on a horse has both front legs in the air, the person died in battle; if the horse has one front leg in the air,

the person died as a result of wounds received in battle; if the horse has all four legs on the ground, the person died of natural causes.

Tigers have striped skin, not just striped fur.

The shortest English word that contains the letters A, B, C, D, E, and F is "feedback."

<http://indianrealist.com/2010/05/14/100-amazing-unknown-facts/>

ON THE LIGHTER SIDE

A woman invited some people to dinner. At the table, she turned to their six-year-old daughter and said, "Would you like to say the blessing?"

"I wouldn't know what to say," the girl replied.

"Just say what you hear mommy say," the woman answered. The daughter bowed her head and said, "Lord, why on earth did

I invite all these people to dinner?"

A guy walks into a post office one day to see a middle-aged man standing at the counter methodically placing "Love" stamps on bright pink envelopes with hearts all over them.

He then takes out a perfume bottle and starts spraying scent all over them.

His curiosity getting the better of him, the guy goes up to the middle-aged man and asks him what he is doing. The man says, "I'm sending out 1,000 Valentine cards signed, 'Guess who?'" "But why?" asks the man. "I'm a divorce lawyer," the man replies.

www.coolfunnyjokes.com

Dates in History

1734: American frontiersman Daniel Boone (1734-1820) is born on November 2 in Berks County, near Reading, Pennsylvania.

1765: On November 1, in the face of widespread opposition in the American colonies, Parliament enacts the Stamp Act, a taxation measure designed to raise revenue for British military operations in America.

1952: On November 1, the United States detonates the world's first thermonuclear weapon, the hydrogen bomb, on Eniwetok atoll in the Pacific. The test gave the United States a short-lived advantage in the nuclear arms race with the Soviet Union. Popularly known as the hydrogen bomb, this new weapon was approximately 1,000 times more powerful than conventional nuclear devices.

1959: On November 1, Montreal Canadien Jacques Plante becomes the first NHL goaltender to wear a full face mask. Montreal Maroon Clint Benedict had worn a leather half-mask for a brief time in 1930, after an errant puck smashed his nose and cheekbone—but it blocked his vision, he said, and he took it off after only a few games. By contrast, Plante wore his mask from then on. A few seasons later, his idea began to catch on, and soon almost every keeper in the league wore a mask.

1993: On November 1, the European Union comes into existence as a result of the Maastricht Treaty.

1995: On November 1, the first all-race local government elections take place in South Africa, marking the end of the apartheid system.

www.history.com



The Tico Way

With its lush tropical jungles and amazing array of wildlife, Costa Rica offers an affordable paradise for travelers of all interests

BY GEORGIA DE KATONA



You've thought about traveling in Latin America for years, but maybe you've put it off because of safety concerns, or worries about the water, or the fact that you don't speak a word of Spanish. Here's the push you need: Costa Rica really is as great as you've heard. It is safe and easy to travel, the country is filled with things to see and do, and your adventures will take place in an almost supernaturally tropical setting.

Sure, Costa Rica has been "discovered." There is a sizable international expatriate community in addition to a healthy flow of tourists. What the presence of all these folks from all over the world means is a whole lot of amazing food options (expat Italian chefs! French pastries! amazing Thai food!), beautifully designed and appointed eco-hotels and resorts (read: good beds) and a lot of English speakers for the myriad activities to choose from.

No matter how many people end up here, there are very few places that feel overrun, and the locals are as easygoing and friendly as you could hope—it's the Tico way ("Tico" is how Costa Ricans refer to themselves). You decide the octane level of your vacation and go from there: You can just as easily catch every possible wave rolling in on either coast, ride every zip line in the country and hike all 121 volcanic formations as you can watch birds from your hammock for days on end.

Some fun facts: Costa Rica has no standing military, and 801 miles of coastline in a country smaller than Lake Michigan. This little country, just .03 percent of the planet's surface, holds fully 5 percent of the world's biodiversity and 10 percent of the world's butterflies. "Eco" isn't a trendy catchphrase here, it is a national priority, evidenced by fully 25 percent



of the country being established as protected forests and reserves and a national pride in "pura vida"—a phrase you're likely to see and hear throughout the country that roughly refers to good life, pure life or vibrant life, and may also be used in greeting. The indigenous population is small (about 2.5 percent) and more remote than in other Central American countries, with their reserves in the jungles well off the beaten path. On the Caribbean side of the country, the city of Puerto Limón (known simply as "Limón") has a vibrant Afro-Caribbean culture, with its own Creole language of Meketelyu.

Carnaval celebrations in Limón, which take place over a week in early to mid-October, fill the streets with calypso and reggae music and thousands of dancers.

A parade in Limón celebrating the African Caribbean culture.



Retreat and Relax

FLY INTO San José and head straight to one of the coasts or Chirripó National Park. It is easy to catch a flight to your destination on the coasts from the airport, especially if you don't want to rent a car (although it is easy and safe to drive here). If you decide to visit Chirripó National Park, you can take a 45-minute taxi for about \$30. We've based this article on the very doable itinerary of hitting both coasts and a major inland highlight over a nine-day period. The three lodges we suggest here have staff on hand to help you plan day excursions of any intensity level. Take advantage of their expertise. Remember, prices vary widely from low season (roughly August through October) to high season (December through April).



