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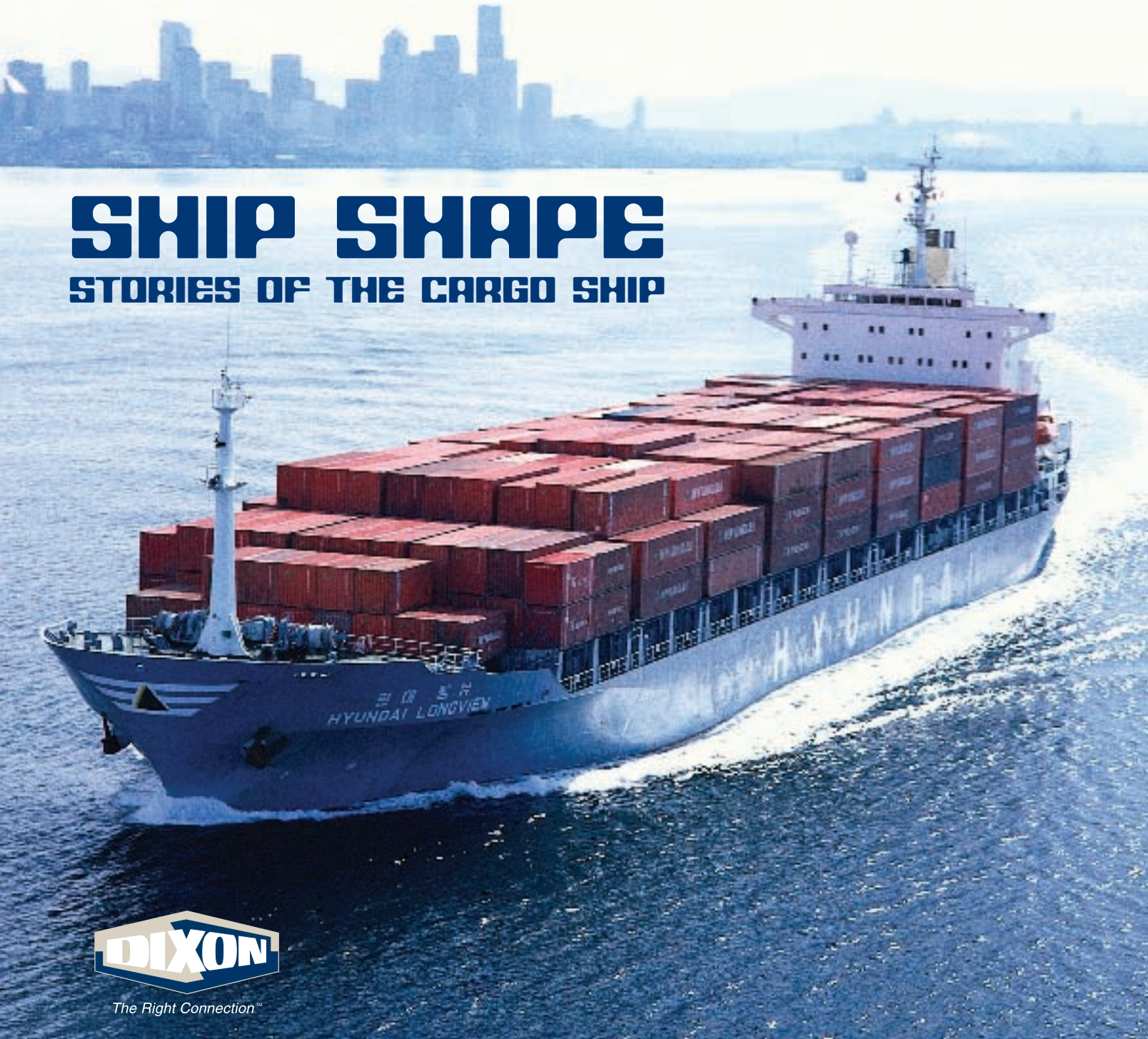

SHIP SHAPE

STORIES OF THE CARGO SHIP

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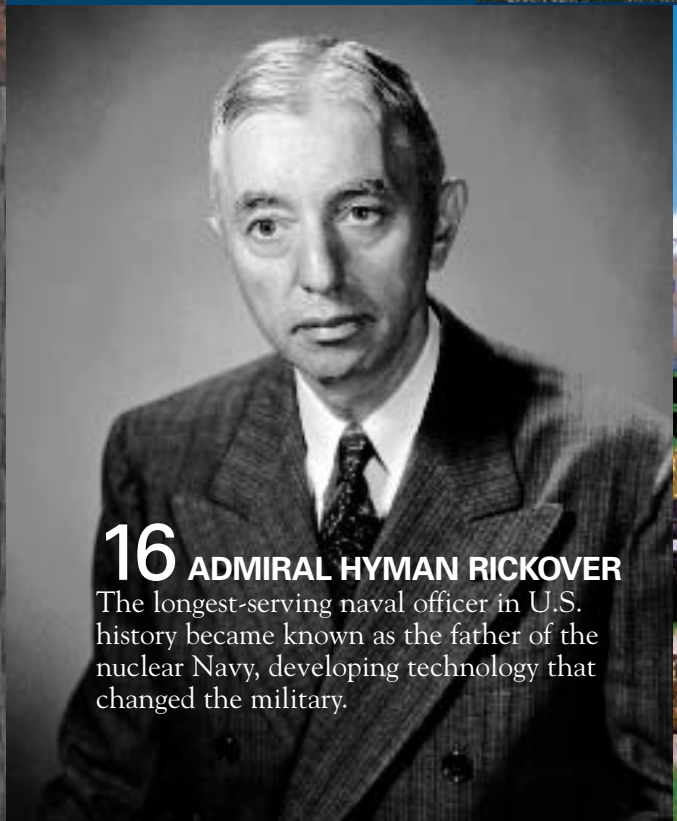

