FALL 2007
Asia/Pacific – Spring 2007

BOSS

CONNECTING TO INDUSTRY

The Sky's the Limit

How engineers have designed the world's tallest buildings ever farther into the sky

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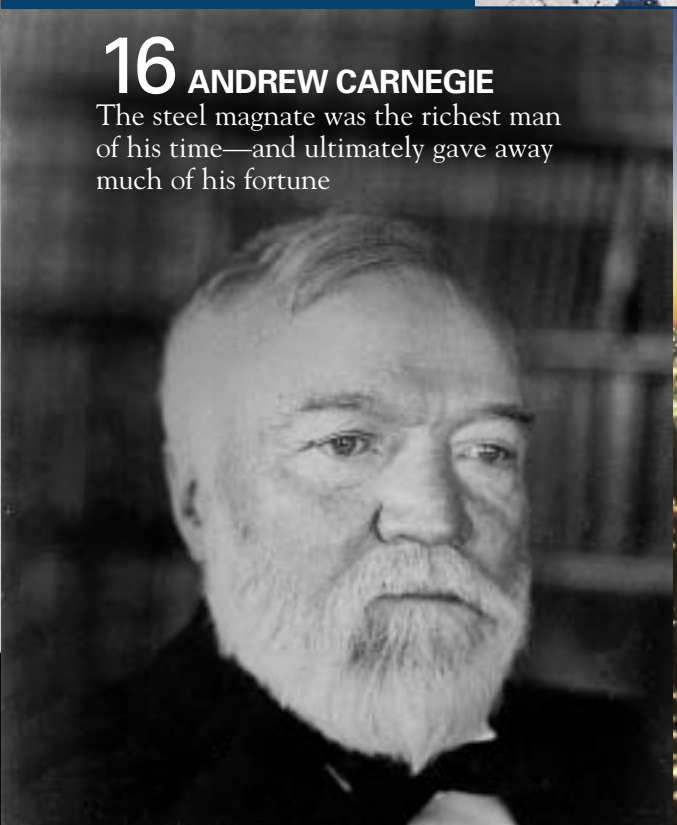

Building Teams

I was recently asked to speak to one of our local civic clubs about Dixon. While preparing for this talk, I gathered lots of information about the type and use of products we make, manufacturing facilities, and locations of offices and distribution centers around the world. Then I began to wonder if these folks would be interested in one of the reasons that Dixon has enjoyed the success that we have—our employees.

The key to success in any company is not just having people to fill roles in the organization. It's about having exceptional people fill those roles and work well together.

In the feature story in this issue of BOSS, you'll learn about how skyscrapers are engineered and built. This process could not be completed without a team of engineers, contractors, and construction workers—all combining their expertise to get that skyscraper built. And it must be built well to stand for years to come.

At Dixon, our employees work cooperatively in manufacturing, customer service, shipping and many other areas to provide the products and services that are of the high quality our customers have come to expect. Individually, those employees could not succeed, but as a team they do, and have been for more than 91 years. Like the teams that work together to build skyscrapers, our teams have a commitment to work together to get the job done—and this helps us to consistently make Dixon the right connection for you.

Next time you admire one of the world's beautiful city skylines, think about the substantive expertise and commitment that went into each of those skyscrapers and know that they reflect the same philosophy on which successful businesses are run.

Thank you,

Dick Goodall

R.L. Goodall
CEO, Dixon Valve & Coupling Company

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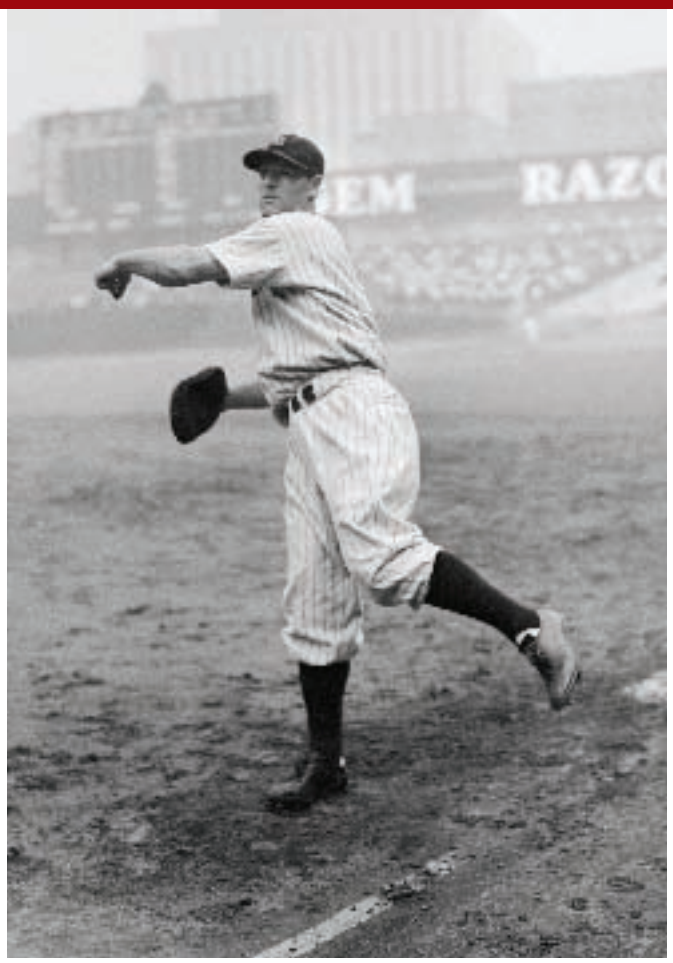
WHAT CAN BROWN DO FOR YOU?®

Lou Gehrig

The legendary Yankees slugger became known not only for baseball greatness, but also for incredible courage and dignity.

By Sue De Pasquale



The moment is one that will go down in the annals of sports history.

The mighty slugger Lou Gehrig, the "Iron Horse," stood on the Yankee Stadium diamond on July 4, 1939, a pile of trophies and gifts at his feet. In the stands, tens of thousands of admiring fans were silent. Wiping away tears, Gehrig leaned into the microphone and began, "Fans, for the past two weeks you have been reading about the bad break I got. Yet today I consider myself the luckiest man on the face of the Earth …." His voice catching, Gehrig went on to praise by name the "grand men" he had known on the field and off, his parents, and wife Eleanor, a "tower of strength." He concluded, "I may have had a tough break, but I have an awful lot to live for."

The "tough break" he referred to, of course, was ALS (amyotrophic lateral sclerosis)—the progressively fatal neurological disease that came to bear his name. The affliction had cruelly struck him down in his prime, as the 36-year-old came off two world championship seasons for the Yankees in 1936 and 1937. Though ALS felled the nation's favorite first baseman with heartbreaking swiftness, the grace and dignity Gehrig showed in facing his illness ultimately sealed his legacy as one of the most heroic sports figures of all time.

Born in New York City on June 19, 1903, young Louis was the only one of four children born to German immigrants Christina and Heinrich Gehrig to survive. An imposing woman, Christina plied her only child with food and worked tirelessly to make ends meet, earning her son's lifelong devotion. "If there were a Hall of Fame for mama's boys, Gehrig would have been a shoo-in," writes Jonathan Eig, in *Luckiest Man: The Life and Death of Lou Gehrig* (2005).

Young Lou enjoyed pickup baseball, but wasn't particularly coordinated. "Some ballplayers have natural born ability," the left-hander once said. "I wasn't one of them." He practiced relentlessly and by his teens was hitting balls out of the park at New York City's High School of Commerce. In 1921, he enrolled at Columbia University on a football scholarship, though he also played pitcher and first base for the Columbia Nine. Amazed by his hitting ability, baseball scout Paul Krichell signed him to the Yankees with a $1,500 bonus (about $93,000 in today's U.S. dollars). On June 2, 1925, Gehrig was tapped to replace an ailing Wally Pipp at first base. He would not miss a Yankee game for the next 14 years.

Lou Gehrig, No. 4, was a powerhouse at the plate. From 1926 until 1938, his batting average never dropped below .300. He clouted home run after home run, and hundreds of runs batted in. In 1931 he set the all-time record for most RBIs in a season (184) and the following year, on June 3, 1932, he became the first American League player to hit four home runs in a game. "To see his broad back and muscular arms as he spread himself at the plate was to give the impression of power as no other ballplayer I ever saw gave it," teammate Joe DiMaggio would later recall.

Throughout the late 1920s and early 1930s, Gehrig played in the shadow of fellow slugger and teammate Babe Ruth, whose outspoken, fun-loving nature compared to the reserved Gehrig made Ruth a favorite with sportswriters and fans. "The fact that he was being taken for granted didn't bother Gehrig a bit," DiMaggio remembers. "He was courteous, gracious and informative whenever the writers asked him anything, but he didn't mind being left to himself."

Like the dependable train he was nicknamed for, the "Iron Horse" kept chugging along, leading the mighty Yankees to

postseason victories while playing through injuries that would have benched lesser men: a broken thumb, broken toe, back spasms, lumbago. (X-rays later showed 17 different fractures in his hands that had healed while he played.)

It was in 1933, when sportswriters first noted that Gehrig was on a "streak" of consecutive games played. That year he married the outgoing Eleanor Twitchell of Chicago, who became Gehrig's "manager." She urged him to start signing autographs, get chummier with the press and (for the first time) negotiate with Yankees management for a higher salary. With his wife's encouragement, the dimpled Gehrig even went to Hollywood, starring in the 1938 Western, *Rawhide*.

But during spring training in 1938, Gehrig began to falter. He tripped rounding base more than once, and developed painful blisters and bruises on his hands. Gehrig went hitless the first four games of the season and ended April with a dismal .133 batting average. The frustrated slugger had no idea that his once bulging shoulder muscles were atrophying, his calves shrinking; refusing to give up, he tinkered with his stance, ordered lighter bats, changed his grip—and continued to play in game after game. Named to the American League All-Star team that July, he came back after the break with a vengeance, recording 12 hits—including three home runs—in 33 at-bats. Though his body was betraying him, Gehrig pushed himself to the limit, ending the regular season with a .295 average and 29 home runs. The Yankees went on to win the World Series, handily beating the Chicago Cubs.

By the following spring, however, Gehrig realized his "slump" was inescapable. On May 2, 1939, he sadly told Yankees manager Joe McCarthy that he was removing himself from the lineup, ending his streak of consecutive games played at 2,130 (a record that stood until the Baltimore Orioles' Cal Ripken Jr. broke it in 1995). "It's a black day for me," McCarthy told reporters. "And the Yankees."

At Eleanor's insistence, Gehrig traveled to the Mayo Clinic in Minnesota in a desperate effort to discover what was sapping his strength. It was there, in May, that Gehrig received the diagnosis of ALS. He died two years later, on June 2, 1941, with Eleanor at his side.

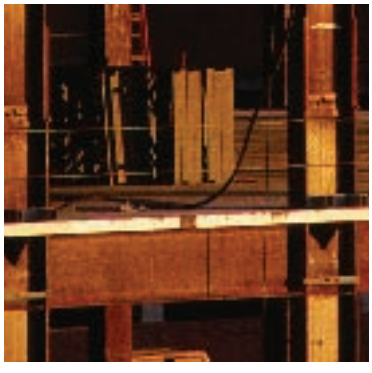
"His records will attest to future generations that Lou Gehrig was one of the greatest baseball players who ever lived," noted then *Herald Tribune* writer Richards Vidmer. "But only those who have been fortunate enough to have known him during his most glorious years will realize that he has stood for something finer than merely a great baseball player—that he stood for everything that makes sports important in the American scene."