Sergio Pucci



Sergio Pucci

The jungle safari-type accommodations at Tortuga Lodge and Gardens provide a relaxing place to unwind in between jungle walks and other outdoor adventures.



Sergio Pucci

> Book your stay in Tortuguero at Tortuga Lodge and Gardens.

Gorgeous, luxe, jungle safari-type accommodations (\$198 high season, \$138 low season) set in lush grounds with a fantastic infinity pool overlooking the river, and an excellent riverside bar/restaurant make this the ideal base for exploration in the area. The friendly and professional staff will happily arrange adventures and guides for you. They've attended to all the little details, even providing rain boots for muddy walks through the jungle. Tortuga Lodge is as great for couples as it is for families traveling with kids. This is one of those places that lures guests back for return stays; you'll understand why once you've visited.

Website: <http://www.tortugalodge.com/>



Justin Andre



Justin Andre



Justin Andre

Offering an abundance of wildlife and things to do, the Iguana Lodge also suits travelers who'd prefer to hit the hammock.



Getting Started

You'll fly into San José, a city of about 2 million people and lots of cars. If you've got an itch to spend time here, you'll discover that the money the country doesn't spend on the military is used to fund a vibrant array of ballet, symphony, arts and theater. Teatro Popular Melico Salazar, which hosts a variety of music and dance performances year-round, offers tickets from about \$5 to \$25. Ticket prices at the decades-old Little Theater Group range from \$2 to \$5—sometimes even cheaper when the production is geared toward students. Centro Nacional de la Cultura, the national museum housed in a former liquor factory, is free.

The Caribbean side of Costa Rica is much less crowded, with the exception of the biggest city, Puerto Limón. Gorgeous, wide-open beaches (many have great breaks for beginning surfers) and wildlife galore are in abundance up and down this stretch of coast, but the gem for all birdwatchers, turtle lovers and nature aficionados is Tortuguero.

Approachable only by boat or plane (easy to arrange from San José; and a quick trip because the country is small), this little village sits amid a maze of canals and a truly astonishing array of wildlife. Between April and October, huge sea turtles nest and lay their eggs along the beach, and between November and January the babies hatch by the thousands. Friendly, knowledgeable guides are easy to hire for trips through the canals and forests, or to show you the delicate nesting grounds



> **After long days hiking** in the 100 percent humidity of the cloud forests of Chirripó (or all the way up to the peak), you'll be thrilled to return to the **Rio Chirripo Retreat**. The pool and hot tub are delightful after a busy day sightseeing, and the food is beautifully prepared. Aside from the amazing views, and gorgeous accommodations, this lodge offers a wide array of activities including yoga, chocolate tours, cheese tours and all sorts of hikes and walks in the surrounding Chirripó mountains. Don't miss out on this little slice of heaven because of the "yoga retreat" moniker; it is welcoming for yogis and non-yogis alike. Rates range from about \$95 for a room to \$147 for a cabin.

Website: <http://www.riochirripo.com/>

The Rio Chirripo Retreat features yoga, hikes and cheese tours.



> **The Iguana Lodge is almost too good to believe:** expansive views of the Pacific Ocean with impossibly long, seemingly abandoned stretches of beach, exquisite lowland jungles with wildlife and birds galore, and more activities than you can possibly do—and hammocks for those who opt out. Only 10 minutes outside Puerto Jimenez, which you fly into from San José, the Iguana is a paradise of incredible food, beautifully designed buildings and grounds, and a truly outstanding staff. Landing at this amazing property is a little bit like walking into a well-appointed Robinson Crusoe fantasy—just don't expect hair dryers, TVs or microwaves. These folks are actively demonstrating just how comfortable sustainability can be, and it is quite enticing. Rates for the rooms are approximately \$85 to \$186 per day, with two mouthwatering meals included in the rates. The Villa Villa Kula is a three-bedroom house available on site for those traveling in a group. The lively Friday night salsa dance parties are an extra treat and a favorite among locals. Website: <http://www.iguanalodge.com/>



Early evening sky over the city of San José, Costa Rica.

of the turtles. The village itself is a colorful collection of buildings and a few shops set smack dab in the breathtakingly lush tropical foliage. P.S. This village—indeed the Caribbean side of the country as a whole—is off the radar for most of Costa Rica’s 1.5 million annual visitors. It is gorgeous and it is mellow. Make it a part of your itinerary.