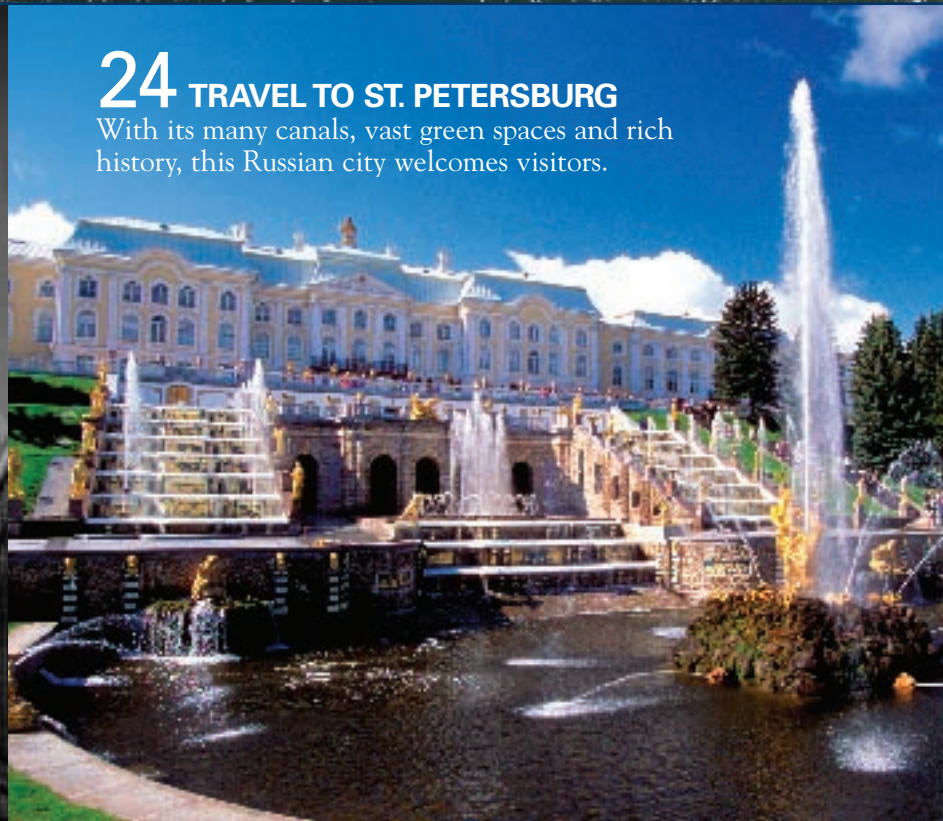

A Reputation for Caring

In this issue of *Boss* Magazine, our feature article is about building cargo ships. It is very interesting reading and I hope you enjoy it. As I reviewed the article, I could not help drawing a comparison between building a cargo ship and building a company. In both cases you must have a vision, a plan, quality material, reliable vendors and skilled, empowered employees. The end result must be a product that delights the customer. However, a ship can't have a reputation for caring and a company can't survive without one.

This past winter, I learned just how crucial customer service is to every business—large or small. I had a problem with the blade tension on my 4-year-old chain saw so I took it back to the local dealer I purchased it from. When I picked it up, I was pleasantly surprised to hear that there would be no charge. "It only took a minute to fix," they said.

The time it took to fix the saw and the fee were not what was important to me. It was the attitude toward customer service that really struck me. This dealer has a reputation for caring and doing the right thing. That reputation brings the customer back—in fact, there is no question where I will buy my next chain saw.

Like this dealer, at Dixon we work hard every day to provide excellent customer service. We believe it is the driving force behind any successful company. We will continue to serve you with quality products and service so we may continue to be "The Right Connection."

Enjoy our magazine. We are always interested in your comments and we thank you for your business.

Thank you,

Dick Goodall

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

BOSS

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Publisher
Dixon Valve & Coupling Company

Editor
Yvonne Lyons

Editorial & Design
Alter Custom Publishing

Art Director
Jason Quick

General Manager
Karen Newell

Copy Editor
Chris Zang

Please submit address changes to:
Alter Custom Publishing
Attn: Jill Rothstein
1040 Park Avenue, Suite 200
Baltimore, MD 21201
443-451-0736
Fax: 443-451-0777

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

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Make it Happen: Dare to Win

Wheelchair racer André Viger challenged himself both as a fierce competitor and as a tireless advocate for the disabled.

BY SUE DE PASQUALE

Grueling can't begin to describe the 600-kilometer Midnight Sun Wheelchair Marathon in Alaska. During the first day of the event in 1993, the Canadian-born André Viger and 12 competitors from around the world first climbed 35 kilometers (21.7 miles) into the Alaska Range foothills, then faced 100 kilometers (62 miles) of fierce headwinds. Hunched over in his three-wheeled, all-aluminum aerodynamic race chair, Viger flew over the course—that day and during the eight days that followed—in a gritty display of physical and mental fortitude. The final stretch on Day 9, an 18-kilometer downhill sprint (11 miles), was, he said afterward, "like the cherry on the cake." Viger sailed across the finish line, capturing the first prize of $5,000 with an elapsed time of 23 hours, 50 minutes and 25 seconds.

For Viger, once described by his protégé Jeff Adams as "the toughest man alive," the victory in Alaska capped a remarkable athletic career that included wins in the wheelchair event of Japan's Oita Marathon (four straight years, from 1984-87), the Montreal Marathon (five times), the Boston Marathon (1984 and 1986) and appearances in five Paralympic Games. Viger's haul from the Games: three gold medals, four silver and three bronze.

Perhaps as notable as Viger's athletic accomplishments is the role he played as a tireless promoter of the Paralympic movement—a movement in its infancy when he came on the sports scene in the late 1970s. "André opened a lot of doors and eyes to wheelchair athletics, he had a resiliency to succeed like no other I've seen before," says Jean Laroche, head coach of Athletics Canada Paralympic, who began working with Viger in 1981. "André saw obstacles as another reason to persevere and used them to motivate himself."

Viger lost a battle to cancer in October 2006 at the age of 54, but his legacy lives on. He established the Fondation André Viger, to encourage the disabled to overcome their handicaps through sports, and founded the successful medical supply company La Maison André Viger, which became

a meeting point for athletes all over Canada. It continues to support the efforts of the disabled by producing wheelchairs and other adaptive equipment.

Growing up in Sherbrooke, Quebec, Viger did not set out to be a standard-bearer for the disabled. He was employed as a steelworker, a few months shy of his 21st birthday, when his life changed in an instant, on June 3, 1973. The car he was riding in missed a curve and flew off the road. Though Viger survived the crash, doctors delivered grave news: Damage to his spinal cord meant he would never again use his legs.

Viger refused to accept the crushing verdict. Displaying the fierce determination that would become his trademark, he spent months mastering the use of crutches and leg braces—and when he finally left the hospital for home he was on foot. But post-hospital life proved vexing. Balance problems led to repeated falls and Viger reluctantly turned to using a wheelchair. When a friend suggested he try sports, he first tried swimming, shot put, discus and weight lifting, before ultimately settling on wheelchair racing.

At the University of Sherbrooke, during the winter months when bad weather interrupted his outdoor training, Viger was a familiar sight in the tunnels beneath campus, where he rolled mile after mile to build his upper body strength. He entered his first local event in 1979 and in 1981 competed in his first Montreal Marathon, finishing third. Viger achieved celebrity status in Canada in 1984, when he participated in the 1,500-meter wheelchair event at the Los Angeles Summer Olympics (a demonstration event), capturing a bronze and effectively putting Paralympic sports on the map. Before long he was competing in events all over the world.

Despite a grueling training and competition schedule, Viger frequently made public appearances, intent on getting out the message that disabled people can make important contributions to society. His motto: "Make it happen: dare to win."

Internationally recognized for his achievements (he was inducted into the Paralympic Hall of Fame in November 2005), Viger was especially beloved in his home country. He was voted Quebec's Athlete of the Year in 1985 and in 1989 he was appointed to the Order of Canada.

Four years later, the University of Ottawa awarded him an honorary doctorate, with a citation that aptly summed up his lasting contribution to society: "All of André Viger's achievements are guided by the same beacon: his set of values. Love and faith in life; self-esteem and self-confidence; compassion for oneself and for others; combined with determination, tenacity, discipline and courage. These values are dear when mind and body are sound; they are cherished all the more when life leaves its mark. When young André Viger was subjected to a formidable test, he held fast to these values and made them his very own. They are the pillars on which he built his life."

SHIP SHAPE

STORIES OF THE CARGO SHIP

On January 18, 2007, the gale force winds in the English Channel were strong enough to take out the power and flood the engine room of the MSC *Napoli*, a 62,000-ton container ship. Though the mammoth vessel went down more than 40 miles from shore, more than 100 of its 2,400 containers—holding a hodgepodge of consumer goods not limited to expensive hand creams, wine barrels, Nike sneakers and even BMW motorcycles—washed up on the beaches of the Cornish coast of England. For weeks following the event, hundreds of locals fought the cold to pillage the loot, until the area was sealed off. According to the United Kingdom's Maritime and Coast Guard Agency, it will be a year before the *Napoli's* valuable floating cargo can be fully recovered by salvage vessels.