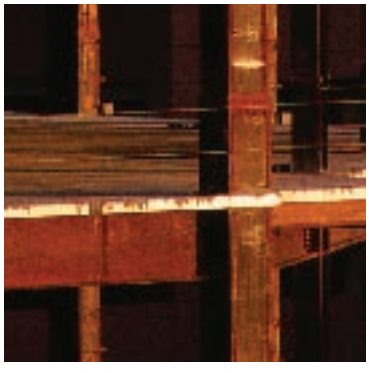
The Sky's the Limit

For more than a century, skyscrapers have climbed farther into the sky thanks to advancements in engineering and the ever-present desire to be the tallest. By Virginia Hughes

Today's skyscrapers stand, in every major city in the world, as breathtaking reminders of the scope of human engineering. The 1,053-foot-tall Burj al Arab Hotel, in Dubai, United Arab Emirates, takes the shape of an enormous sail, seemingly floating on the sandy soil of an artificial island 985 feet from the coast. The 1,667-foot Taipei Financial Center (Taipei 101), currently the tallest building in the world, stands steady in a region that sees 6-point earthquakes and 155-mph typhoon winds.

But it was economics, not technology, that spurred the construction of the first skyscraper. On October 8, 1871, a fire of unknown origin raged through downtown Chicago, leaving 300 people dead, 90,000 homeless,





and $200 million (more than $3 billion in today's U.S. dollars) in property damages. The subsequent demand for office space, coupled with the high cost of downtown real estate, left only one way to build: up.

Thus, in 1885, Chicago produced the 10-story, 138-foot Home Insurance Co. Building that, though since torn down, was said to look like a Renaissance palace. Cast and wrought iron made up most of its inner core, but also—unlike previous buildings—steel. This led most historians to deem the building the first "real" skyscraper. It weighed just one-third as much as a similarly sized stone building.

Before this iron-and-steel innovation, tall buildings stood only thanks to strong masonry walls—sometimes as much as 6 feet thick. "The walls supported all of the weight," explains Donald Friedman, seasoned structural engineer and expert in the preservation of historic buildings. "They got to be sort of ridiculous." Thick walls meant that windows had to be set deep within the walls, often creating ugly, dark recesses across the building's façade.

In the early 19th century, England's industrial revolution led to the development of the iron frame building—rigid iron column supports upon which outer, non-structural "curtain" walls hang. French architect Gustave Eiffel brought this technology to the United States, literally, in 1885, with the riveted iron internal structure of the Statue of Liberty. Most European cities of the 19th century had strict building ordinances that set height limits on all new buildings. "The Paris skyline was a level plateau of shorter buildings, punctuated by spires of the great cathedrals," says Lee Gray, associate dean of the College of Architecture at the University of North Carolina-Charlotte. American engineers, limited by no such rules, quickly mimicked Eiffel's innovation, experimenting first with iron and then with mass-produced steel.

After the Home Insurance Co. Building, the "Chicago School" of architects built a few other skyscrapers within a decade. By the turn of the century, every major city wanted the world's tallest building for its skyline.

For most of the 20th century, the architectural spotlight oscillated between Chicago and New York, as each churned out building after building of unusual design and epic proportions. New York's Woolworth Building, built in 1913, and the Chicago Tribune Building, built in 1925, looked like skinny Gothic cathedrals. In 1930, New York's art deco chrome-top Chrysler Building, at 1,046 feet, claimed to be the tallest in the world—but not for long. Just one year later (and nine blocks south), the spire of the General Motors-backed Empire State Building edged higher, to 1,250 feet. The Empire State Building maintained the title of world's tallest for 41 more years.

In 1972, the twin towers of the World Trade Center took the lead, with 110 floors and 1,368 feet of glass façade. (See sidebar on page 14 for more about the collapse of the WTC.) Not to be outdone, two years later, Chicago's Sears Tower, with its signature black bands and 110 floors, reached 1,451 feet.

The most-talked-about skyscrapers, once classically American, are now constructed on the other side of the globe. The United States now claims only four of the 20 tallest buildings in the world. (See sidebar on page 15 for the complete list.) "It's a funny thing," Friedman says, "but non-architects would have a hard time naming the tallest building in the world today."

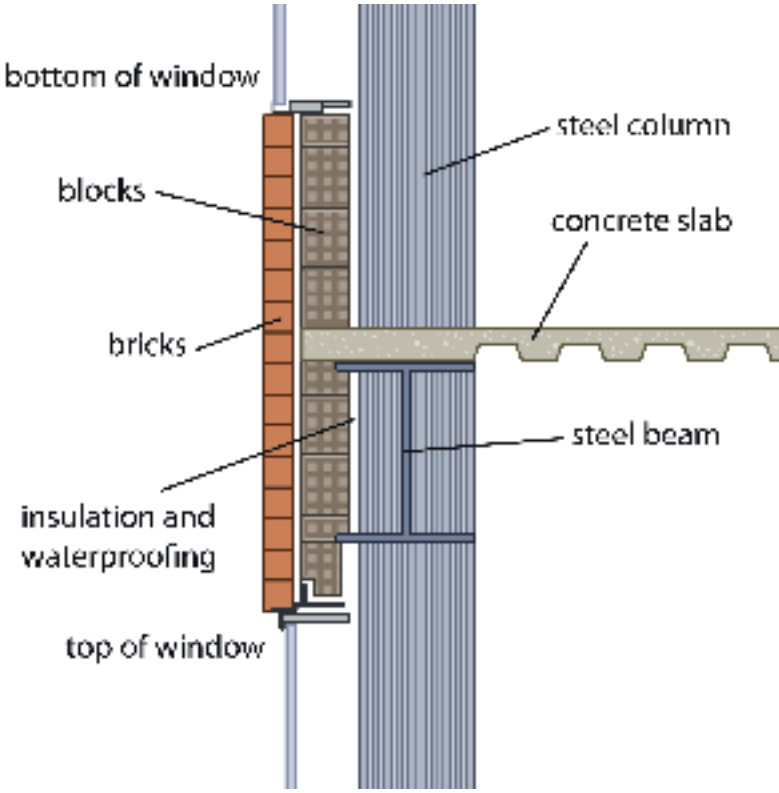
BUILDING TALL

"There's no hard and fast definition of what a skyscraper is," Friedman says. From an engineer's perspective, he explains, it's just a building tall and skinny enough that wind forces factor heavily into the design.

When a building engineer isn't worried about building tall—say, for buildings under 20 stories—then only one force affects structural design: gravity. Friedman uses the example of building a 10-story steel-frame building on a lot that's 100 feet by 100 feet. Because it's so short, the architect could create all kinds of unusual structures: "If you wanted to have masonry on the top five floors and glass below that," he jokes, "it'd be ugly, but you could do it."

Consider using the same 100-by-100-foot lot to build a 50-story building. Gravity is no longer the engineer's chief concern. "All of a sudden you're worried about earthquakes, or keeping that building from swaying in the wind," Friedman says.

Indeed, today's skyscraper engineers consider, first and foremost, these "Big Three" forces: gravity, earthquakes and wind. The tallest buildings today—at almost 1,700 feet



Cutaway section of steel and concrete skyscraper construction

Fighting Fire at the Top

The prospect of being 1,000 feet from the ground when a fire breaks out is frightening.

But how do you ensure fire protection in a skyscraper?

Just like any other building, every floor of a skyscraper contains a sprinkler system. "The big challenge in a skyscraper is moving that water to the upper floors," explains Craig French, plant manager of Dixon Powhatan, which specializes in manufacturing fire protection equipment. When a fire breaks out, a massive hydraulic basement pump fights against gravity to get water to the upper floors. The water travels up from the basement in large-diameter, steel standpipes, then branches from the standpipes into small-diameter sprinkler pipes on each floor. Pressure-reducing valves allow the water to flow safely from the standpipe, which French says can withstand water pressures up to several hundred pounds per square inch (psi), into the sprinkler pipes, which can only handle about 175 psi.

Another challenge: In a tall building, firefighters can't use an outside fire hydrant. "If you're 50 stories up, that'd take a heck of a ladder truck," French jokes. Instead, they connect their hoses directly to the building's standpipes, using its own water pump to fight the fire.

Some of the world's tallest buildings: (from the left) are Burj al Arab Hotel, Dubai, United Arab Emirates; Sears Tower, Chicago; Taipei 101, Taipei, Taiwan; Empire State Building, New York.

tall—must be about 50 times stronger against wind forces, in fact, than the 200-foot buildings of a century ago.

A wide margin of safety is built into modern building codes, so that if standard materials are used with standard construction methods, the chances of a skyscraper's collapse are extremely slim. The biggest challenge for structural engineers, then, isn't keeping a building standing—it's keeping it standing steady. "All skyscrapers move, because to make them not move would be totally economically unfeasible," says Vicki Arbitrio, of New York's Gilsanz, Murray, Steficek firm, who's been a structural engineer for 24 years. "But people don't like to know that they're moving."

To make a skyscraper's sway as imperceptible as possible, engineers first consider its drift, or "deflection ratio"—the ratio of lateral sway to building height. The top of the World Trade Center towers, for instance, used to sway about 2 feet. "But that's 2 feet in 1,200 feet of height," Arbitrio explains, "so that ratio was actually pretty small." In addition to drift, an engineer must also consider acceleration, or how fast a building sways from side to side.

The acceptable degree of sway also depends on the tenants. Office workers, often on their feet or working intently at their desks, won't notice a building's movements nearly as much as someone sleeping in a high-rise apartment. These criteria could even vary from floor to floor.

A skyscraper's total design demands a massive coordination effort between three principal players: the architect (and leader of the team), the structural engineer and the mechanical engineer.

One of the architect's first tasks is to analyze the geological makeup of the building site, to determine the depth of the bedrock and to make sure it is void of any archaeological remains. The next step is to dig a hole, generally 30 or 40 feet deep, and to fill the hole with concrete foundations. Steel base plates are embedded in the concrete to support steel and concrete columns that will form the backbone of the structural skeleton.

Think of a skyscraper as a human body: its construction flows from the inside out, starting with the skeleton, or structural frame. The earliest skyscrapers used cast iron as the primary frame material. Though iron can bear strong loads under compression—that is, when pressed down by gravity—it becomes brittle when stretched by tensile forces, such as high winds. Steel, strong under both compression and tension, became the material of choice when inventor Henry Bessemer found an inexpensive way to remove impurities from iron to create it. His "Bessemer process" allowed for the inexpensive mass production of steel.

The skeleton of modern skyscrapers is made of columns of steel and reinforced concrete, in varying proportions. Steel structures, like the Empire State Building, are made of huge steel I-beams, but have concrete floor slabs.

Concrete structures, like the Trump Tower, are made of concrete columns that are reinforced every few feet with small steel bars, called rebar. It is fortuitous that the two materials are chemically compatible; if you added a metal like aluminum to concrete, for instance, it would set off a dangerous chemical reaction.

Concrete and steel each have advantages and disadvantages, depending on the intended function of the building. In essence, a steel building is light, flexible and easier to build tall. Concrete buildings, on the other hand, are heavy, stiff and sway at much lower accelerations than steel. "If you believe there will be a lot of change [made inside the building] in the future, steel is better," Friedman explains. Internal staircases for tenants occupying multiple floors, for instance, are more easily added to steel structures. "But if you want to minimize floor to floor height, like in an apartment house, concrete is better."

The new Time Warner Center in New York shows how the two materials can be used in tandem. The lower levels, comprised of office and retail space, are made of steel. The higher towers, one of which is an apartment building and the other a hotel, are made of concrete all the way up to the top.