If you start asking folks who’ve been to Costa Rica about where to go inland, you’ll likely hear comments about Monteverde Reserve, which is a private cloud forest reserve. This is one of those

places that is often overrun with tourists, and seems to require separate charges for “activities” every time you turn a corner. It is beautiful, make no mistake, but for a less manic, and much less expensive, experience you should head straight to Chirripó (“eternal waters”) National Park. You’ll travel from lush, lowland tropical forests to the higher, and cooler, cloud forests. For those keen to hike to the highest peak in Costa Rica (approximately 3,820 meters above sea level), and willing to make the 30-mile trek that leads to the top, you will pass through the cloud forest into



A sea turtle digs in the sand to deposit her eggs in Tortuguero National Park.

the páramo, the bare, scrub brush area above 3,400 meters, with its own unique highland wildlife and spectacular views over the cloud forest all the way to the Atlantic. If day hiking is all you intend to do, you’ll be thrilled with the waterfalls and the beauty of the lush,

Monteverde Landscape, Costa Rica





Clockwise: The sun sets over the ocean in Corcovado National Park. A hiker pauses beneath falls in the Osa Peninsula. A white-faced capuchin monkey eats star fruit on the Osa Peninsula, Costa Rica, near Drake Bay Rainforest stream in Monteverde National Park.

foggy forest, not to mention ever more birds and wildlife to gaze at.

The Pacific side of the country is by far the most popular tourist destination, but that shouldn't put you off from heading there, particularly if you want to surf (or learn). To avoid some of the

to the comings and goings of tourists, though they are as friendly and welcoming as you'd hope. The wide open beaches stretch for miles, the water is clean and blue, and the not-to-be-missed Corcovado National Park is the major destination of this region. This

season, but the best for spotting creatures if you can handle a couple of rain showers a day. December through April is high season in this paradise.)

By this point you may think you've gotten used to seeing dozens of species of exotic wildlife every day, but you

By this point you may think you've gotten used to seeing dozens of species of exotic wildlife every day, but you will still be stunned by the volume of graphic, colorful frogs, watchful and occasionally noisy monkeys, tapirs, jaguars, birds and eagles.

busier "scenes," head to the Osa Peninsula on the southern end of the country. It is more remote and more expensive, though not prohibitively so, and it is jaw-droppingly beautiful. The local scene unfolds with little attention

park has one of the highest concentrations of biodiversity on the planet, 13 major ecosystems, dozens of waterfalls, and the only vibrant, dense, old-growth rain forest left on the Pacific Coast. (August through November is the wet

will still be stunned by the volume of graphic, colorful frogs, watchful and occasionally noisy monkeys, tapirs, jaguars, birds and eagles. ■



Costa Rica National Parks Info for Tortuguero, Chirripó and Corcovado National Parks
<http://www.costarica-nationalparks.com/>



WILLIAM THE CONQUEROR

THE 1066 INVASION OF ENGLAND MARKED THE BIRTH OF TODAY'S ROYAL LINE—AND THE ENGLISH LANGUAGE

BY EUGENE FINERMAN

LEARNING on a lectern, safe in the hindsight of history, a professor would praise the Norman Conquest of England: how it brought a superior culture to a backward island, how it forged a great nation and created a brilliant language. But any Englishman in 1066 would not have foreseen an invasion fleet of 700 ships as the gift of progress. His impression would have been of a French horde—10,000 men, 3,000 horses—with the intent of overthrowing the anointed king and replacing him with the notorious Duke of Normandy. By December 1066, this ruthless adventurer had claimed the English throne after a brilliantly planned invasion. History would respectfully call him William the Conqueror.

William's father was the Duke of Normandy but his mother was a tanner's daughter. Though the old Duke never bothered to marry his mistress, he still proved a doting father to his only son. Young William was raised at court and designated the heir to the duchy. In any other province of France—and probably in most of Europe—this line of succession would have been a scandal. But Normandy was literally the Wild West of France.

The Normans actually were Scandinavians, descended from Vikings who had overrun northwestern France. In 911 an exasperated French king made the best of a hopeless situation.

He ceded the province to the Viking chieftain, granting him the title of duke. In return for that prestigious title, the Viking warlord pledged his allegiance to the king and did promise to become somewhat of a Christian. By William's time, a century and five generations later, the Norsemen had become *les Normandes*. They now spoke French and had acquired a veneer of Gallic culture, but at heart they were still Vikings.