Today, more than 90 percent of the world's traded goods—liquid, solid and gas—move by cargo ship. A 1500-foot oil tanker can carry more than a half-million tons of crude oil at one time; much smaller, compartmentalized chemical tankers can safely tow a variety of dangerous, volatile or fragile substances, from hydrochloric acid to coconut oil to beer. And thanks to container ships, which hold as many as 5,000 40-foot steel boxes, Barbie dolls can be made by workers in China, with nylon hair from Japan, plastic bodies from Taiwan and paint pigments from America.

Without question, cargo shipping in the last 50 years has revolutionized the global economy. But with all of the economic growth it's spurred, shipping has its dark side: In the wake of the 9/11 terrorist attacks, Western governments are much more concerned with security threats posed by the millions of containers exchanged between nations each year (see sidebar, page 14). Moreover, massive oil and chemical spills from tankers damaged at sea, as well as the toxic substances given off during the scrapping of old ships (see sidebar, page 12), demonstrate that these incredible vessels can leave a damaging environmental footprint.

These disasters are virtually the only reason cargo shipping makes it into the popular press. But shipping is an enormous industry with a relatively good safety record. More than 2 billion tons of oil is carried by ships each year and virtually 100 percent is delivered without spillage. About 50,000 merchant ships are now in operation, run by more than a million seafarers from 150 countries.

Surprisingly, you don't need many hands to run a ship—crews are 20 or 30 at most. Today's technology allows a helmsman to steer not with a spoked wooden wheel, but with a single joystick and mouse ball.

Technology isn't cheap, of course, and the most expensive

BY VIRGINIA HUGHES

as long as there's

a need to move things from one place to another, there's going to be the need to design and build ships.

ships cost upward of $150 million. Still, the investment's well worth it: the operation of all merchant ships generates an estimated annual income of over $380 billion in freight rates, or about 5 percent of the total global economy, according to the Round Table of International Shipping Association.

And experts say the industry will only grow. As John Tuttle of the U.S. Merchant Marine Academy puts it, "We build ships because we enjoy it, but that's not why people buy them. People buy them because there's international trade. And as long as there's a need to move things from one place to another, there's going to be the need to design and build ships."

BUILDING A CARGO SHIP

Goods have been traded by ship since the dawn of modern civilization. More than 4,000 years ago, the people living in what is now Pakistan used the Arabian Sea to send beads and gems to West Asia and Africa. During the Middle Ages, more than 3,000 wooden sailing vessels in the Venetian merchant fleet served the likes of Marco Polo.

The early 19th century brought about steam-powered ships that revolutionized the industry. By 1820, steamships from America were making trips across the Atlantic twice as fast as the old sailing ships.

And the industry was revolutionized, yet again, when the first steel ships came along at the turn of the 20th century. Builders started by placing a large steel beam from bow to stern, called a keel, around which the hull of a ship was built. In those early days, the steel sheets were riveted together.

In the next half-century, shipbuilding design evolved in parallel with the design of automobiles and airplanes. "A 1935-built ship had a framing and they put the skin on top of the framing. Your old 1950 basic automobile had a chassis, and a skin on top of the chassis. A 1940-built airplane had a frame, then skin on top," explains Vincent Treglia of the Texas Maritime Academy, a maritime engineer for 40 years. Now, he continues, for cars, planes and ships, "the skin—the steel—is an integral part of the structure."

The advent of welded steel came around the time of World War II, and today's modern ships are basically huge boxes made of welded steel. In an empty container ship that weighs about 18,000 tons, for instance, about 14,000 tons of that weight comes from the steel. Shipbuilders usually buy

TANKER SHIPS: MOVING LIQUID CARGO

Vincent Treglia of the Texas Maritime Academy has been engineering cargo ships for 40 years. Here we asked him just how a tanker ship loads and unloads its precious liquid cargo.

What does a tanker ship look like?
A modern tanker is a large box. They can be up to 1,000 feet long. Modern oil tankers now are double-skinned, and double-hulled. Then there's a central cargo block, with between 15 and 40 tanks on it.

A chemical carrier can have up to 100 tanks on it. Or it can be 15, depending upon what they're actually carrying. Some chemical carriers, we'll call them "drugstore ships," carry 30 or 40 grades of cargo.

(Opposite page) Oil tankers, carrying precious liquid cargo, can be up to 1,000 feet long; (left) A propeller for a cargo ship can weigh as much as 94 tons.

the steel in rectangular, 10-by-40-foot plates, most of which get cut into much smaller pieces. "You're taking thousands and thousands of small steel pieces and basically welding them into one piece," says Tuttle.

The process is complicated because welding distorts the steel. "Think about taking a yardstick, putting your hand on the center and putting weights on the ends—it's going to bulge," Tuttle explains. In the same way, a ship's steel framing will want to bulge from ocean pressures, "so you have to put the ship together so it can survive this," he says.

Shipbuilding today uses "block construction"—prefabricated, multi-deck sections of the hull or superstructure are built and tested on land, moved to the dock and welded together until the complete ship is formed. Most shipyards install piping and electrical cables while the various blocks are on land because it's usually much easier than assembling them in a cramped and dark interior space of the ship.

Moving the mammoth vessel from land to sea is usually done in one of two ways. The first is called an end- or side-launch berth, where during the building process the ship is attached to a hill with a series of latches. Then when all of the blocks are in place, the latches are removed and gravity pulls the ship down the hill and into the water. Tuttle says this method is "the more traditional way, but in the last 20 years people have done it less because you have to build the ship on an incline, which makes it more time-consuming."

Much more common today is to use a graving dock—a narrow, concrete basin that is bound by gates called a caisson. "It's basically a hole dug in the ground, right by the water, with a door between the water and the hole," Tuttle says. The ship will be put together in blocks on an empty graving dock; then, when it's ready to float, the doors are opened and the water rushes in.

Though small details vary, the underlying construction is the same for oil tankers, chemical tankers and container ships alike. "Going from ship to ship you get the same basic systems to make the ship run, like electric and plumbing," Tuttle says. A tanker, for instance, needs a complicated piping system to get its cargo in and out of the tanks without spillage. But a similar piping design also is needed for the ballast system on a container ship.

What has changed in recent decades, though, is computer technology. A computer calculates the minimum amount of steel that should be ordered, and how to cut the large plates

How much can an oil tanker hold?
For a large ship, we're talking 350,000 tons of oil.

Why put the same liquid into so many different tanks?
The biggest reason is to prevent something called "free surface effect." Without being divided, if the ship started to roll then all the oil would go to one side and the ship would rock. So you have to make sure the tanks are about 98 percent full, or else even inside the tanks the liquid will slosh from side to side. Fact is that a few ferryboats have sunk over the years because the decks get flooded and they just turn turtle.

What are the tanks made of?
They're usually free-standing stainless steel tanks. And the more tanks, the more cost there is to build a ship.

How does the liquid get on and off the ship?
Ships are typically loaded on one side of the dock. You connect the ship to the dock either with flexible hoses or with a fixed piping arrangement called a chicksan. It's like a mechanical arm. When the vessel's loading or unloading cargo, its height changes in the water, so this flexibility allows for that. Pipes don't bend, and hoses are, by definition, flexible, so what you choose to use depends on your purpose.

Then they use pumps ... to get the oil, or whatever liquid, from the dock to the ship. There are tanks at both ends [on and off shore]. On the loading end, you've got pumps pumping from the tank on the shore into the ship. And the tanker has pumps to discharge the cargo.