Once a building's skeleton falls into place, the building team turns next to the emerging skyscraper's veins. Mechanical contractors install elevator shafts, plumbing pipes, electrical systems, air conditioners and computer networking wires as soon as the metal decks go down on each floor.

Finally, with the strong steel core and all the pipes installed, comes the most visible component: the skin, sometimes called the building envelope. Though the façade is generally critiqued mostly for its aesthetic qualities, its practical purpose is to keep the elements out. The windows and roof must be watertight, and windows are often treated with coatings that will keep too much sun (and thus heat) from shining through.

To figure out how strong a building must be to resist earthquakes or windstorms, the writers of building codes look to several decades of historical weather data. For a specific region, Friedman explains, "you have a certain size storm that, on average, will show up once every 100 years. That's called a 100-year storm. There's also 500-year storms, and 100-year earthquakes and 500-year earthquakes." Those statistics will help give a rough estimate of what weather a geographic region can expect over time. But what about differences in, say, wind patterns from one block to the next?

For these micro-level estimates, engineers send their skyscraper design to a lab that specializes in wind tunnel simulations. One of the most famous labs is Boundary Layer Wind Tunnel Laboratory at the University of Western Ontario. There they use tiny scale models of the world's major cities to test a proposed building's outer shell, sway and structural load, as well as what kind of winds it will produce for nearby pedestrians.

Going Up?

Using a machine to lift goods is not modern technology. In ancient Greece, Archimedes used hoisting ropes attached to a pulley; and the Roman gladiators rode elevators up to the top arena of the Colosseum. But the engine-controlled elevator didn't come about until the mid-19th century, where it was used mostly by workers in factories, mines and warehouses.

In 1853, American Elisha Otis invented a safety device that, in case a cable should break, prevented a freight elevator from falling down the shaft. With this assurance of safety, so grew the idea of elevators to carry people. Big cities of the early 19th century saw the construction of large and luxurious hotels that "always showcased the latest in technology," says Lee Gray, associate dean of the College of Architecture at the University of North Carolina-Charlotte and elevator historian.

When the first passenger elevator was installed in a New York Fifth Avenue hotel in the late 1850s, it was described as a "movable room," complete with benches and a chandelier. Although its ascent was painfully slow, "the idea wasn't speed," Gray explains, "it was gracious living."

In the 1870s, the passenger elevator moved to the office building. "And that's where our modern concept of the elevator comes from," Gray says. "When you're in an office building, it's about speed and fast-paced business."

The old hotel elevators were powered by steam, as were the first office elevators—but not for long.

Steam-powered elevators were soon replaced by cheaper, quieter hydraulic elevators. The hydraulic elevator car sits atop a heavy piston, moving in a cylinder. The piston moves up and down by water pressure produced by pumps.

Though a few hydraulic elevators are still in use today, their speed is ultimately limited by how fast you can move the piston. To be of practical use in an office building of 10, 20 or 50 stories, elevators had to be much faster. The need for speed led to the development of the electric elevator, first built by German inventor Werner von Siemens in 1880.

Though many historians say the skyscraper would never have been possible without the invention of the elevator, Gray says this perspective "oversimplifies what is a really wonderful story of technology." The steam elevator allowed buildings to grow taller. But the subsequent demand for even taller buildings spurred the technology of faster elevators. "I think of it as a technological dance," he says. "Yes, the elevator made the skyscraper possible. But without the skyscraper we wouldn't have the modern elevator."

THEN AND NOW

Advances in computer technology in the last 20 years have certainly changed the way skyscrapers are designed and constructed. After she graduated from engineering school in 1983, Arbitrio recalls that nobody really knew how to use CAD (computer-aided design). She shared a phone line with three other co-workers. "The whole pace was just much slower," she recalls. "Nobody has that luxury anymore. Between e-mail and faxes and phones, we're all connected to each other all the time."

Has the modern age also changed the skyscraper's cultural and economic significance? The first skyscrapers, Friedman says, "represented the high technology of that era." But in the hustle-bustle pace of the 21st century, these past technological marvels, perhaps, are no longer so breathtaking. "Every little city … now has its own group of skyscrapers," he adds. "People used to come from all over to see them, go look out of a window at the top, and be faint. That doesn't really happen anymore."

Many historians have argued that skyscraper technology began with an economic push, and that all subsequent skyscrapers were built for the same reason: to make money. The cost of a skyscraper is astronomical—the 4.25 million square-foot Petronas Towers, built in Kuala Lumpur, Malaysia, in 1998, cost $1.6 billion—but owners expect to make back their initial investment, and more, from high-rent tenants. "It's certainly true that no one's going to invest in a skyscraper without the expectation of making money," Friedman says. "But if that's all there was to it, we would never have gotten past the cookie-cutter box buildings of the 1960s."

Indeed, no one who's ever seen a skyscraper up close, even in fast-paced 2007, could doubt its significance. The 9/11 attack on the World Trade Center, after all, was meant as a symbolic blow to America's identity. And the Empire State Building, old and rundown as it is inside, gets 4 million tourists each year. Now, with almost half of the world's population living in urban centers, there's little doubt that skyscraper technology will continue to evolve. And in that sense, the sky's the limit.

Why the World Trade Center Fell

After two jets crashed into the World Trade Center on September 11, 2001, the slow collapse of its 1,368-foot-tall twin towers changed forever the skyline of New York City and the political dynamic of the world. The first tower to be hit, the north, stood for an hour and 40 minutes after impact, while the south tower lasted for 2 hours and 59 minutes—saving the lives of thousands of tenants working on the floors below.

Immediately after the tragedy, the American Society of Civil Engineers (ASCE) began a study to investigate the structural cause of collapse. (Completed in May 2002, its report served as the foundation for the three-year investigation later done by the National Institute of Standards and Technology.)

"We started just like any other forensic job," says structural engineer W. Gene Corley, team leader of the ASCE report, who also was the principal investigator for the Federal Emergency Management Agency's (FEMA) study of the bombing of the Murrah Building, in Oklahoma City. The team first assembled as much raw data as it could, including the towers' original design plans; the weight, fuel loads and speed of the planes; and the distribution of fireproofing on each floor. "Then we did as many calculations as we could in the short time we had to try and figure out why this happened," Corley says.

Though newspaper reports following the attacks described them as explosions, "there wasn't really an explosion in the normal sense," Corley says. "The fireball that occurred with each crash is really what's called deflagration"—the rapid burning of very fine particles of fuel. "It'll break windows, do minor things like that, but won't cause any damage to the structure."

The structure fell because of the heat. The fire produced by the crashes was so immense, Corley says, "that there was no hope of ever putting it out. It just had to burn out on its own." With any structural material, including steel, heating it up makes it lose strength. In the meantime, the impact had jarred loose much of the fireproofing from the columns and the floors. Corley says this was most likely the trigger of the final collapse: "the sagging of the floors pulled the exterior columns in so far, that finally they just couldn't carry the load."

Still, Corley finds it amazing that the towers stood as long as they did, especially considering that two-thirds of the exterior columns were either gutted completely or incurred significant damage. "That engineering certainly saved lives. Ninety-nine percent of the people below where the plane hit got out alive. Most other buildings would have collapsed much sooner."

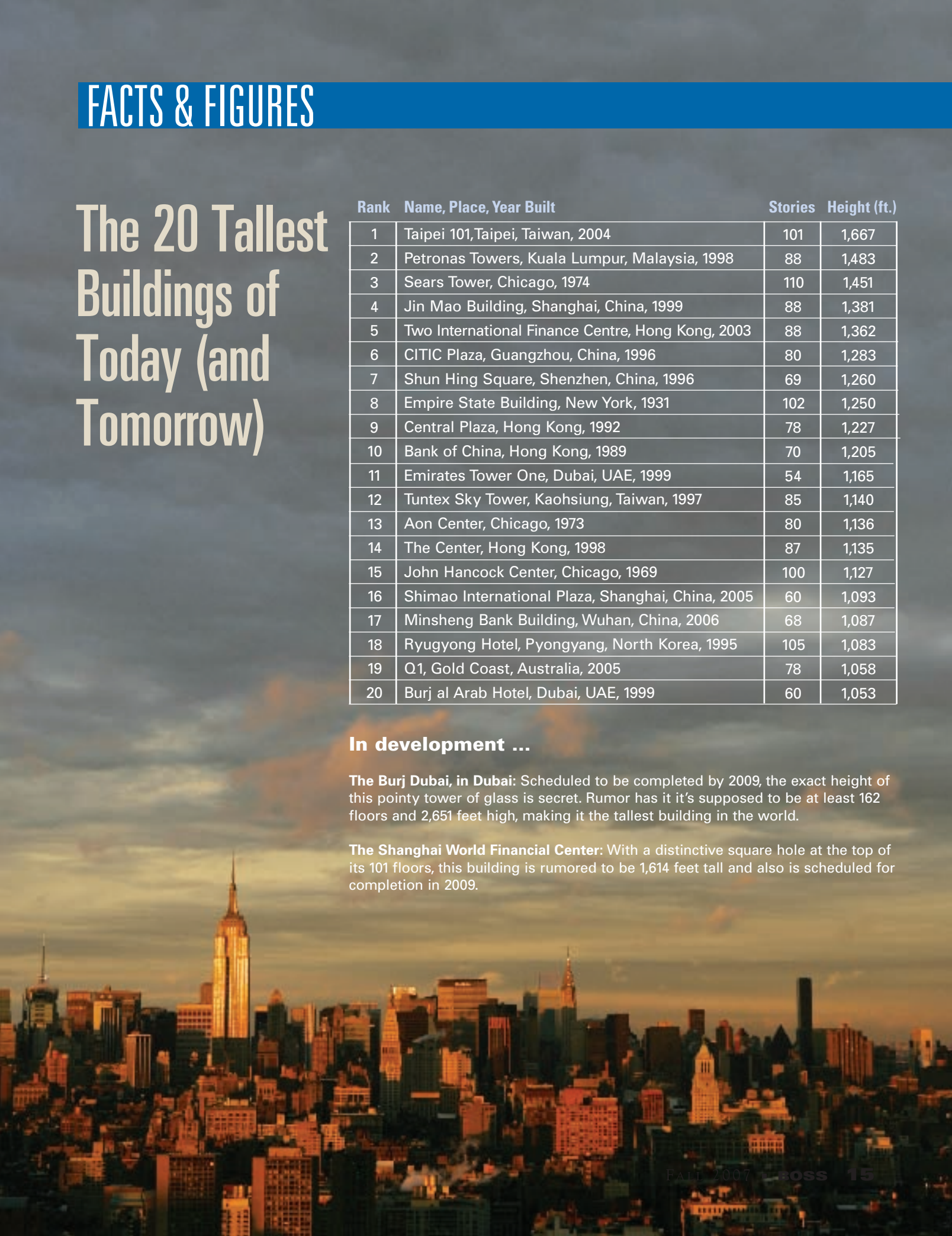
The 20 Tallest Buildings of Today (and Tomorrow)