Great Seal of William the Conqueror

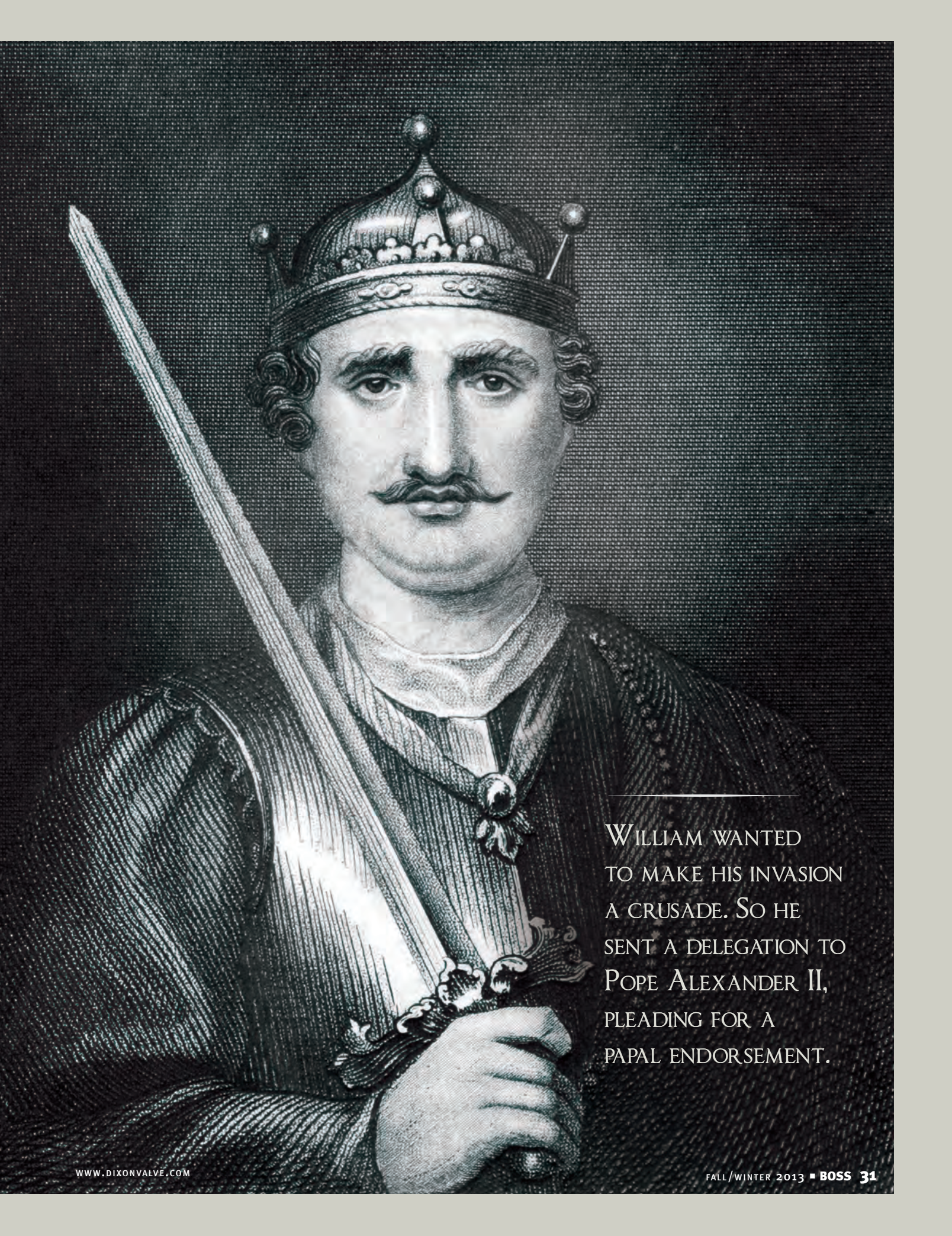
William, like his forebears, observed a deference to the King in Paris; but he had no such respect for the neighboring provinces. Brittany, Flanders and Anjou appealed to the King to stop the Norman aggression. William was only in his 20s, and he already was notorious for his military skill and his political ambition. Yet the Duke was also pragmatic. He was not prepared to fight the King, not over a few towns in Brittany. Though his ambitions were

curbed in France, he saw the chance of gaining the throne in England.

King Edward of England (ca. 1003-1066) was William's cousin. With his passive personality and religious preoccupation, Edward was more a monk than a king. In his monastic conduct, he also refrained from producing any heirs. So who would succeed the aging king? In 1051, the 23-year-old William visited his English cousin; the Duke left with the promise that he was Edward's designated heir.

Unfortunately for William, during the last decade of Edward's life, the King had given the same promise to Harold, the Earl of Wessex. The King was known to be fickle, and the tired old monk might have said anything to badgering courtiers just to be left alone. From England's perspective, Harold was already king in all but name. The Earl of Wessex governed the realm while Edward prayed.

Edward died on January 5, 1066; the following day the royal council proclaimed Harold as king and he was immediately crowned. Learning of this, William sent an ultimatum to his rival, demanding that Harold resign the throne to him. The Norman invoked not only Edward's promise but also an oath that Harold had sworn under duress. In 1063, Harold was shipwrecked on the coast of France. He found himself in William's custody, an



WILLIAM WANTED TO MAKE HIS INVASION A CRUSADE. SO HE SENT A DELEGATION TO POPE ALEXANDER II, PLEADING FOR A PAPAL ENDORSEMENT.

intimidated guest. To earn his freedom, Harold was obliged to swear an oath of allegiance to William. The oath was made on saints' relics; so any violation would be sacrilege. Now king of England, Harold discounted the oath—but not the threat. He prepared for war.

William wanted to make his invasion a crusade. So he sent a delegation to Pope Alexander II, pleading for a papal endorsement. In the absence of English advocates, the Pope heard only the Norman side of the argument: Edward's promise and Harold's sacrilege. With the added understanding that the Church would benefit from a grateful King William, the pontiff authorized and blessed the enterprise, bestowing the Standard of St. Peter to lead the Normans into battle. Under that holy banner, William assembled an army of French mercenaries and brigands, offering these cutthroats a chance for titles and estates.