THE DEATH OF A SHIP

On March 24, 1989, the *Exxon Valdez* tanker hit Bligh Reef on Prince William Sound and spilled more than 11 million gallons of Alaskan crude oil into the water. In response to this environmental disaster, the U.S. Congress passed the Oil Pollution Act of 1990 and other regulations that required oil companies to phase out use of their single-hull ships and replace them with double-hull ships. The idea is that if you have a double hull and hit something—like a reef—the ship's outer hull will break but not its inner hull, keeping the ship afloat and the oil inside. A complicated technical debate exists among marine engineers as to whether double-hull tankers are actually safer; so far, there's no evidence that the switch has caused fewer accidents or oil spills. Nevertheless, the rest of the international political community soon followed the U.S. example and set similar regulations.

Suddenly, the oil companies had a big problem: How to get rid of these huge single-hull ships? Some ship owners chose to convert their single-hulls to double-hulls at a cost of many millions of dollars rather than scrap a relatively young, and still commercially viable, asset. But most have gone for the cheaper option of shipbreaking (or in more positive terms, "ship recycling"). In theory, ship recycling makes sense: these huge ships are full of valuable steel and other materials and parts that can be scrapped, melted, resold and reused. (A very large tanker, for example, can provide 30,000 tons of steel, worth about $1 million on the scrap market.) But in practice, ship recycling—done almost exclusively in poor countries where labor is cheap and the local demand for scrap steel is high—is notorious for its medical and environmental hazards.

Scrapping a ship by hand can be done in as little as six months. First, anchor chains and braided steel cables pull the vessel up the beach and secure it to the ground. Next, the ship's fuel tanks are emptied. Usable oil gets resold, while sludge is burned on the beach. Next, the crews attack the inside quarters of the ship, ripping out wood paneling, the electrical system and asbestos-filled insulation to get at the valuable piping. Finally, the ship's engine is removed and the remaining steel monster is cut apart in large pieces, using torches, and hauled up the shore.

With a vast, starving population, South Asia has a pool of laborers willing to subject themselves to harsh conditions for meager wages. Now, more than 90 percent of the world's junked ships go to India, Bangladesh and Pakistan to be dismantled.

into smaller pieces with the minimum amount of waste. And computer programs can give ship engineers precise geometric and technical descriptions of the ship. The computer also tells the engineers who parts are being bought from, what they cost, and what their physical properties and dimensions should be. Every player on the design team can see design changes immediately after they're made, averting problems before they happen. Thanks to computers, an entire ship can be built easily in less than a year.

This isn't to say that the process is completely automated. "You certainly need people to design the thing, to run the computers, to make sure that the machines do everything correctly," Tuttle says. He adds that the preliminary design—done by a half-dozen human engineers—is the most important part of the shipbuilding process, and is what has led countries like Japan and Korea to pull way ahead of the rest of the world.

"It's all in the planning and the engineering. The Koreans and the Japanese spend an awful lot of time in thinking about how they're going to put the things together before they start," Tuttle says.

Other economic and political factors also have contributed to America's lag in the shipbuilding industry. In 1920, the Jones Act dictated that all ships carrying the U.S. flag must be built in the United States and owned by U.S. citizens. And because the cost of parts and labor is much more expensive in the U.S., ship operators are more inclined to fix up old American ships rather than build new ones.

Fifty years ago, the U.S. merchant fleet had 3,083 deep-water vessels of 1,000 tons or more and was ranked largest in the world. But by 2005, this number had dropped to 412, which ranks 15th in the world.

Because shipbuilding uses a wide range of technologies, employs many workers and generates foreign currency income, it's an attractive industry for developing nations. Today, South Korea is the world leader. But in the next few years, because of massive government investment and low labor costs, the top spot will probably go to China.

THE CONTAINER REVOLUTION

On May 1, 1956, a crowd of hundreds gathered at Wharf II in the Port of Houston to watch as the world's first container ship sailed into port. As one witness later described, "We had seen thousands of tankers in Houston, but never one like this. So everybody looked at this monstrosity and they couldn't believe their eyes."

Indeed, the *Ideal X* was a wonder. Just five days before its arrival in Houston, a 72-foot land-based crane in Newark, N.J., had loaded it with 58 aluminum trailer trucks full of cargo. The crane dropped one box onboard every seven minutes; the entire vessel was ready to go in less than eight hours.

Watching the loading while eating his lunch was 43-year-old Malcom McLean, the restless and calculating entrepre-

neurial genius whose thriving trucking company, McLean Industries, was funding the shipment. The idea came to him three years before, in 1953, when he learned that the U.S. government was selling leftover World War II tankers to shipping companies for practically nothing. Worried that this would take business away from his trucking company, McLean thought he might literally piggyback onto the competition—and avoid the increasing congestion on U.S. highways—by rolling his trucks onto ships. Because truck wheels would use up valuable cargo space, this roll-on idea was soon scrapped in favor of standardized, stackable containers. In 1955, McLean's company acquired the Pan-Atlantic Steamship Corp., bought two of the old T-2 tankers, hired top-notch container engineers and began the container revolution.

Before this, transportation was very much mode specific. "People were either railroad guys, or maritime guys, and thought that their particular vessel was very important," explains Marc Levinson, economist and author of *The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger*. But McLean realized that manufacturers cared not about how the goods were shipped, but how efficiently. "The idea of putting goods into a container didn't originate with Malcom McLean; this was not his brainstorm," Levinson explains. "His accomplishment was finding a way to do it that was actually profitable."

Profitable it was. In 1956, the cost of loading a ship was $5.83 per ton. On the *Ideal X*, the cost per ton was just 16 cents. In the 1950s, the cost of ocean shipping accounted for a whopping 12 percent of the total value of U.S. exports, and 10 percent of imports. But now, thanks to containers, say economists Edward Glaeser and Janet Kohlhase, "moving goods is an essentially costless" part of the production process.

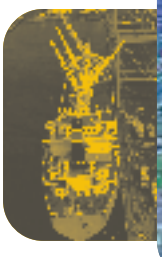
These immense savings came about because container shipping minimized the time that a ship was idle—the most expensive part of the process. "A ship's not generating revenue when it's sitting in port," Levinson says. "So to really cut costs, you've got to expedite the loading, and unloading, get the ship under way."

Before container shipping, a typical port was made up of wooden piers that stuck straight out from the shore into the water. The ship would pull in alongside the pier, and be tied up for a week or two while teams of longshoremen would unload its contents into nearby warehouses.

Today's port scene is drastically different. When a ship comes into port, it docks not beside jutting piers, but parallel to the concrete waterway. As soon as the ship is tied up, land-based cranes—usually three or four—immediately go to work. The cranes lift containers off the ship and then place them on vehicles to be moved to a storage area. After a certain number of containers have been removed, the cranes start moving in both directions—unloading and loading simultaneously.

"A port is a lot like a factory these days," Levinson says. Computers give crane operators the precise order in which to unload and load the containers, and drivers are told which containers go to which storage yard, and when. "The company will know how many containers per hour a single crane operator has moved," he adds. "They're measured, above all, by efficiency."

Within a decade of *Ideal X's* historic trip, container shipping had facilitated a sweeping change in the way goods are sold and moved around the world. Before the revolution, goods were generally manufactured from start to finish at the same place, which was usually near a port to cut down on transportation costs. After containers, transportation became cheap and the supply chain could be made longer.



As Levinson puts it, "The container made a fundamental change in the cost of transporting goods. Shipping goods internationally used to be extremely expensive. Now it's very cheap. And the decline in the cost made it feasible to trade many things that couldn't be traded before."