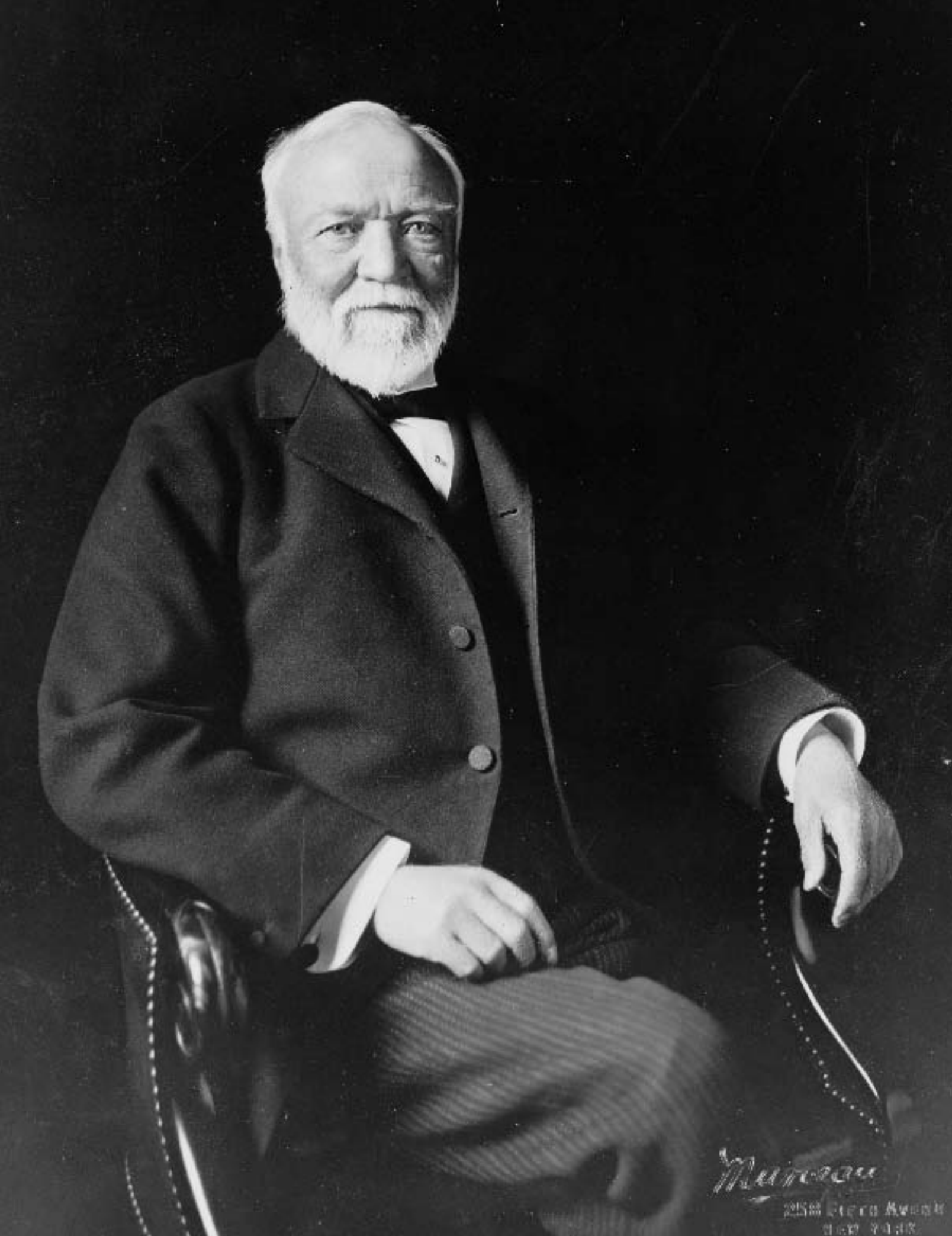
Rank	Name, Place, Year Built	Stories	Height (ft.)
1	Taipei 101,Taipei, Taiwan, 2004	101	1,667
2	Petronas Towers, Kuala Lumpur, Malaysia, 1998	88	1,483
3	Sears Tower, Chicago, 1974	110	1,451
4	Jin Mao Building, Shanghai, China, 1999	88	1,381
5	Two International Finance Centre, Hong Kong, 2003	88	1,362
6	CITIC Plaza, Guangzhou, China, 1996	80	1,283
7	Shun Hing Square, Shenzhen, China, 1996	69	1,260
8	Empire State Building, New York, 1931	102	1,250
9	Central Plaza, Hong Kong, 1992	78	1,227
10	Bank of China, Hong Kong, 1989	70	1,205
11	Emirates Tower One, Dubai, UAE, 1999	54	1,165
12	Tuntex Sky Tower, Kaohsiung, Taiwan, 1997	85	1,140
13	Aon Center, Chicago, 1973	80	1,136
14	The Center, Hong Kong, 1998	87	1,135
15	John Hancock Center, Chicago, 1969	100	1,127
16	Shimao International Plaza, Shanghai, China, 2005	60	1,093
17	Minsheng Bank Building, Wuhan, China, 2006	68	1,087
18	Ryugyong Hotel, Pyongyang, North Korea, 1995	105	1,083
19	Q1, Gold Coast, Australia, 2005	78	1,058
20	Burj al Arab Hotel, Dubai, UAE, 1999	60	1,053

In development ...

The Burj Dubai, in Dubai: Scheduled to be completed by 2009, the exact height of this pointy tower of glass is secret. Rumor has it it's supposed to be at least 162 floors and 2,651 feet high, making it the tallest building in the world.

The Shanghai World Financial Center: With a distinctive square hole at the top of its 101 floors, this building is rumored to be 1,614 feet tall and also is scheduled for completion in 2009.




Mureau

Andrew Carnegie

The poor boy who became the richest man of his time is perhaps best remembered for his philosophy: the man who dies rich dies disgraced.

by Kristi Birch

The life of Andrew Carnegie is the classic rags-to-riches American tale, the story of a poor immigrant boy who, by sweat and by wit, became the richest man of his time. It is also a story of irony and seeming contradictions. While his Scottish parents fought for the rights of common workers, Carnegie became one of the "captains of industry" who built the American steel empire—a union buster who squeezed the life out of his workers. He was a huge figure in American industrial history, but small in stature and devoted to his mother. At the end of his life, after spending decades accumulating wealth, he was a philanthropist who gave his fortune away.

Carnegie was born in Dunfermline, Scotland, the center of the Scottish linen industry, in 1835. His father, William Carnegie (accent on the second syllable), was a hand-loom weaver; his mother, Margaret, the daughter of a tanner and shoemaker. William was a self-educated man and politically active; he fought for laws to ensure the safety of workers and was opposed to any sort of inherited privilege, including monarchies.

In 1847, steam-powered looms replaced William's trade. Margaret Carnegie, the backbone of the family, went to work to support them, mending shoes and opening a small grocery store. But it wasn't enough. In 1848, she borrowed 20 pounds for ship fare, and the Carnegies moved to the United States to live with two of Margaret's sisters in Pittsburgh, Pa.

Pittsburgh was, at the time, a great industrial city and where most of the country's iron was manufactured. William went to work in a cotton factory, and 13-year-old Andrew also got a job there as a bobbin boy, working sunup to sundown for $1.20 a week. Eventually William Carnegie left the factory, and started making hand-loomed tablecloths to sell door to door. The family struggled, and when Andrew saw his mother crying over their poverty, he pledged that one day he would have enough money to return with his mother to his Scottish hometown, where they would ride through the streets in a fine carriage with horses.

Two years later, Andrew landed a job as a messenger boy for the Pittsburgh telegraph office. He was thrilled. Besides getting to work in sunlight, he could also spend his Saturdays at a local library and

schedule his theater deliveries around evening showtimes to catch a Shakespeare play for free. "That is how in 1850 I got my first real start in life," he wrote in his autobiography. "There was scarcely a minute in which I could not learn something. … I felt that my foot was upon the ladder and that I was bound to climb."

He did. To do his new job faster, Carnegie memorized the streets of Pittsburgh and the names and addresses of the important people he made deliveries to. He managed to impress Thomas A. Scott, superintendent of the Pittsburgh Division of the Pennsylvania Railroad. Scott hired Carnegie as his personal assistant and telegrapher in 1853 for $35 a month—$10 more than he had been making. Carnegie worked his way up through the company and eventually succeeded Scott as superintendent of the Pittsburgh Division. In 1855, on Scott's advice, he invested $500 in 10 shares of Adams Express, a shipping company. His family had to mortgage the home they had finally purchased, but Adams Express paid off. Later, he invested in sleeping cars for the Pennsylvania Railroad, another successful venture.

When the Civil War started in 1861, Scott was hired to supervise military transportation for the North, and he put Carnegie in charge of the military railroads and telegraphs of the government. Carnegie supervised reopening the Union railway lines to Washington that the Confederates had cut, and oversaw transporting Union soldiers after their defeat at Bull Run. But the biggest effect the Civil War had on Carnegie's life was its fueling of the iron industry. The demand for armor, cannons, shells and other industrial products made Pittsburgh, already an iron town, the center of the war industry. Carnegie knew he could take advantage of it.

He left his position with the railroad to develop the Keystone Ironworks and Union Ironworks. Keystone made iron bridges for railroads, to replace the weaker wooden ones. Within three years, when he was 33, Carnegie was making $50,000 per year (about $9.8 million in today's U.S. dollars). As his wealth grew, so did his consciousness of having it. In a memo he wrote to himself from the St. Nicholas Hotel in New York where he had moved with his mother (his father died in 1855), he pledged to resign from business at the age

"There was scarcely a minute in which I could not learn something. … I felt that my foot was upon the ladder and that I was bound to climb."

of 35, never to make more than $50,000 a year, and to spend any excesses on "benevolent purposes."

But his drive and vision pushed him on. Just two years later, Carnegie started using a new refining process to convert iron into steel. Steel is more flexible than brittle iron, and Carnegie knew it would be profitable. He borrowed money to build a new steel plant near Pittsburgh. In 1888, he bought his rival company, Homestead Steel Works, and then continued to buy smaller steel mills. By the late 1880s, Carnegie Steel was outproducing all of Great Britain.

Comfortably wealthy, Carnegie now had time to pursue more than business. He was a friendly, happy man, and prone to enjoying himself. He traveled and patronized the arts. He also wrote about the social issues and politics of his day. He wrote *Triumphant Democracy*, a book about the superiority of American democracy over British monarchy. In 1889, he wrote an essay called "The Gospel of Wealth," in which he argued that while ambitious men were entitled to accumulate great wealth, they were also obligated to return that money to society for the public good.

He was also hugely influenced by Herbert Spencer, the

The riots at Carnegie's plant in Homestead were front-page news. A depiction from a *Harpers* magazine of the time (left); one of Carnegie's steel plants was Ohio Works in Youngstown, Ohio (below); Carnegie built some 2,500 libraries. The Carnegie Museum and Library is in Pittsburgh, PA (right).

English philosopher who applied Charles Darwin's "survival of the fittest" theory to human society. As much as he admired Spencer's Social Darwinism, Carnegie did not believe in complete *laissez-faire* capitalism, and he even published an essay on the rights of workers to organize. Nonetheless, the men in his plants often worked 12 hours a day, seven days a week. The only holiday he gave them was the Fourth of July.

In 1892, the price of steel had started to fall, and in the spring, Carnegie's general manager at the Homestead plant, Henry Clay Frick, wanted to slash wages and break the Amalgamated Association of Iron and Steel Workers. On vacation in England, Carnegie wrote Frick a letter supporting him. When Frick slashed wages, the workers rebelled. So Frick locked 1,100 men out of the plant, hired strikebreakers, built a fence three miles long and 12 feet high around the plant, and brought in Pinkerton detectives to guard it. The result was bloody. Nobody knows who fired the first shot, but the strikers and the Pinkertons fought for 14 hours. Three detectives and nine workers died. State militia eventually took over the plant, which enabled the strikebreakers to keep working. That was the end of the union at Homestead.

It was a scene that would have made Carnegie's grandparents turn in their graves. It was also one he came to regret: "It is expecting too much of poor men to stand by and see their work taken by others," he later wrote. "The Works are not worth one drop of human blood. I wish they had sunk." To some, these words are hypocritical. They are, if nothing else, evidence of the conflict between the working-class life he was born to and the privileged one he had created for himself. Carnegie wanted to respect labor, but he also wanted his company to succeed.