William knew the strengths and weaknesses of the English forces awaiting him. They were infantry; in close combat they wielded axes with a devastating fury. However, they were vulnerable to archery and cavalry. So William recruited archers and



A vintage color engraving from 1864 depicts the death of King Harold at the Battle of Hastings in 1066.

expected. A Norwegian army of 10,000 men had landed in northeastern England. The King of Norway had no justification for the attack; he simply was a ruthless man with an irresistible opportunity. While the English and the Normans would be killing each other in the south, he would seize the north. The Norwegian army brushed aside the

Hastings. His outnumbered infantry faced a Norman array of knights and archers. The English assembled on a ridge, a good defense against cavalry. The Norman knights who tried charging up a hill were fighting gravity as well as the axe-wielding English. However, the English were vulnerable to the Norman barrage of arrows. One struck Harold in the eye. The battle lasted through the day of October 14, and though Norman losses were heavy, the English were annihilated.

Harold's death left the English without a leader. For the clergy of England, the succession was ordained. Bearing the Pope's endorsement, William of Normandy was the rightful king. Led by its bishop, London peacefully accepted the Conqueror, who was crowned at Westminster Abbey. Not all of England was so passive, however. There would be disorganized rebellions for the next five years; they were nuisances rather than threats to William, but he savagely suppressed them. As a further precaution William constructed 35 castles in strategic positions around England. (The Tower of London began as the Norman stronghold guarding the capital.) Yet those towns and shires that accepted

WILLIAM RECRUITED ARCHERS AND HORSEMEN. HIS 2,000 KNIGHTS WOULD BE THE LARGEST FORCE OF CAVALRY ON ENGLISH SOIL IN 10 CENTURIES.

horsemen. His 2,000 knights would be the largest force of cavalry on English soil in 10 centuries, since the Roman invasion. To protect his encamped army from surprise attacks, William's fleet would also transport a prefabricated fortress; the wooden ramparts would be immediately assembled upon landing in England. This shrewdly planned invasion would require 700 ships.

Harold was waiting, his army assembled on the southern coast of England. In late September an invasion unfolded, but not the one Harold

English militia and sauntered through the countryside. So confident were the invaders that they did not even bother to wear armor. The English army, marching 185 miles in four days, caught the Norwegians unprepared with a surprise attack on September 25, 1066. The King of Norway died, as did most of his army.

But the English had no time to celebrate or rest, after news came of the Norman invasion. Harold led his tired and depleted force to the south, a march of 241 miles, to a Sussex village called



The Tower of London, one of 35 castles that William constructed.

William found him to be a just and efficient king. He established both an institution and a royal line that continues to this day.

The Norman Conquest had an even greater significance. Until 1066, English had been a Germanic language. The Conquest brought a ruling class and an occupying army that spoke French. In

languages mingled and melded. By the 14th century this pidgin hybrid had become the language of the realm, spoken alike by king and peasant. Even to our ears today it would sound vaguely familiar.

Two centuries after the Norman invasion, in the late 1500s, William Shakespeare penned these lines in

time, the language barriers dissolved. After all, the common soldiers wanted to make themselves understood at the local tavern ... and to English women. The two nations and their

describing his country:

*This fortress built by Nature for herself
Against infection and the hand of war,
This happy breed of men, this
little world...*

*This blessed plot, this earth, this realm,
this England.*

Today this remains our portrait of England, freedom's bastion against Napoleon and Hitler. Yet, in the thousand years before Shakespeare, the island had been ravaged and enslaved by centuries of invasions. First there were the Romans, then the German barbarians, followed by the Vikings. In 1066, William of Normandy landed on England's shores.

It would be the last invasion ... and the lasting one. ●

Lok-on (aka Push-On) Fittings

Dixon offers the widest variety in the industry!

Features:

- new GHT design plus a wide variety of available thread designs
- available configurations:
 - hose barb x male thread
 - hose barb x female thread
 - hose barb x hose barb mender
 - hose barb x rigid tube shank
 - 90° fittings
 - solid or swivel male
 - solid or swivel female

Materials:

- brass, stainless, plated steel
- end caps available in highly visible plastic or durable brass



Dixon Brass

40 Chestnut Ave. Westmont, IL 60559 • ph 630.323.4442 • fx 630.323.4120

dixonvalve.com • customer service: 877.963.4966



The Right Connection™



Don't 'Run It Till It Drops'

Ignoring scheduled maintenance can have deadly consequences

> We've all heard the saying "Time is money." This expression is especially profound for a contract with a specific finish date and penalties to pay if the project isn't completed on time. With the completion date looming, we have one eye on the project and one eye on the clock. One wrong move is a recipe for disaster.

The rainiest summer in years had put the concrete slab pouring for the new industrial park way behind schedule. But things were looking up. The 10-day forecast was clear skies and

low humidity—perfect pouring days. The project manager gathered the workers to explain the situation, telling them that, until further notice, everyone would be working double shifts with no days off. Also, nothing should be done other than pouring concrete. When one worker asked about scheduled maintenance for the equipment, the reply was, "Run it till it drops, we'll deal with it later."

The project manager and his assistant were in their office reviewing their progress, when, after 13 straight

days of pouring slabs, they calculated the project as less than two days away from being back on track. After checking the five-day forecast and seeing no predicted change in the weather, they began "high fiving" each other. If the weather would hold out, not only would they be on schedule, they'd be ahead of schedule. The celebration was cut short, however, when one of the crew supervisors barged through the door yelling, "Boss, we got a problem! Dial 911 now!"