After the world's largest shipping companies jumped on the container bandwagon, ports had no choice but to adapt. The biggest ports like New York, Los Angeles, Rotterdam and Sydney had to overhaul their layouts to accommodate large, land-based cranes. And since factories no longer needed to be near a port, container shipping gave smaller port cities a huge opportunity. In 1950, Seattle's six piers in use for general cargo were in danger of being closed. Instead, the Port Commission wisely spent $32 million building two new container terminals, and today Seattle is a major player in the distribution network. Perhaps most noticeably, the container revolution made Far Eastern countries—eager to build their economies with foreign investment, especially in manufacturing—major players in the shipping industry. Of the 300 million containers that moved across the oceans in 2006, 26 percent originated in China.

Since the early '80s, as container shipping drastically lowered the cost of international freight, the volume of freight has quadrupled. Brian Cudahy, director of the Steamship Historical Association and author of *Box Boats: How Container Ships Changed the World*, calculated that in 1975, Sea-Land company's containers placed end to end would stretch from Manhattan to Cleveland. Today, if you placed end to end all of the containers needed to exhaust the world's fleet, it would more than encircle the Earth.

In modern society, we use and depend on goods every day that were produced someplace else without much thinking about the boats that brought them to us. But from distributing Barbie dolls to fueling the ever-changing world economy, those big boats are truly indispensable for living in the modern world.

CONTAINER SECURITY AFTER 9/11

Nearly 10 million containers came into U.S. ports in 2004. In a post-9/11 world, U.S. security officials see each container as an opportunity for terrorists to carry out another catastrophic attack.

The very reason container shipping is so profitable for exporters and importers—a sealed container can go efficiently from origin to destination with no intermediate handling of its cargo—makes it a nightmare for customs officials. The fact is, if each and every container ship was searched thoroughly, it would slow down the transportation process so much that the ships' amazing cost savings would evaporate.

Moreover, imagine the manpower that would be needed to check each box on a container. For just two of America's largest ports alone—Los Angeles and Long Beach—searching every container that comes in every day would take 35,000 customs inspectors.

Each container comes into port with a list of what's inside, but there's no way for a security official to check that the list is accurate. If you open one container's side doors, you'll see only a wall of cartons stacked floor to ceiling, blocking the rows and rows of others stacked within. It's easy to see how the container full of illegal drugs or immigrants could sneak through without a problem.

So what's the solution? Within months of 9/11, the U.S. Customs and Border Protection agency (part of the Department of Homeland Security) began a program called the Container Security Initiative, intended to prevent terrorists from delivering a weapon via container. The CSI starts by identifying the small number of high-risk containers (using "advance information and strategic intelligence"). Then, for countries that have agreed to participate, these high-risk containers will be screened at their point of origin, using large X-ray and gamma-ray machines and radiation detectors. Some shipping companies also are starting to use "smart" containers, which will tell U.S. security officials if they've been tampered with during transit.

So far, more than 50 ports across the world—in South America, the Caribbean, Europe, Africa, the Middle East and throughout Asia—have signed up with the CSI, which according to U.S. Customs, accounts for more than 90 percent of all trans-Atlantic and trans-Pacific cargo imported to the United States.

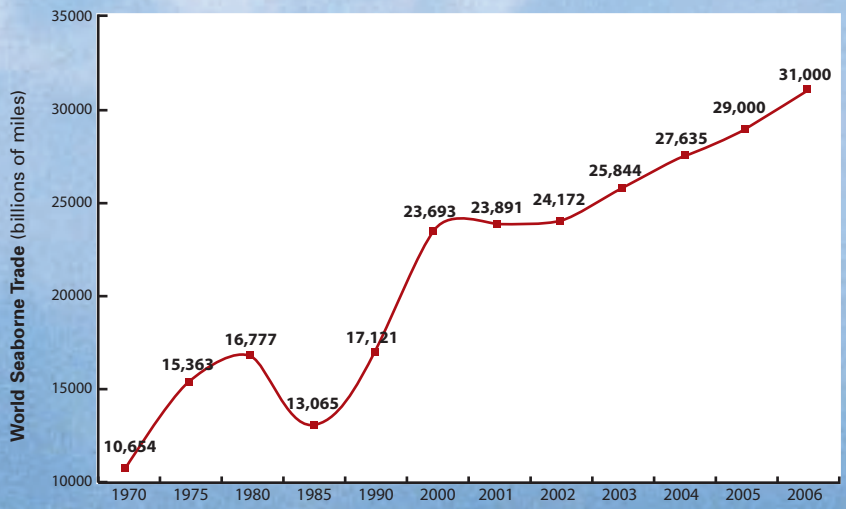
Still, economist and author Levinson is dubious about the effectiveness of these or any other container-searching initiatives. "At this point, frankly, the biggest concern is politics," he says. "There's a lot of people talking a lot of nonsense here, because it's really important for them to be seen as being tough on terrorism, seen as doing something. Despite what the people concerned may tell you, this thing basically runs on the honor system. If they know you, and if you're a regular shipper on a particular route, your container isn't very likely to get searched."

Cargo Shipping By the Numbers:

Shipping trade estimates are usually calculated in ton-miles—a measurement of tons carried, multiplied by the distance traveled. In 2004, for example, the industry shipped 6.76 billion tons over 4 million miles, resulting in a staggering 27,635 billion ton-miles of trade.

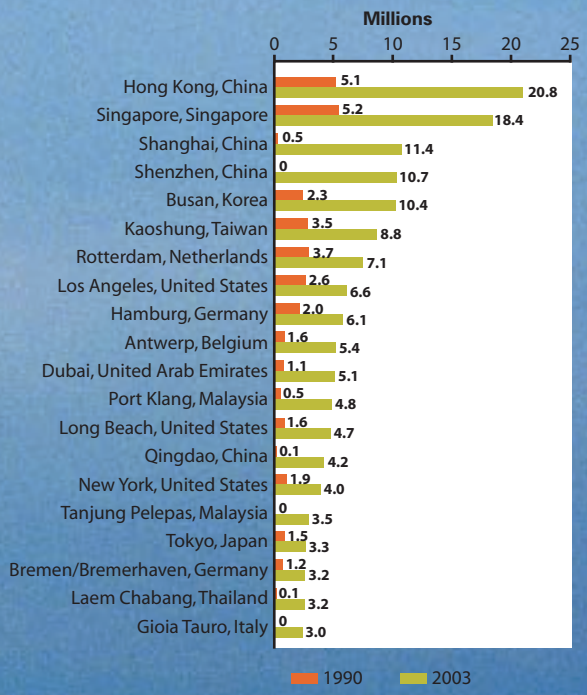
The graph (right) shows the **Growth of the Cargo Shipping Industry** since 1970. The figures for 2005 and 2006 are estimated.

Source: International Maritime Organization report on International Shipping and World Trade, September 2006.



The World's Largest Container Ports

ranked by number of containers handled annually



Containers are counted in 20-foot equivalents; if a port handles 40-foot containers, each one is counted as two for purposes of this chart.

source: The Box, by Marc Levinson

From Steerage

by Kristi Birch

When Admiral Hyman G. Rickover died in 1986, his career was extolled in numbers. Just the length of his military career was impressive enough: 63 continuous years, making the Father of the Nuclear Navy the longest-serving naval officer in U.S. history. And thanks to the technology Rickover developed in the 1950s, 150 naval ships were operating under nuclear power. Former Navy Secretary John Lehman calculated that those 150 ships accounted for 3,000 ship years of operation. The number of nuclear accidents during those three millennia? Zero.

It's hard to argue with data like that, but Rickover's success did not come easy or without conflict. He was tenacious, principled and extraordinarily hard-working, but the one thing nobody ever called him was easygoing. He didn't get to where he was by being nice, and he certainly never had it easy.