All this time, Carnegie was still living with his mother, now in the Windsor Hotel on Fifth Avenue. Margaret Carnegie was possessive of her son, and he remained devoted to her. In 1881, he fulfilled his promise to return with his mother to Scotland. They were cheered by the townspeople as they rode in a fine coach through Dunfermline, as the rich people who had bequeathed the town's new library. After Margaret died five years later, Carnegie was finally free to marry his longtime girlfriend, Louise Whitfield. They had a baby girl and named her Margaret.

In 1900, banker J.P. Morgan approached Carnegie. Morgan wanted to buy Carnegie Steel and several other producers and integrate them into one company. At age 64, Carnegie was beginning to think about retirement, and he agreed. When they settled on a price of $480 million (about $10 billion today), Morgan congratulated Carnegie on becoming the richest man in the world. Morgan's company became U.S. Steel.

Carnegie, who was fond of saying that "the man who dies rich dies disgraced," spent the rest of his life giving his money away. He founded the Carnegie Endowment for International Peace and several scientific research centers including the Carnegie Institute of Technology, which is now part of Carnegie-Mellon University, and the Carnegie Institute in Washington, D.C. He also founded and supported art galleries, museums and music halls, including New York's Carnegie Hall. He is probably most famous for the more than 2,500 libraries that bear his name. By the time he died in 1919, he had given away more than $350 million. He is buried in a modest cemetery plot at his estate in Massachusetts, with his wife and servants.

MILESTONES IN HISTORY

THE BERLIN WALL

THE CREATION AND DESTRUCTION OF A COMMUNIST ICON

by Eugene Finerman

The Berlin Wall was the manifestation of tyranny, the cruel boundary where Communism declared its ambition, arrogance and ruthlessness. An Iron Curtain extended across all of Eastern Europe, but it was never more evident than in the Wall that divided Berlin. This was the symbol of the Cold War, but its origins began at the end of another war.

What is to be done with Germany after the war? That was the chief topic to be decided by Franklin Roosevelt, Winston Churchill and Josef Stalin when the Allied leaders met at Yalta in February 1945. The Allies knew that one final offensive would crush the Third Reich, but they wanted more from a defeated Germany than a white flag and a change in government.

As stated in the Yalta Declaration, the Allies' goals were "to destroy German militarism and Nazism and to ensure that Germany will never again be able to disturb the peace of the world." The Yalta Conference agreed upon a general plan for a post-war Germany. Following its unconditional surrender, a defeated Germany would be occupied, governed and rehabilitated by the Allies. Each of the Allied powers would have a sector of Germany to administer. This territorial division would reflect the military reality of where the Allied armies were; the British and Americans in western Germany and the Soviets in the east.

However, Berlin would have a special status. The Allies intended Berlin to be the capital of their administration. A joint commission representing the Soviets and the Western powers would decide and coordinate their policies. Although Berlin was 100 miles within the Soviet zone, the city also would be divided into sectors among the Allies. The British and Americans would police and administer their respective zones in Berlin and they would have unimpeded access to western Germany.

This spirit of cooperation lasted as long as Hitler did. He killed himself on April 30, 1945, as the Soviet army engulfed Berlin. When the Allied leaders—Stalin, Churchill and now Harry Truman—met at Potsdam, Germany, in July 1945, the Western powers already had evidence of the Soviets' intentions in Eastern Europe. Communist governments had been imposed on Poland and Hungary, although Stalin promised that they would be just temporary administrations until free elections could be held.

On the question of post-war Germany, however, Stalin did adhere to the agreements made at Yalta. The Soviet army kept within its designated zone, half of Berlin was ceded to the Western powers, and they participated in the Allied Control Council for the governing of occupied Germany. Of course, participating is not necessarily the same as cooperating. Beyond the ideological differences between capitalism and Communism, the Western powers and the Soviets had diametrically opposite goals toward Germany. The Americans and the British wanted to reconstruct an industrial but rehabilitated Germany, whose factories would produce cars rather than tanks. The Soviets, having lost more than 20 million soldiers and civilians in the war, wanted a suppressed Germany, shorn of heavy industry and reduced to being a 136,000-square-mile farm.

With the Allied Control Council in a general state of deadlock, each occupying power now set its own policies in governing its German sector. Britain accepted American policy and aid in reconstructing the British sector. By 1947, western Germany was being administered as one zone. If the Western powers were creating one Germany, the Soviets were creating their own. German communists, who had spent decades living as obscure pensioners in Moscow, now found themselves being elevated to government ministers in eastern Germany. The sectors of Germany had become divisions.

There would be two German states, each proclaimed in 1949. East Germany was 41,646 square miles and, according to a 1946 census, had a population of 18 million. West Germany was 94,911 square miles and had a population of 45 million; however, West Germany also held an additional 186 square miles of territory: West Berlin. One hundred miles within East Germany, West Berlin stood as an enclave of freedom, a showcase of Western prosperity, and a sanctuary for those who sought to escape the tyranny and subsistence of Communism. In 1956, East Germany's population had fallen to 17 million. One million East Germans had defected, and most had escaped to West Berlin. While most of the East German border with its Western rival was defined by guards and lined with barbed-wire barriers, the division between East and West Berlin was perfunctory.

People passed freely from one sector to the other; half a million people crossed on a daily basis. Many East Germans worked in the western half of the city; the capi-

Souvenir hunters collected parts of the Berlin Wall after its official opening (far left); Vice President George Bush looks over the Berlin Wall into East Berlin with Berlin's Governing Mayor von Weizacker and Chancellor Helmut Kohl (left).

talist wages were higher. Shopping was another enticement; the stores of West Berlin certainly had more to offer than those of East Berlin. There were checkpoints at the pedestrian and traffic crossings, but a proper ID sufficed. The subways and trains between the sectors did not even have checkpoints; one could defect for the price of a ticket. It actually seems surprising how many people were willing to return to East Berlin; by 1961 the number of defections was more than 2 million.

East Germany had a demographic crisis: it was depopulating. Worse, the defections included the most skilled and ambitious of its work force. Walter Ulbricht, the leader of East Germany, had a solution that would be grotesque, barbaric, humiliating but effective: a wall around West Berlin. August 13, 1961, early Sunday morning as Berlin slept, East German soldiers and militiamen began constructing barriers along the eastern boundary of the city.

This, the first form of the Berlin Wall, was 103 miles of barbed wire around West Berlin. Transportation from West Germany remained unimpeded; but traffic between the two Berlins was now confined to a few heavily guarded checkpoints. Ulbricht announced that the barriers were meant to deter Western aggression.

The barbed-wire ring was soon supplemented with a 12-foot-high wall of concrete blocks. It took three years to complete. Yet, people continued to escape, climbing over or tunneling under the Wall. The masons working on the Wall had to be guarded against defecting. As a further deterrent, the East Germans began building a second wall 100 yards farther east of the main barrier. The ground between these two walls was cleared of buildings and pitted with trenches and traps. Furthermore, 116 watchtowers overlooked the area, and the guards had shoot-to-kill orders. That 100 yards between the walls became known as the Death Strip.

The Wall became the symbol of the Cold War. On June 26, 1963, President John F. Kennedy visited Berlin and, in sight of the Wall, he defined the "great issue between the Free World and the Communist world."

"Freedom has many difficulties and democracy is not perfect, but we never had to put a wall up to keep our people in, to prevent them from leaving us … The wall is the most obvious and vivid demonstration of the failures of the Communist system … an offense not only against history, but an offense against humanity."

But the Wall and East Germany seemed impervious to history and humanity. The only changes were further enhancements in the Wall's formidable structure. Five years of construction created a new wall built of reinforced concrete slabs, 12 feet high and 4 feet wide, each weighing 6,000 pounds. Ironically, although the slabs were built to withstand impact and erosion, their surfaces were susceptible to graffiti. The youth and artists of West Berlin made a defiant art of decorating their side of the Wall.

This was the ominous yet satirically adorned Wall that President Ronald Reagan denounced on his visit to Berlin on June 12, 1987. The Cold War was thawing, a new and moderate leadership now prevailed in the Kremlin, and yet the Berlin Wall still stood. Reagan addressed Soviet leader Mikhail Gorbachev on this cruel incongruity.

"General Secretary Gorbachev, if you seek peace, if you seek prosperity for the Soviet Union and Eastern Europe, if you seek liberalization: Come here to this gate! Mr. Gorbachev, open this gate! Mr. Gorbachev, tear down this wall!"

Mikhail Gorbachev was of the same mind. The Soviet Union was decaying, a fourth-rate economy that could not guarantee subsistence to its own people yet was subsidizing a world-class military and a restless empire. If the Soviet Union had any hope of survival and reform, it had to accept its limitations. The Soviet Union withdrew from Eastern Europe in 1989, allowing those former satellites to determine their own paths.

The new face of East Germany was Egon Krenz. Hoping to cultivate popularity, Krenz promised that the borders between the two Germanys would eventually be opened. When Krenz's propaganda minister announced on November 9, 1989, that the border would be opened for private trips abroad, tens of thousands of East Germans quickly assembled at the Wall's checkpoints, demanding access to West Berlin. The border guards were overwhelmed by the multitude, and no one in the government dared to oppose the popular surge. The gates went up and the crowd came pouring through. The Berlin Wall no longer had a purpose.

Without the Wall, there was no East Germany. It was reunited with the West in October 1990. The Wall itself became a quarry, subject to the chisels and hammers of souvenir hunters. Some sections were auctioned off, much of the rest was simply torn down. A few stretches remain as a historical monument.

Most of the fabled walls of history served to protect their people and those fortifications stood for hundreds of years. The Berlin Wall was built to suppress its people, and it stood for 28 years. The lesson is obvious.

Bridging the Gap
Between the Is and the Ought

By Michael Josephson

During a workshop for high-level executives, it became clear that there was widespread dissatisfaction about the ethical state of their industry. The participants wanted everyone to live up to higher standards. That is, until we got down to specific situations where scrupulous truth-telling, promise-keeping, and good-faith compliance would require changes that could negatively affect the bottom line or become competitive disadvantages.

It seems that everyone is for ethics in the abstract.

It's not uncommon to hear someone condemn situational ethics and moral relativism one moment, only to defend some deceptive, misleading or otherwise improper professional practice the next. Most people want to do their jobs with complete integrity but, despite popular rhetoric that good ethics is good business, many don't seem to believe it. Or they're just not willing to pay the cost.

Let's face it. Ethics can be quite constraining, especially in a business context. Consequently, lofty ideas about morality and virtue often give way to more pragmatic standards of decision making, involving factors such as what it takes to win, what our competitors are doing, and what we're likely to get away with. "Do what's right" becomes "Do what works."

The hard thing is to live up to our moral aspirations when there is a wide gap between the "is"—what people are actually doing—and the "ought"—what people should be doing based on moral principles. People of character know that ethics is not about the way things are. It's about the way they ought to be.

Ethical standards are prescriptive, not descriptive. They tell us how we should behave. And they're not merely suggestions. They're ground rules.