A crew had been in the midst of its normal routine. One man held the hose and poured the concrete while the other two smoothed and moved it about. They were almost done with this slab when suddenly the pump began grunting. One worker moving the concrete asked nervously, "Do you think we should shut the pump down?"

"Nah, it's just a small clog," replied the mover. "It'll take care of itself. Besides, we've got orders not to stop pouring!"

"I've heard it make a lot worse," added the guy holding the hose, "and nothing happened."

"Yeah, I know, but I can't remember the last time we did anything to that pump," replied the first mover.

Just then, the pump made a menacing growl. The metal fitting, worn paper

thin by the abrasive concrete, couldn't handle the load anymore. Like a cannon shot, the hose exploded away from the pump. With blinding speed, it flew past the man holding the end and struck the other two workers, sending them flying through the air, landing face down in the freshly poured concrete.

All things wear out over time, including industrial hose and couplings. In many cases, you can't see that [they] are worn out until it's too late.

By the time help arrived, it was too late for the men.

All things wear out over time, including industrial hose and couplings. In many cases, you can't see that the hose and/or couplings are worn out until it's too late. If a change-out

schedule is in place, adhere to it, even if there's pressure to just keep moving. If not, setting up a hose assembly change-out schedule, whether it's based upon time of service or amount of product conveyed, saves money in the long haul and promotes a safe workplace. All hose assemblies will come out

of service, one way or the other. You can do it when planned and it's convenient for you. Or you can wait and let it take itself out of service.

Waiting, or trying to stretch that dollar too thin, can have devastating consequences. ■

Dixon Sanitary Quick Weld Ferrules

An easy-to-weld assembly for non-sanitary applications.

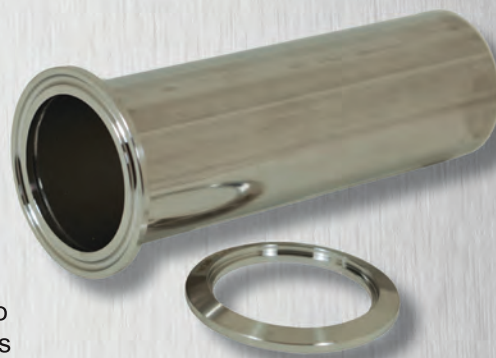
Features:

- Just slip onto sanitary OD tube and weld
- No need to butt weld!
- Size range 1" - 6"

Material:

- 304 stainless steel

All sizes are in stock at Dixon Sanitary. To learn more about our Quick Weld Ferrules call 800.789.1718.



Dixon Sanitary

N25 W23040 Paul Road • Pewaukee, WI 53072 • ph 800.789.1718 • fx 800.789.4046

dixonvalve.com • customer service: 800.789.1718



The Right Connection™

Strike Back Against Stroke

Find out the steps you can take to prevent a deadly or disabling “brain attack”

> When it comes to stroke, the statistics are sobering. Stroke is the No. 2 cause of death worldwide, and a leading cause of disability in the United States. Each year, Americans pay about \$73.7 billion in stroke-related medical costs and disability, according to the American Stroke Association (ASA).

Often referred to as a “brain attack,” a stroke occurs when a blood vessel carrying oxygen and nutrients to the brain is either blocked by a clot (ischemic stroke) or it bursts (hemorrhagic stroke). If you suspect that someone is experiencing stroke symptoms, it’s critical to call 911 immediately, says Dr. Jason Freeman, a vascular neurologist at Sibley Memorial Hospital in Washington, D.C.

“Time is of the essence. The quicker you see a doctor, the quicker you can receive medications that could save your life and decrease the severity of potential side effects,” says Freeman.

Symptoms vary depending on the individual and where in the brain the stroke occurs, but there are some common warning signs to look for.

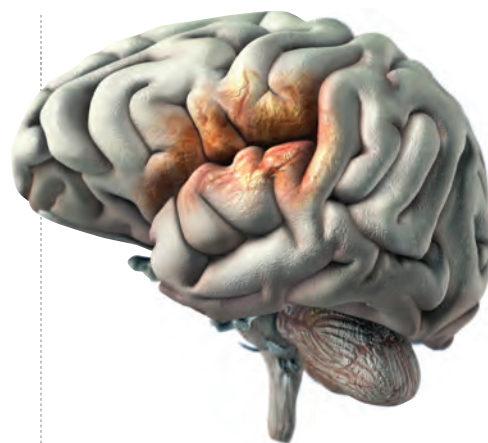
The ASA recommends using the “FAST” acronym as an easy way to remember these signs:

F = FACE DROOPING: Does one side of the face droop or is it numb? Ask the person to smile. Is the person’s smile uneven?

A = ARM WEAKNESS: Is one arm weak or numb? Ask the person to raise both arms. Does one arm drift downward?

S = SPEECH DIFFICULTY: Is speech slurred? Is the person unable to speak or hard to understand? Ask the person to repeat a simple sentence, like “The sky is blue.” Is the sentence repeated correctly?

T = TIME TO CALL 911: If someone shows any of these symptoms, even if the symptoms go away, call 911 and get the person to the hospital immediately. Check the time so you’ll know when the first symptoms appeared.