His career in ships began in steerage. In 1906, 6-year-old Chaim, as he was called then, sailed to the United States on the *Finland*, his mother guarding the sheet that held their belongings. The Rickovers had left their hometown of Makow in what was then Russia because of the anti-Semitism of that time. The family eventually settled in a poor immigrant area of Chicago. Years later, Rickover would learn that all the Jewish residents in Makow had been killed in the Holocaust.

He got his first job at the age of 9, when he earned three cents an hour holding a kerosene lantern for a neighbor who operated a machine in his basement that shaped pieces of galvanized iron used to decorate buildings. In high school, he delivered telegrams for Western Union. He often made deliveries to his congressman, Adolph Sabath. Sabath nominated Rickover to the U.S. Naval Academy in Annapolis in 1918. Rickover was thrilled: he desperately

Admiral Hyman G. Rickover oversaw the development of the first nuclear submarine, the *USS Nautilus*, right, which was in service for 24 years and needed refueling only three times.

Admiral and Mrs. Rickover meet with President and Mrs. Carter in 1977 at the White House (opposite, left); Captain Alton K. Thompson, center, gives Admiral Rickover, left, and Vice President George H. W. Bush a tour of the nuclear-powered ballistic missile submarine *USS Ohio* (SSBN-726) following the commissioning ceremony (opposite, right).

to Four Stars

The Career of Hyman Rickover, Father of the Nuclear Navy

wanted an education, his family had no money for tuition, and the Academy was free.

But being nominated did not mean being accepted, and because he had to work during high school, he was not prepared for the Naval Academy's entrance exams. So he holed up and studied night and day for weeks, and passed—just barely. "I was probably as poorly prepared academically as any plebe who had ever entered the Naval Academy," he remembered in a 1983 editorial in *The Washington Post*.

Once at the Academy, he continued to work hard, disregarding the first of many Navy rules by studying after taps, and managed to graduate 107th in his class of 540. He spent the first five years after Annapolis serving on the destroyer the *USS La Vallette* and the battleship *Nevada*. In 1929, he earned a master's degree in electrical engineering from Columbia University, and then went to the Navy's submarine school.

Rickover got a taste of submarine life and submarine problems when he was assigned as an engineer on the *S-48*, an old submarine whose sister ships had either sunk or had explosions at sea. Not long after he came aboard, one of the *S-48's* main batteries caught fire, which could have caused a serious explosion. Rickover climbed into the hull wearing a gas mask and smothered the fire with blankets. Later, when the submarine's propulsion motors kept acting up, he redesigned and rebuilt them.

He had his only sea command assignment in 1937 on the *USS Finch*, a minesweeper. During World War II, he served as head of the Electrical Section of the Bureau of Ships and then as industrial manager in Okinawa, commanding the Naval Repair Base.

In 1946, Captain Rickover received orders to report to Oak Ridge, Tenn., to be trained in nuclear power and reactors. Oak Ridge was one of three main research sites of the Manhattan Project, the United States' secret program aimed at developing an atomic bomb before the Germans. There, he became convinced that submarines should run on nuclear power. The United States' military policy during the Cold War was deterrence through the threat of annihilation. Nuclear subs could provide that. At the time, submarines were propelled by fuel-burning diesel engines on the surface, and by batteries when submerged. The batteries were charged by the diesel engines, so these submarines had to resurface every few days for the diesel engines to get enough oxygen to recharge the batteries. A submarine powered by a nuclear reactor, on the other hand, could stay submerged for months at a time and thus remain invulnerable to attack. At first, the Navy was resistant to Rickover's ideas. It called him back to Washington and gave him an atomic energy advisory position. His office was a converted former women's restroom.

Anything but a quitter, Rickover pleaded his case for atomic submarines to the chief of naval operations, Admiral Chester W. Nimitz. A former submarine guy himself, Nimitz approved the idea, and Rickover became head of the new Nuclear Power Division Bureau of Ships. Just a couple of years later, the Atomic Energy Commission decided to create a Division of Reactor Development, which would have a branch for naval reactors. It hired Rickover to head the branch.

With both of these positions, Rickover now had real power. It has been reported that he even sometimes wrote letters on one letterhead to himself in his other position. (Any requests made in the letters were always approved.)

Working himself and his group at a merciless pace, Rickover took less than a decade to oversee the development of the first nuclear submarine. Initial sea trials began in 1954,

and on January 17, 1955, the *USS Nautilus* glided down the Thames River in Connecticut and blinked out the message, "Under way on nuclear power." The *Nautilus* traveled more than 62,000 miles and did not need refueling until 1957. During her 24 years of service, she needed refueling just three times. (The new Virginia-class nuclear submarines are expected to steam for their full service life without refueling at all.) She was the first submarine to pass under the North Pole's icecap. In 1960, the *Triton*, another nuclear submarine, became the first ship to circumnavigate the world totally submerged.

Despite his work during this time, in 1951, a Navy selection board passed over promoting Captain Rickover. He was passed over again the following year. Typically, being passed over twice forces an officer into retirement. But the second time, the press and the Senate Armed Services Committee objected, and another selection board convened, promoting him to rear admiral in 1953.

The reason the Navy gave for passing on Rickover's promotion was that he was too specialized to meet the qualifications of a flag office. But many believed that Rickover's caustic personality was the problem, plus the fact that he didn't act like a Navy man. He rarely wore his uniform, and he once bragged that he'd never had a book of Navy regulations in his office. And he suffered fools badly. As he said to Diane Sawyer on "60 Minutes" in 1984, "I never thought I was smart. I thought the people I dealt with were dumb. Including you."

Rickover personally interviewed every officer candidate applying for jobs aboard a nuclear submarine. The interviews were legendary. He made candidates sit in chairs with six inches sawed off the front legs, so they would feel out of balance. Then he tried to intimidate them to see how they would react under stress. *Newsweek* reported an incident in which Rickover told an applicant that if he really wanted the position, he would call his fiancée and call off the wedding. When the man picked up the phone, Rickover cursed at him for being spineless. The man did not get the job.

But his uncompromising demand for excellence also earned him admirers as well. The most famous one was President Jimmy Carter, who had served under him as a naval officer. Carter once said that Rickover had more influence on him than anyone except his parents. When junior officer Carter interviewed with Rickover, Rickover asked him how he'd performed at the Naval Academy, and Carter was pleased to say he'd graduated 29th out of 820. But when Rickover asked him if he'd done his best, and Carter said "not always," Rickover shot back, "Why not?" Hence the title of Carter's 1976 campaign autobiography, *Why Not the Best?*

Rickover was awarded two Congressional Gold Medals, one in 1958 and another in 1982, not only for his work in nuclear submarines but also for overseeing the development of the first large-scale civilian power station: a pressurized water reactor at Shippingport, Pa., which supplied electricity to Pittsburgh. In 1980, President Jimmy Carter presented Admiral Rickover with the Presidential Medal of Freedom, the country's highest non-military honor.

Admiral Rickover was also a huge advocate and critic of American education. He and his first wife, Ruth, spent countless hours researching and writing about the inadequacies of American schools. The admiral published three books about education reform in the late 1950s and early '60s. Three years before he died, he founded the Center for Excellence in Education, which sponsors the U.S. Biology Olympiad, a biology competition for U.S. high school students, and the Research Science Institute at MIT, a highly competitive summer program in math, the sciences, and engineering for approximately 75 select high school students, known as "Rickoids."