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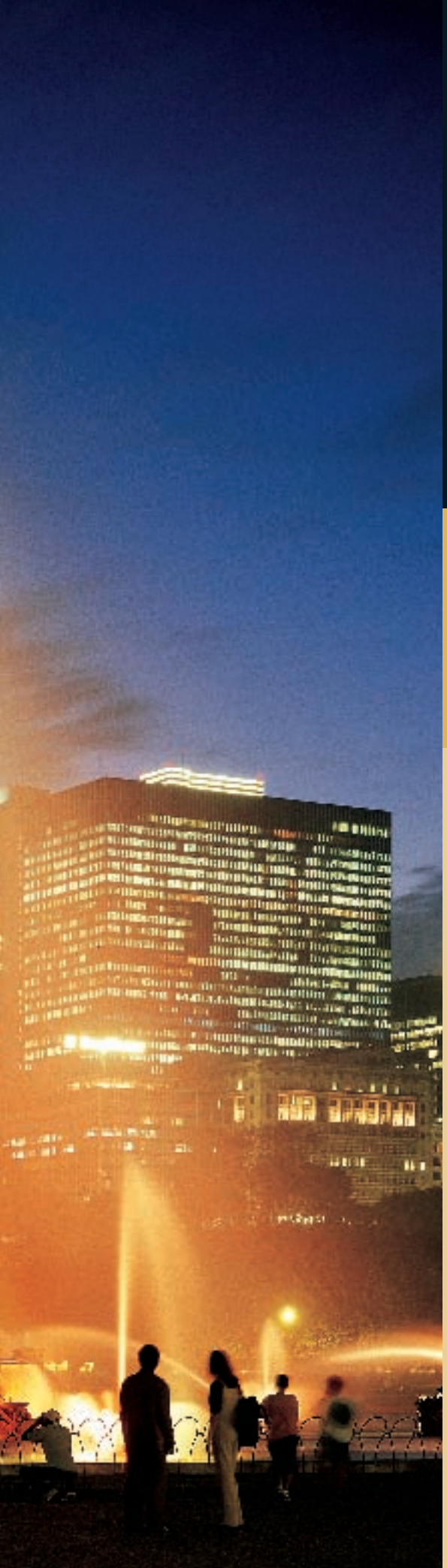
Santa Fe



BY GREG RIENZI

Visit Chicago

An eclectic city known for sports, food, music and magnificent architecture

Ask anyone: Chicago is hot, even when it's cold. The Illinois city on Lake Michigan remains a premier travel destination both domestically within the United States and worldwide. In 2005, roughly 32 million people visited the Windy City for its food, architecture, festivals, sports and dynamic night-life scene.

Thought Chicago was just a home for famous gangsters? Think again.

French explorers discovered the area along the Chicago River and Lake Michigan in the 17th century and named it after an American Indian term for "smelly onion," as the vegetable grew wild there. In 1803, Fort Dearborn was established where the Chicago River meets the lake and was manned until the outbreak of the War of 1812.

Chicago was incorporated as a city in 1837 with a population of 4,200 residents. Today, it's home to 2.8 million people, many of them certifiably sports mad over the many professional teams who play there: the Cubs and White

Sox (baseball), the Bears (American football), the Bulls (basketball), the Blackhawks (ice hockey) and the Major League Soccer team the Fire. The Fire is named after the Great Chicago Fire that occurred on Oct. 8, 1871, killing 300 people and destroying nearly every building in the city.

Despite its immense size, Chicago is foremost a walker's city. The current top attraction to stroll to is the Navy Pier, a large pier on Lake Michigan close to the downtown area. Originally opened to the public in 1916, the Navy Pier went through an extensive renovation and renewal in the early 1990s and today is a tourist's playland replete with a three-story Children's Museum, shopping, restaurants, miniature golf, Shakespeare theater, concert stage, promenades and rides. Its signature ride is a 148-foot-tall Ferris wheel modeled after the first of its kind built by George W. Ferris for the 1893 World's Fair, held in Chicago. Most of the buildings from the fair, designed by renowned architect Daniel Burnham, still exist as museums.

Another popular destination in Second City (a reference to Chicago's historical position as America's second largest city) is the Magnificent Mile, a shopper's paradise on Michigan Avenue with more than 430 stores, including upscale department stores and high-end retailers such as Louis Vuitton and Giorgio Armani. The strip also features many restaurants, clubs and hotels.

Most of the popular neighborhoods to visit (Lakeview, Bucktown, Old Town and Gold Coast) lie along Lake Michigan, which looms like an ocean.

The best way to get around town is on the "El" (elevated train system), which forms a large loop around the heart of Chicago's downtown business district, hence the area being called "The Loop."

The El can take you to many favorite destinations, including the Navy Pier, Sears Tower, Soldier Field (home of the Bears), Wrigley Field (Cubs) and the city's two most famous outdoor areas, Grant Park and Millennium Park.

Visitors to Grant Park must check out the Clarence Buckingham Fountain, commissioned in 1927 by philanthropist Kate Buckingham to honor her late brother, a prominent Chicago businessman and art collector. The magnificent fountain, modeled after one at the Palace of Versailles, is best seen at dusk when it is beautifully animated with a computerized choreography of color spotlights.

Millennium Park, located in the heart of downtown Chicago, is a sprawling 24 1/2-acre center for art, music,

Chicago's grand Clarence Buckingham Fountain in Grant Park (page 24); the city is an architecture lover's dream. Its skyline is enhanced by its position along the shore of Lake Michigan (left).

The city is easily commutable on the elevated train system (this page top); Navy Pier is filled with entertainment, food and plenty of shopping (this page bottom).

Windy City Facts

When to go: While many contend the term Windy City originated from the local newspapers dubbing those at the 1860 Republican National Convention "the greatest collection of windbags," the nickname's lasting power has a lot to do with the gusts that blow off Lake Michigan—and the fact it can get downright cold there. That said, late spring through the summer is perhaps the best time to go: Less wind-chill factor and many of the city's can't-miss special events—Chicago Blues Festival, Taste of Chicago (touted as the world's largest food festival), Air and Water Show—take place from June to September.

What to do: So much to do, how much time do you have?

Befitting the home of the tallest building in the United States (Sears Tower) and several Frank Lloyd Wright masterpieces, Chicago is an architecture lover's paradise. The Chicago Architecture Foundation (www.architecture.org) offers a wide variety of bus and walking tours and a popular boat tour on the Chicago River. *The Devil in the White City* fans should hop aboard the bus tour that serves as companion fodder for Erik Larson's best-selling book about the 1893 World's Fair.

Two good bets on cold or rainy days are the Art Institute of Chicago and the Shedd Aquarium, the largest indoor aquarium in the world.

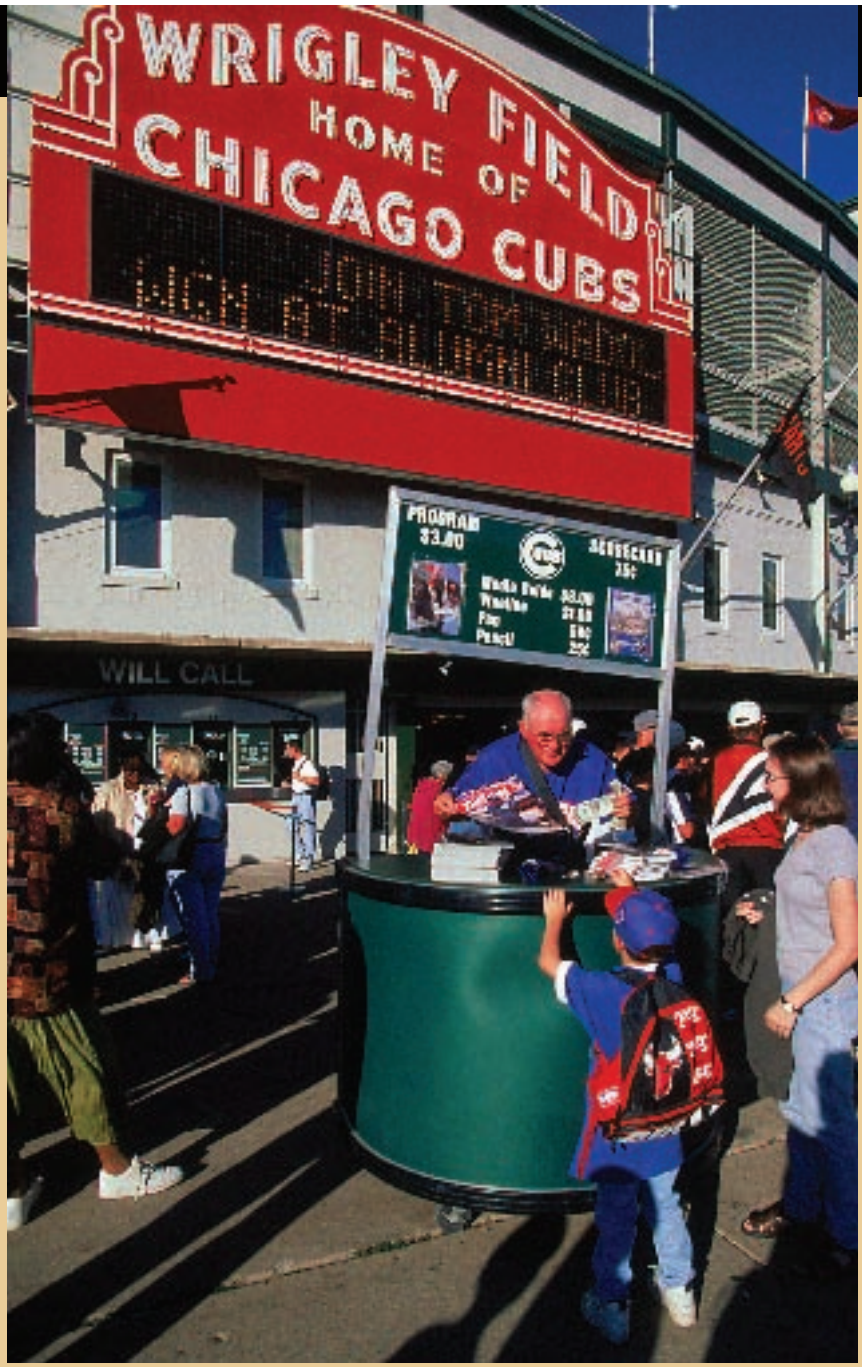
If you're in the mood for kitschy art shops, trendy restaurants and bar hopping, go to Bucktown, a neighborhood that gets its name from the goats kept in the backyards of its early residents.

If the weather is nice, walk, jog or bike along the Chicago Lakefront Path, an 18.5-mile linear park along Lake Michigan's shoreline. Make sure you stop at Oak Street Beach, haven for the young and tanned.

Where to stay: Big spenders should opt for the landmark Drake Hotel, the 87-year-old Italian Renaissance-style luxury hotel in the fashionable Gold Coast area. Or, just come have high tea there or eat at the famous Cape Cod room. If you don't mind eccentric accommodations, try the strategically located Hotel Indigo, whose individualized rooms boast vibrant colors and unique touches such as teak benches in the bathroom. You also can't go wrong with the Palmer House Hilton (The Loop) and The Willows (Lakeview neighborhood).

Where (and what) to eat: Hungry? You came to the right city. Many locals swear by the Chicago Chop House, an award-winning steakhouse in a city known for them. The food is great and the Chop House has an extensive wine list and cigar bar. Gino's East is the place for legendary Chicago-style deep-dish pizza. A current hot spot is Sushi Samba, which offers Japanese cuisine with some Latin flair. Sticking to the Latin theme, bring your appetite to Brazzaz or Fogo de Chão, two Brazilian steakhouses where the Gauchos (carvers) expertly carve up skewers of grilled meat tableside. Another local favorite is Gene & Georgetti's, an old-school Italian steakhouse that feels like a private club.

Travel Tips from Locals



George Shea Jr. has a passion for sports and food. Or is it vice versa? No matter, Chicago has oodles of both.

Shea, 28, a territory manager for Dixon, currently lives just west of the city but was born and raised on the north side of Chicago. No surprise then he's a diehard Cubs fan—as if there were any other type.