Some risk factors for stroke are unchangeable, notes Freeman. Your risk is higher, for instance, if a parent, grandparent or sibling has suffered a stroke. African Americans have a much higher risk of death from stroke than Caucasians do, and stroke is more common in men than women. Age also plays an important role: The chance of having a stroke approximately doubles for each decade of life after age 55, according to the ASA.

While there’s nothing you can do about your age or family history, there are factors that you *can* treat or control, many relating to lifestyle. Among them:

Treat high blood pressure (hypertension). High blood pressure forces the heart to pump blood more vigorously throughout the body. The increased pressure can weaken vessels, thus leading to a higher risk of stroke. Regular exercise, a healthy (low sodium) diet, and prescribed medication can be effective in controlling high blood pressure.

Diagnose and treat atrial fibrillation (AF): Approximately 15 percent of all stroke victims suffer from AF, a heart rhythm disorder in which the heart’s upper





chambers quiver rather than beat effectively. Symptoms include heart palpitations and a general feeling of dizziness. The good news? An estimated 75 percent of AF-related strokes can be prevented if AF is properly diagnosed and treated.

atherosclerosis. And high-sodium fare is known to increase hypertension. “That’s why a healthy diet, rich in nutrients and low in cholesterol and sodium, is so important,” says Freeman. Replace that morning bagel and cream cheese with oatmeal and fruit, for

minutes of brisk exercise each day (in consultation with your physician).

Adopting these and other common-sense practices, together with checkups with your doctor, can help you avoid becoming one of the estimated 137,000 people who die of stroke each year in the United States. ◀

“Time is of the essence. The quicker you see a doctor, the quicker you can receive medications that could save your life and decrease the severity of potential side effects.”

Put down the cigarettes: Smoking doubles your risk of stroke.

Trade those French fries for a salad: Diets that are high in cholesterol (think: bacon cheeseburgers) can lead to fatty buildup in the arteries known as

instance, and avoid fatty steaks in favor of chicken or lean cuts of beef.

Get moving! Exercising regularly and raising your heart rate strengthens the heart, notes Freeman, thereby lowering your risk of stroke. Aim for 30

Dixon Fire Field Adjustable Valves

Operates as a stand pipe valve or floor control valve in Class I and III systems.

You have trusted our factory set valves for more than 30 years, and we have listened to the market place for our newest product innovation.

Features:

- ease of adjustability
- compact design
- superior outlet flow in high pressure scenarios
- made in the USA

Depending on a contractor’s preference or an AHJ’s specifications, you can count on Dixon. Call or e-mail (dixonpowhatan@dixonvalve.com) today for a quick shipment of Dixon’s Field Adjustable valve from one of our 16 warehouse across North America.



scan to download our field adjustable valve data sheet



The Right Connection®

Dixon Fire

800 High Street, Chestertown, MD 21620 USA • ph 877.712.6179 • fx 800.283.4966
6350-5 Netherhard Road, Miss. Ontario, Canada • ph 800.786.9697 • fx 905.564.8822

**dixonvalve.com • customer service: 877.712.6179 USA
800.786.9697 CANADA**

Hitting the Mark

“This is my rifle. There are many like it, but this one is mine. My rifle is my best friend. It is my life. I must master it as I must master my life.”

—from *The Creed of a United States Marine*

> What invention revolutionized infantry warfare, put food on the table for American frontier families and has enthralled millions of action movie fans? The rifle.

As early as the 13th century, Chinese warriors used portable fire lances (bamboo or metal tubes that shot projectiles by using gunpowder). Handheld firearms spread quickly across the Eurasia continent; the Mamluks, the Mongols and the Muscovites all used firearms in the 1300s. Eventually, western Europeans adapted the fire lance technology and created smoothbore firearms—primitive weapons often described as small, portable cannons.

Rifles, designed to be fired from the shoulder, are distinct from their smoothbore counterpart (the musket) because of the pattern of grooves, or “rifling,” edged into the barrel’s walls. These grooves impart a spin on the bullet that elongates the distance over which the rifle can fire accurately—much the way a competent quarterback spins the football to increase the distance and accuracy of a pass. In the early 18th century, Benjamin Robins, an English mathematician, used Newtonian mathematics to show that elongated bullets, if fired from rifled barrels, would exhibit increased accuracy over longer distances.

Not surprisingly, the rifle’s accuracy made it a favorite among American colonists. “Nowhere else was the cult of accuracy so rigorously worshiped as in colonial America,” notes military history

expert Alexander Rose in his book, *American Rifle: A Biography*.