Rickover himself was not exempt from his own criticism. By the time he retired in 1982, the four-star admiral had become ambivalent about his role in the arms race. In his last appearance before Congress, he said, "I did it because it was necessary for the safety of this country" but also said he would "sink them all" if the Soviets would also disarm. He expressed his fear that the human race would destroy itself, not only from the use of weapons but also through the radiation that can result from nuclear power. "Some new species will come along," he added. "They may be wiser."

The Shippingport, Pa., power station developed by Admiral Rickover.

Listen Up!

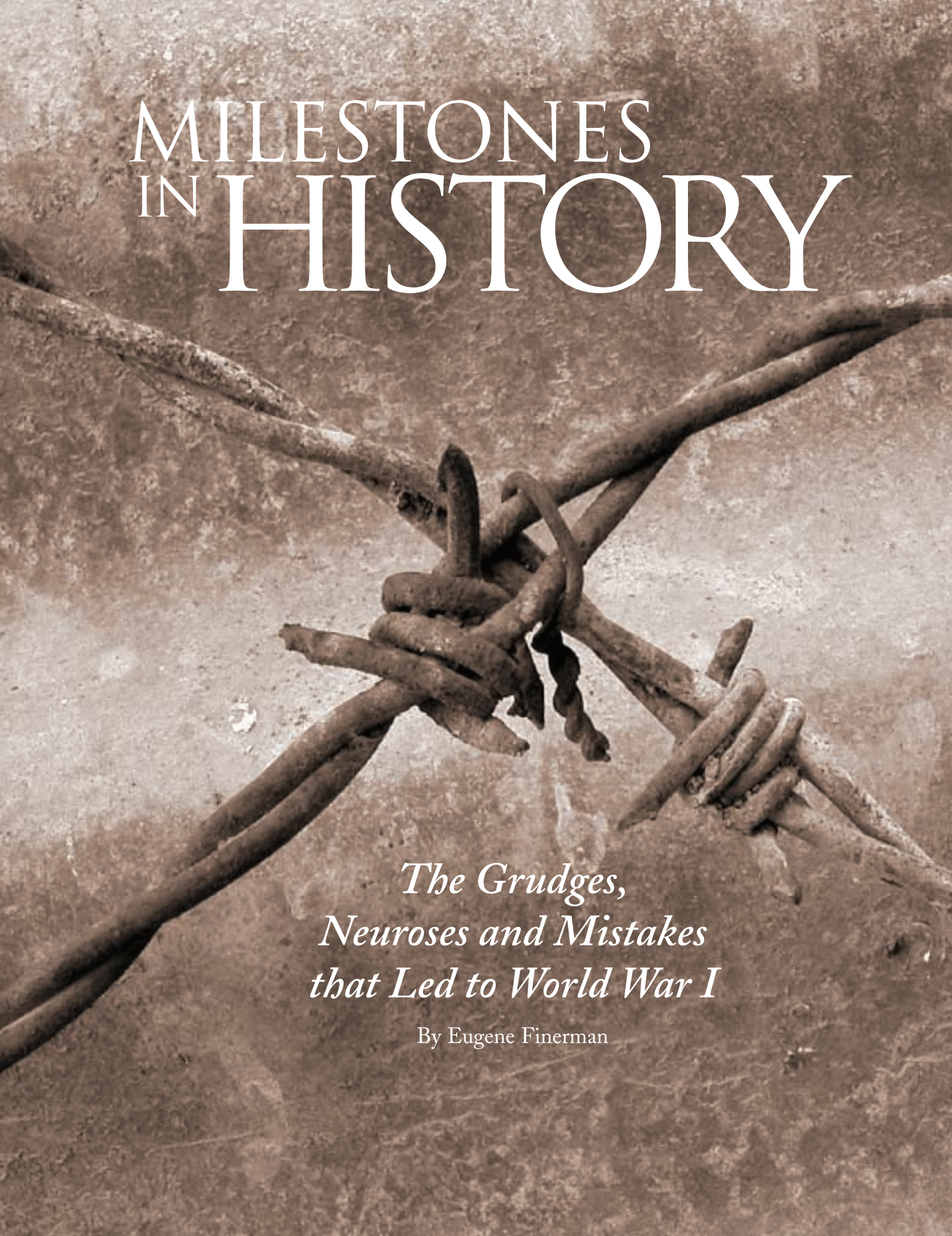
By Michael Josephson

R-E-S-P-E-C-T: Aretha Franklin taught us how to spell it. If we were lucky, our parents taught us what it means, and that it's a fundamental pillar of good character. Though we're not duty-bound to respect everyone in the sense that we hold them in high esteem, we are morally obligated to treat everyone with respect.

Often that means really listening to what others have to say. That means consciously hearing and actually considering what is being said. That's hard when we're not really interested or don't think much of the person talking or we are just waiting for our own turn to speak. The fact is that most of us don't listen very well, certainly not all the time and especially with the people closest to us. Kids are especially adept at tuning out their parents, but parents are equally skilled at ignoring or dismissing as foolish or irrelevant what their kids have to say.

The disrespectfulness of not listening is most apparent when we are being ignored or patronized by others. As when someone we are talking to rolls his eyes in a show of impatience or contempt, or fake interest is betrayed by a vacant stare or wandering eyes.

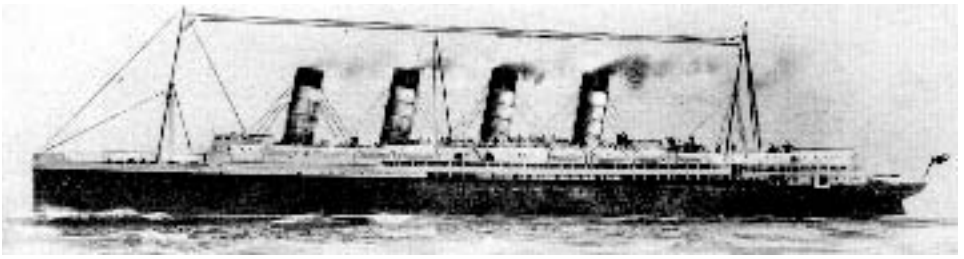
We all want to know that what we say and think matters. But if we want others to care about what we say, we need to show we care about what they say. Like all the important virtues, we teach respect best by demonstrating it. So listen up! It will make people feel better and you may even learn something.



MILESTONES IN HISTORY

The Grudges, Neuroses and Mistakes that Led to World War I

By Eugene Finerman



the Lusitania

The end of one war is often the start of the next. In 1871 the Franco-Prussian War ended. The French and Germans had fought over a matter of vanity: Who had the better army? The Germans decisively proved that they did. After six months of heroic futility, France sued for peace. Otto von Bismarck, the chancellor of Germany, demanded that France cede two of its eastern provinces, Alsace and Lorraine. A vanquished France could not refuse such exacting terms but would never forgive them. The cornerstone of French foreign policy now would be revenge. But against the world's best army, France would need allies. It took some 20 years to find them.

Most of Europe did not fear Germany. The more immediate danger to peace was Russia. The czar's empire extended from Germany to the Pacific Ocean, had twice the population of any other European country and was intent on further expansion. As the self-anointed champion of the Slavic Peoples, Russia vowed to free Bulgaria, Macedonia and Bosnia, part of the Balkans, from Turkey. In 1877, after a short but bloody war, Russia nearly achieved its goal. The territories were liberated, or at least had changed from Turkish rule to Russian domination.

The other great powers of Europe—Britain, Austria-Hungary and Germany—were alarmed by the prospect of Russian control of the Balkans. Forming a united front in 1878, they forced Russia to surrender most of its gains. Bulgaria's independence was acknowledged, but Macedonia was returned to Turkey. Bosnia's final status was undecided but would be administered by Austria-Hungary.