So what if the supposedly cursed team hasn't won a World Series in nearly a full century. Since when has that stopped their faithful from showing up at the iconic Wrigley Field, major league baseball's second-oldest ballpark (built in 1912). Originally known as Weeghman Park, Wrigley was the site of Babe Ruth's historic "called shot," when he allegedly pointed to the center-field bleachers during the 1932 World Series and then hit the next pitch there for a homer. It's also where Matthew Broderick famously goes to play hooky in the 1986 film *Ferris Bueller's Day Off*.

If you go during baseball season, Shea says you must make a point of being one of the 41,118 in attendance. Who knows what celebrity you will hear sing "Take Me Out to the Ballgame"? Ozzy Osbourne, Mike Ditka, Bill Murray and Dennis Farina have tried, to varying degrees of success.

"You can't have a bad time there," Shea says. "It's a gorgeous field, the smell is great, and just being there puts people in a good mood."

Before and after a game, Shea recommends you check out his favorite watering hole, Murphy's Bleachers, across the street from the entrance to Wrigley's bleacher section. Here you can get a canned beer for a buck and a mouth-watering Chicago-style grilled Vienna hot dog, which is served on a steamed bun and dressed with onion, relish, tomatoes, celery salt and, for the brave of heart, sport (piquant) peppers.

But hold the ketchup, says George Shea Sr., 65, national training manager for Dixon Valve.

"That would be a mortal sin. Go with the mustard. My son orders ketchup just to aggravate me," says the elder Shea with a laugh.

Both Shea Sr. and Jr. agree you can spend most of the day in Wrigleyville, the name for the stadium's surrounding neighborhoods. The area sports a wealth of great bars and restaurants that buzz with activity win or lose, which, by the way, you can ascertain from the "W" or "L" flag planted atop the scoreboard.

Sports fans who come to Chicago outside the baseball months (April to September) should find some time to see "Da" Bears, Bulls or Blackhawks. As for hard-to-find tickets for all the Chicago teams, the younger Shea says where there's a will there's a way, and scalpers galore. For those scalper shy, try www.StubHub.com.

Shea Jr. admits that while most of the year the weather in Chicago can be "absolutely insane," there is no place he'd rather be.

"I love it here, I really do. Chicago is a great place to be year round," he says. "This city has a little bit of everything, and we are spoiled with great food."

Speaking of food, Shea says that no trip to Chicago would be complete without also savoring a sandwich stacked high with what's called Italian beef, thinly sliced roast beef soaked in its own gravy and numerous spices. "I've certainly had my share," Shea says with a laugh. The elder Shea has, too.

architecture and landscape design. Its most prominent features are the Frank Gehry-designed Jay Pritzker Pavilion, an awe-inspiring outdoor concert venue topped by a billowing headdress of brushed stainless steel ribbons, and the Crown Fountain, two 50-foot glass block towers at each end of a shallow reflection pool. The towers project rotating video images of Chicago citizens who appear to have water coming out of their mouths, courtesy of a water outlet in the screen.

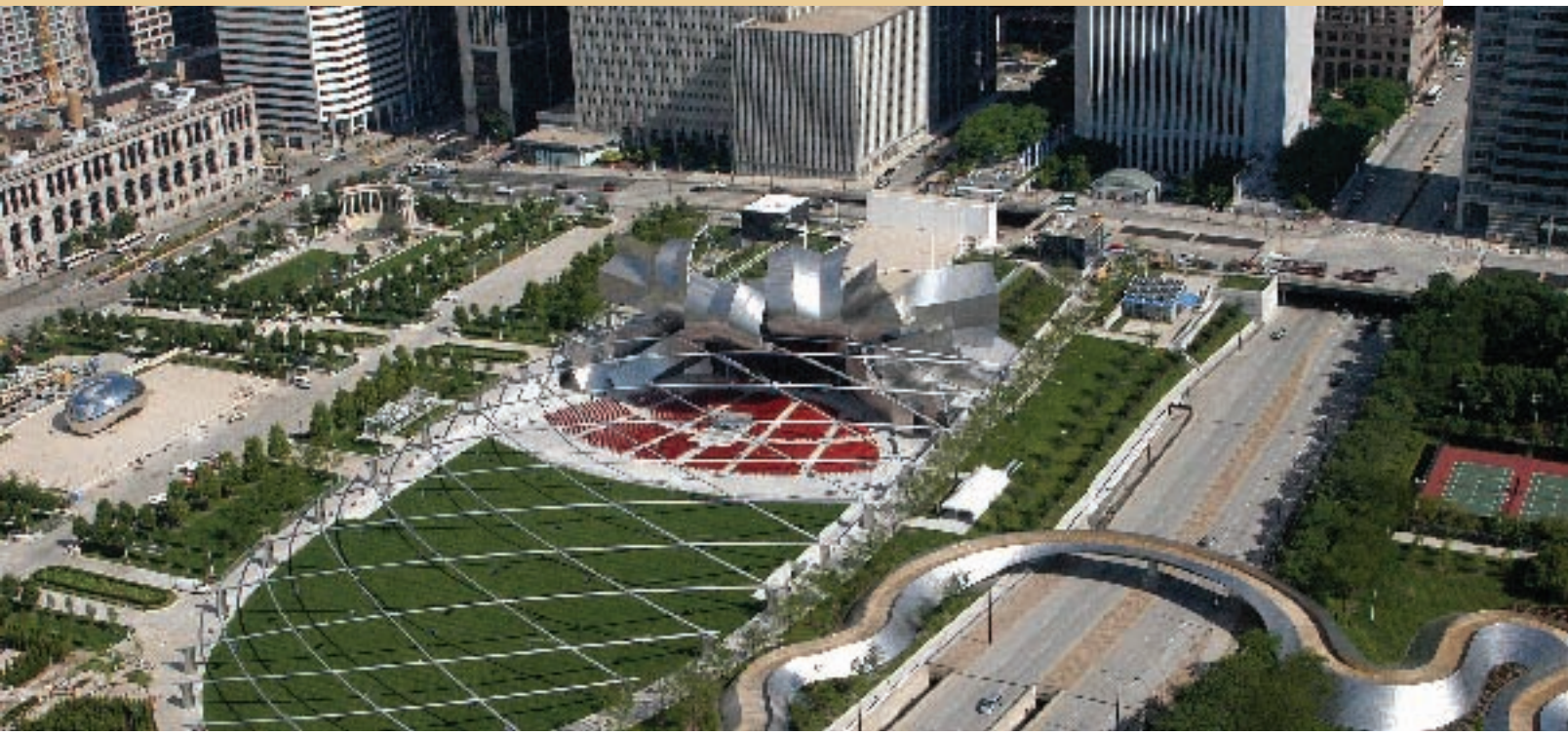
For the best views of the city, take a river or lake cruise, or visit Sears Tower Skydeck or the Hancock Observatory.

Many locals swear by Chicago's concert festivals and music venues. Two must-see spots are Buddy Guy's Legends, owned by the legendary blues guitarist (who plays there regularly) and the historic Andy's Jazz Club.

The city's current big attraction is "Niki in the Garden," an exhibition of 30 monumental outdoor sculptures by the internationally renowned artist Niki de Saint Phalle. The exhibition will be displayed in and around Garfield Park Conservatory through Oct. 31, 2007.

Still, if gangsters are your thing, take a ride on the Untouchables Tour and hit old gangster hot spots and hear accounts of the exploits of Capone, Moran and Dillinger. Consider it a personal favor to Al.

The Chicago River flows through Chicago and is dyed green for St. Patrick's Day (top); the Magnificent Mile is a shopper's paradise (near right); the view from the John Hancock Building (far right); the Frank Gehry-designed Pritzker Pavilion in Millennium Park (below).



The Hidden Costs

While saving a few bucks can seem tempting, you can't put a price on safety.

By Phil Kimble

In today's business environment, companies need to work smarter, faster, more efficiently. Processes such as Lean Manufacturing and Just In Time manufacturing help companies stay competitive and profitable. Even when one thinks they have all of the facts, the lure of saving a few dollars today can lead to huge safety issues later on.

For example, at a processing plant, one of eight assemblies that collects heated water from processing equipment developed a very small leak. These lines connect to a heat exchanger where the water is chilled and pumped back to the processing equipment. In an effort to avoid future production interruptions, the decision was made to change all eight assemblies.

With the leak temporarily under control, the department manager supplied all pertinent information along to the purchasing department. He requested exact replacements because these assemblies had served him well for many years. The purchasing agent received quotes with similar pricing from his regular suppliers. He then remembered the salesman from a new outfit in town who stated he could beat any price. To the purchasing agent's amazement, the new guy's price beat his regular vendors by 40 percent. When questioned, the new salesman revealed that his quote met all requirements except that the hose had a 150-degree Fahrenheit temperature rating instead of the requested 200°F. Since the stated operating temperature was 120°F, it didn't seem like a problem. The order was placed.

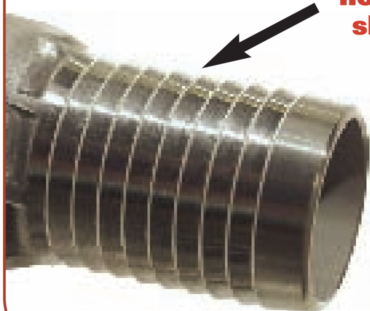
The minute the new assemblies arrived, the department manager was on the phone with the purchasing agent to find out why his instructions had not been followed. During this conversation, the purchasing agent replied that the new assemblies met every criteria as stated, and then he gloated about how much money he saved the company. Fearful that another line failure might interrupt production, the department manager grudgingly decided to install the new assemblies.

At the end of the next day, workers shut down the processing equipment including the chiller. Before the daily cleanup was complete, one of the new assemblies ruptured, spraying a worker with scalding hot water. The company's investigation into the accident revealed that the shut-down process did not follow the equipment manufacturer's procedure for stopping the processing equipment first and the chiller last. The workers shut down the chiller before the processing equipment because it was easier. The residual heat in the processors raised the water temperature to 180°F at the collectors. The hoses on the new assemblies, which were made of a thermoplastic material, literally melted.

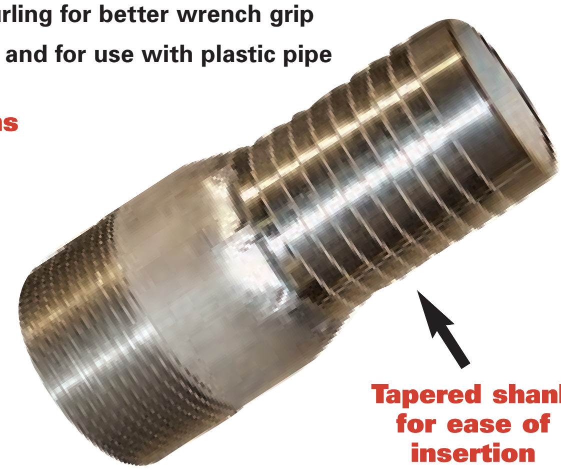
Temperature spikes, although harder to detect, can be just as dangerous as pressure spikes. Strive to ask questions beyond the obvious. The prospect of being a "hero" can cloud one's judgment while inadvertently putting others in harm's way. Safety trumps savings every time.

King Combination Nipples:

- **Primary use in open end discharge of liquid, vacuum or suction**
- **Available in brass, steel, aluminum, stainless steel, nylon and polypropylene**
- **Attaches to end configurations with threads, victaulic grooves and beveled ends for welding**
- **Attaches to hose with band clamps or bolt clamps**
- **Smaller sizes have knurling for better wrench grip**
- **Available in jump sizes and for use with plastic pipe**



Serrations not too sharp



Tapered shank for ease of insertion

Standard NPT threads

Eating Organic: Are the Benefits Real?