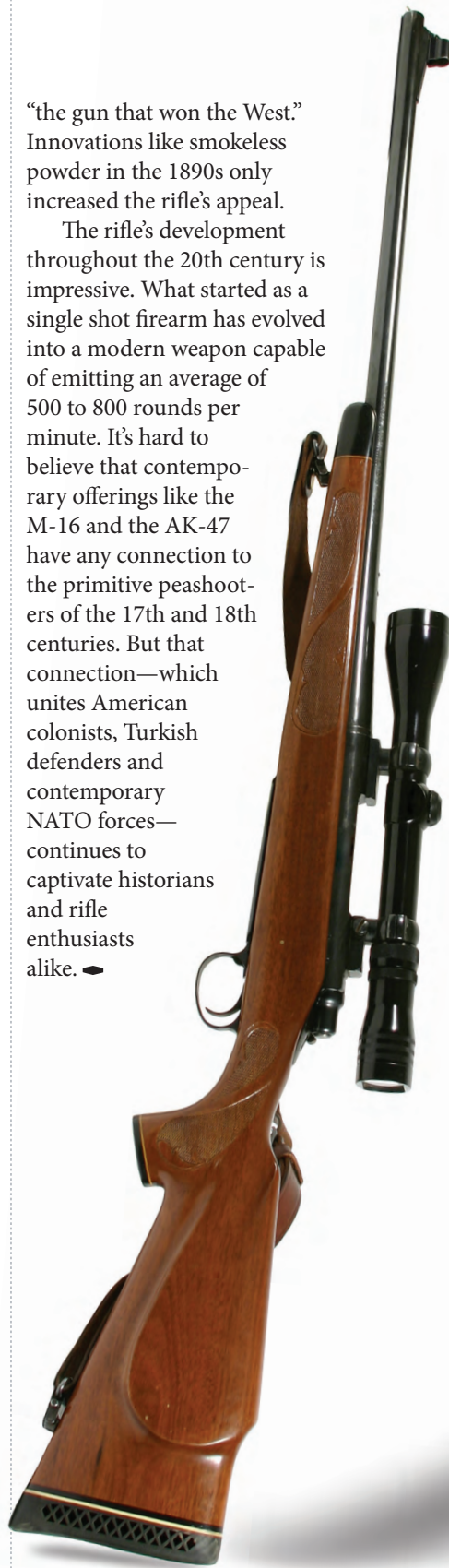
But military commanders were slow to utilize the early rifle because it was prone to mechanical problems. The black powder used to reload the weapon often mucked up the barrel, and reloading was a painfully slow process. Also, conventional European infantry tactics involved the two opposing armies lining up and exchanging volleys. Accuracy over a long distance wasn’t all that necessary when the enemy was crouching stationary less than 100 yards away. While specialized sharpshooters were enthusiastic early adopters of the rifle (gaining notoriety in the Revolutionary War and the War of 1812), the rest of the army relied on smoothbore muskets.

That changed with the invention of the Minie ball in the 1840s—a bullet system, named for its French co-developer Claude-Étienne Minié—that effectively solved the slow loading problem (an expanding “skirt” on the bullet made it easier to reload than earlier tight-fitting bullets) and increased the shooting range to 300 yards. By the mid-1800s, rifles had become the weapon of choice on the battlefield, figuring prominently in the American Civil War, the First Boer War and the Russo-Turkish War.

Around this period, the American Oliver Winchester began marketing and manufacturing the Winchester repeating rifle, which became wildly popular among frontiersmen in the later 1880s, earning its reputation as

“the gun that won the West.” Innovations like smokeless powder in the 1890s only increased the rifle’s appeal.

The rifle’s development throughout the 20th century is impressive. What started as a single shot firearm has evolved into a modern weapon capable of emitting an average of 500 to 800 rounds per minute. It’s hard to believe that contemporary offerings like the M-16 and the AK-47 have any connection to the primitive peashooters of the 17th and 18th centuries. But that connection—which unites American colonists, Turkish defenders and contemporary NATO forces—continues to captivate historians and rifle enthusiasts alike. •





©2012 Dixon Valve & Coupling Company. All rights reserved.

GO AHEAD: ASK THE TOUGH QUESTIONS. AT DIXON'S INNOVATION CENTER, THAT'S HOW WE COME UP WITH THE BEST ANSWERS.

At Dixon, we're much more than quality products, people and customer service.

We're the place to go for answers to your processing challenges.

Finding new ways to optimize operations ... reduce maintenance downtime ... promote better safety and environmental compliance. These are the reasons why we opened our Innovation Center – the industry's newest product R&D resource featuring state-of-the-art equipment, a dedicated engineering staff, and interactive training facilities.

Bring us your challenges. Let's work together to develop the new generation of products and solutions.

Dixon: *The Right Connection* for innovation.



Call: 877-963-4966

The Right Connection™

dixonvalve.com/innovationcenter

Logistics keeps supply chains flowing in s t e ad of s to ppi ng a n d s tar t ing.

A lot rests on your industrial manufacturing supply chain. UPS has the logistics solutions to help you run it efficiently, saving time and money.

The key to a successful industrial manufacturing business is a finely tuned supply chain. After all, if what you need isn't in the right place at the right time, production can be halted, shipments delayed and sales lost. Fortunately, you have a logistics partner in UPS. Our experts evaluate every inch of your global pipeline.

We identify inefficiencies in places you may not even be aware of and uncover hidden revenue that might otherwise have been overlooked. We automate processes, optimize inventory management and help you reduce customs delays. In other words, we help your supply chain shift into high gear.

Watch how UPS helps Roush Enterprises keep their supply chain flowing and profits growing at ups.com/indmfg



WE ♥ LOGISTICS®