By Sue De Pasquale

Once found only in health food stores and farmers' markets, organic food is going mainstream. Today, around the world, approximately 75 million acres (31 million hectares) are being grown organically, according to the International Federation of Organic Agriculture Movements (IFOAM). In the United States alone, nearly three-quarters of Americans report that they've tried organic food and drinks and about a quarter consume these products regularly.

Whether you want hormone-free beef or pesticide-free carrots, you don't have to look far or even go out of your way, as more and more grocery store chains and even warehouse and club stores have begun stocking their shelves with organic options.

What's the draw? While there remains some debate about whether the pesticides and hormones used in producing conventional food products have adverse health effects, those who regularly opt for organic foods believe these products offer better quality and are better for their health and the environment.

To earn the U.S. Department of Agriculture's (USDA) "organic" label, products must adhere to a stringent set of national standards that were put in place in 2002. Meat, poultry, eggs and dairy products must come from animals that are given no antibiotics or growth hormones. Foods must be produced without most conventional pesticides, fertilizer made with synthetic ingredients or sewer sludge, bioengineering or ionizing radiation. USDA officials inspect organic farm operations to make sure farmers adhere to these requirements, and even those who handle and transport organic food from farm to market must be certified.

While organic farming is inarguably good for the environment (generating no pesticides or other agents to "run off" into groundwater, among other things), organic production and distribution is also more costly than conventional farming. Not surprisingly, these costs get passed along to the consumer—organic fruits, vegetables, milk and meat can run up to 40 percent more than conventional products, says Jovan Ruzicic of the Environmental Working Group (EWG), a Washington, D.C.-based nonprofit research organization.

USDA officials don't predict an appreciable cost adjustment anytime soon. "As long as demand increases faster than supply and prices of conventionally produced food remain constant, organic food will continue to sell for higher prices," the government agency reports in its newsletter, *Amber Waves*.

The good news, says the EWG's Ruzicic: If you can't always buy organic, you can dramatically lower your exposure to chemical pesticides by being selective about where you put your organic food dollars. The EWG recently published a list

of the "Dirty Dozen"—the 12 most contaminated fruits and vegetables, as well as the 12 most "Consistently Clean" items. "If people follow the lists as we suggest, they can reduce up to 90 percent of their pesticide intake from produce," Ruzicic says.

Topping the Dirty Dozen list were peaches (almost 97 percent tested positive for pesticides and almost 87 percent had two or more pesticide residues) and apples (92 percent and 79 percent). The remaining offenders: sweet bell peppers, celery, nectarines, strawberries, cherries, pears, imported grapes, spinach, lettuce and potatoes.

Heading the Consistently Clean list: Onions, avocados and sweet corn (more than 90 percent of the samples of these vegetables showed no detectable pesticide residues, according to the EWG). Others: pineapples, mangoes, asparagus, sweet peas, kiwi, bananas, cabbage, broccoli and papaya. People eating all the conventionally grown products from this list would be exposed to fewer than two pesticides a day, according to the EWG. By contrast, those eating from the Dirty Dozen will be exposed to about 15 pesticides a day. (To help shoppers keep these lists handy, the EWG has produced a wallet-sized card that can be downloaded for free at www.foodnews.org.)

"Because the toxic effects of pesticides are worrisome, not well understood, or in some cases completely unstudied," notes the EWG, "shoppers are wise to minimize exposure to pesticides whenever possible."

FACTS

- **The global market for organic products was estimated to be at more than 30 billion Euros ($49 billion U.S.) in 2006. The vast majority of organic products are consumed in North America and Europe.**
  SOURCE: International Federation of Organic Agriculture Movements
- **Australia leads the world in certified organic surface area, with 11.8 million hectares in 2006. Argentina ranks second (3.1 million hectares/7.6 million acres), China third (2.3 million hectares/ 5.6 million acres) and the United States fourth (1.6 million hectares/3.9 million acres).**
  SOURCE: The World of Organic Agriculture—Statistics and Emerging Trends 2006
- **In 2003, fruits and vegetables accounted for 42 percent of the $10 billion in total organic food sales. Total U.S. sales of organic products are expected to reach $17.8 billion in 2007.**
  SOURCE: National Business Journal.
- **The United States has led the way in adding new organic land, according to the IFOAM, with 400,000 hectares (988,000 acres) coming on line in 2006. Italy (110,000 hectares/271,000 acres) and Poland (85,000 hectares/210,000 acres) also posted noteworthy growth.**
  SOURCE: International Federation of Organic Agriculture Movements
- **Don't be fooled: While many food products bear labels proclaiming them "all natural," the term is not interchangeable with "organic"—a designation defined and regulated by the U.S. government.**
- **Between 1997 and 2003, the number of certified organic livestock animals increased fivefold, reports the USDA in *Amber Waves,* adding that dairy "has been one of the fastest growing segments of the organic food industry."**

The Zipper

The invention of this hookless fastener was a time-saving and novel idea—one that is now used daily by millions around the globe.

By Sue De Pasquale

Though sewing machine inventor Elias Howe conceptualized a labor-saving fastening solution as early as 1851, it took nearly seven more decades—and the persistence of a grieving young widower and a deep-pocketed financier—before the zipper as we know it today would be successfully manufactured.

Lawyer Lewis Walker was captivated the moment he set eyes on the boots of inventor Whitcomb Judson at Chicago's World's Columbian Exposition in 1893. Walker installed Judson's "clasp locker or unlocker for shoes"—a series of wire hooks pulled together and locked by an advancing slider—on his own boots, and he launched the Universal Fastener Co. in 1894, hiring Judson to develop a marketable product.

Beset by challenge after challenge, Judson's big breakthrough came when he clamped the fastening elements along the beaded edge of fabric (rather than hand-sewing each link directly to the garment). This meant the finished piece could be attached to clothing via a sewing machine.

By 1904, Universal Fastener had evolved into the Automatic Hook and Eye Co. and came out with a product called "C-curity," boasting, "A pull and it's done!" Unfortunately, the fastener routinely popped open unexpectedly.

Enter Gideon Sundback, an electrical engineer and émigré from Sweden. He signed on with Walker to solve the fastener's fatal design problems in 1908.

When his young wife died in childbirth, the grieving Sundback gave himself over completely to his work, ultimately departing radically from the hooks that had been so crucial to Judson's earlier designs. Instead, Sundback affixed jaws that clamped around both sides of a fabric tape. A slider wedged these clips apart on the way up and forced the beaded edge into the opened jaws, which snapped around the bead (the "hidden hook").

An elated Walker established the Hookless Fastener Co. and production began in earnest in mid-1914. Though manufacturers were initially hostile to the newfangled product, World War I brought with it opportunity: money belts for the troops, secured with hookless fasteners, then air corps flying suits and life-preserving vests.

In 1923, the fastener was dubbed with the name we know it by today when the B.F. Goodrich Co. came out with its Mystik Boot ("Opens with a pull. Closes with a pull"). Company president Bertram G. Work suggested using an "action" word "to dramatize the way the thing 'zips,'" and "zipper" quickly caught on. Meanwhile, the Hookless Fastener Co. became known as "Talon."

Though 20 million Talon zippers were being sold annually by 1930, the fashion industry was wary until designer Else Schiaparelli introduced her 1935 spring collection, which was virtually "dripping with zippers," according to the *New Yorker*. Around this time in Tokyo, Tadao Yoshida founded what would eventually become YKK, the world's largest manufacturer of zippers and fastening products.

Today, Talon, YKK and others are among the leading global companies producing a variety of zippers—metallic, plastic, even "invisible"—for everything from pencil cases to spacesuits. The zippers we use today differ little from the one pioneered by Gideon Sundback nearly a century ago.

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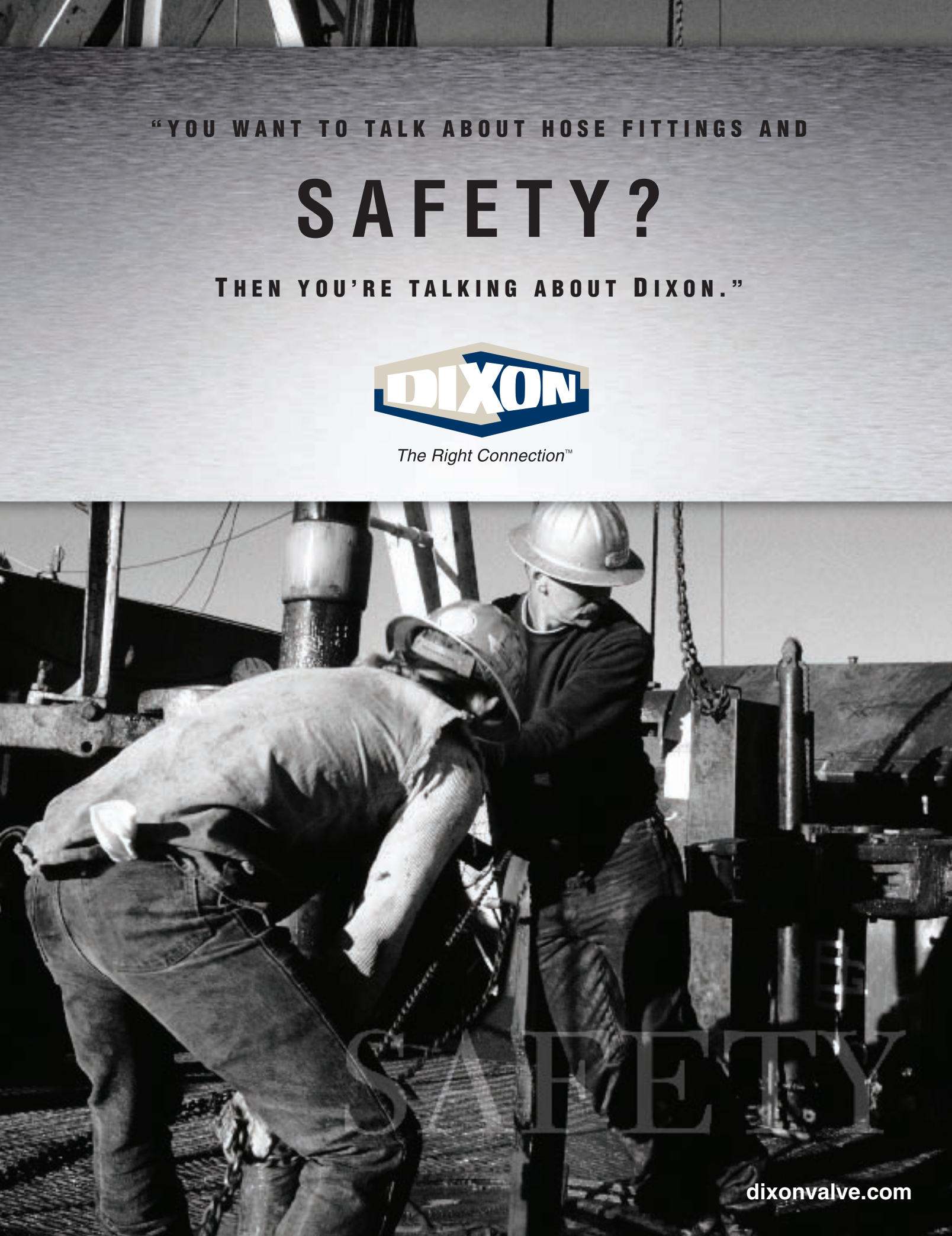
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