Austria-Hungary should have refused. Another province seething with ethnic unrest was the last thing needed in an empire churning with contending nationalities. A half-dozen Slavic peoples—Czechs, Slovaks, Croatians, Slovenes, Ukrainians and Poles—lived within Austria-Hungary and they all aspired to either self-rule or secession. With the addition of Bosnia, the dual monarchy now acquired the problem of Serbian nationalism. Russia encouraged the political agitation among its fellow Slavs. The cohesion of Austria-Hungary was fragile and, if it collapsed, Russia expected to acquire the Slavic fragments.

As a bulwark against Russian aggression, Austria-Hungary and Germany formed an alliance in 1879. The advantage for Austria-Hungary was obvious. Germany's army could intimidate even the Russian horde. For Germany, the alliance made a lasting friend of Austria-Hungary and created an understanding with Russia. Bismarck did not want to make any enemies—other than France. He personally pledged to Russia that the German-Austrian alliance was defensive in nature. Germany's power was meant to deter, not threaten.

This was Bismarck's policy, and it lasted as long as he did. For more than 20 years, the German chancellor and his emperor had a successful partnership: Kaiser Wilhelm reigned and Bismarck ruled. However, in 1888, the old kaiser died and the next Wilhelm—his grandson— was determined to rule for himself. The dismissed Bismarck thought that the success of his policies justified their continuation. The 29-year-old kaiser thought differently.

Wilhelm II ruled the richest, most powerful nation in Europe and he wanted Germany to have a commanding presence in the world. The new kaiser was boisterous, arrogant and rash, and new German foreign policy reflected his personality. He regarded Russia as a barbarian oaf that Germany could snub with impunity. As a further affront to Russia, Wilhelm began an alliance with the Ottoman Empire.

Confronted with this abrasive, threatening Germany, Russia now realized its need for an ally. Of course, France was more than eager; it loved the idea of Germany trapped and crushed between the two. Yet, such an alliance might have seemed impossible.

The two countries were the political opposites. In fact, it was illegal in Russia to play France's national anthem, "La Marseillaise." But the personality of Wilhelm II brought France and Russia together in 1892.

The kaiser also had a pathological jealousy of Britain. If his Germany was the greatest power in Europe, how could an island off Europe be the greatest power on Earth? Britain had the world's greatest navy; Germany had the world's best army. How could they even fight? Wilhelm thought of a way: the construction of a massive German navy. With its limited coastline, Germany did not need such a navy; but the kaiser's ego did. Britain could not ignore the rising challenge. By 1907, Britain had a pact with France and Russia.

READY TO FIGHT

Europe's grudges, ambitions and fears had blended into rival, glowering blocs. Germany, Austria and Ottoman Turkey formed one alliance; France, Russia and Britain opposed them. War was not inevitable, but everyone seemed eager for an excuse.

Serbia provided it. Allied to Russia, this small kingdom in the Balkans had a historic claim to the province of Bosnia. Hoping to incite a Bosnian uprising against Austria-Hungary, Serbia sheltered and armed rebels. Terrorism made Bosnia dangerous but the Archduke Franz Ferdinand, the heir to Austria-Hungary, would not be dissuaded from touring the province. On the morning of June 28, 1914, he and his wife survived one assassination attempt. That afternoon, they would not be so lucky. One gunman, Gavrilo Princip, killed them.

The Serbian government had no idea of the assassination plot but, by aiding terrorists, was still culpable. Austria-Hungary might have seemed perfectly justified in attacking Serbia, but the skein of alliances complicated the situation. A simple war between Austria-Hungary and Serbia was out of the question. Alliances had been formed; if one country went to war, they all went to war.

On July 28, Austria-Hungary declared war on Serbia. The next day, Russia responded. By Aug. 4, Europe was at war. From St. Petersburg to London, the public seemed overjoyed. The coming war seemed like a glorious parade, and everyone wanted to march along.

Since the Franco-Russian pact of 1892, Germany's general staff had prepared for a two-front war. Named for its chief architect, the Schlieffen Plan was a timetable for conquest. In 1870-71, the Germans had defeated the French in six months.

(Opposite page) A map of Europe before World War I changed its borders. U.S. soldiers in World War I were issued everything from first-aid kits to gas masks (left). Millions died in the war, many fighting in trenches (right).

Now, they planned to do it in six weeks. The Schlieffen strategy was to crush the French before the lumbering, underdeveloped Russia could train, supply and transport an army sufficient to attack Germany. To surprise and outflank the French, the plan's demanding schedule required Germany to invade Belgium. Britain guaranteed Belgium's sovereignty and would certainly go to war if Germany invaded. The Schlieffen Plan anticipated that, but also expected to win before a significant British army could be raised and transported to France.

Yet, for all its meticulous calculations, the Schlieffen Plan failed. With its command of the sea, Britain quickly transported 120,000 men to slow the German offensive. In the East, after only a month's preparation, the Russians launched an offensive and invaded Prussia. German troops had to be rushed to the Eastern Front. With unexpected obstacles and opposition, the sapped German offensive stalled. Both sides held their positions, digging in and creating a line of trenches that extended from Switzerland to the North Sea. A similar bloody stalemate developed on the Eastern Front.

Millions of men were sacrificed in a war of attrition. The tactics of war were reduced to a brutal choreography. One side would launch a full frontal assault against an array of machine guns. Then the other side would counter-attack using the same suicidal plan. And while Europe destroyed itself, America looked on.

Britain and France pleaded for help, and German brutality offered provocation for American intervention. In 1915, a German submarine sank the British ship *Lusitania*; of the 1,198 passengers who died; 128 were Americans. Yet, President Woodrow Wilson was not ready to bring America into the war. He faced a number of political obstacles. The country's many German-Americans were reluctant to see their new country fight their old one. Irish-Americans did not want to help Britain, the old enemy that was still occupying their ancestral isle. Acceding to this isolationist sentiment, Wilson successfully campaigned for re-election in 1916 on the slogan "He Kept Us Out of War."

Beyond these political factors, the scholarly Wilson had a philosophical reason for America's neutrality. He would not join any alliance with czarist Russia. Russia was a tyranny, oppressing and persecuting its subjects. By contrast, Germany and Austria-Hungary were enlightened and liberal. While the czar reigned, America would stay neutral.

But the czar fell in March 1917. In place of the monarchy was a provisional government committed to the principles of democracy.

Wilson now could commit America to the war. On April 2, 1917, he asked Congress for a declaration of war against Germany and its allies. The president proclaimed that the mission of this war was "to make the world safe for democracy." Ironically, Russia would soon be a tyranny again. Its liberal government was overthrown by the Communists in November 1917. The war had toppled the czar; and it toppled the provisional government. The Communists gained a following by their promise to withdraw Russia from the war.

Signing a treaty with the Communists, Germany had won on the Eastern Front; but it was too late to win the war. The first wave of a 2-million-man American Army broke the German resistance in 1918. In the Mideast, Allied victories had reduced the Ottoman Empire to the borders of Turkey. After four years of war, Austria-Hungary was disintegrating into ethnic fragments. The war was over.

Nine million men were dead and no one had really won. The victors were as demoralized as the defeated. The surviving countries were either enfeebled by loss or poisoned with rage. Contrary to Wilson's goals, the world had been made safe for Stalin and Hitler.

The end of one war is often the start of the next.

ST. PETERSBURG,

Explore a treasure trove for history buffs

by Greg Rienzi

If St. Petersburg listened to its billing, the northwestern Russian city might just suffer a calamitous identity crisis. The city, formerly known as Petrograd (1914-1924) and Leningrad (1924-1991), has been dubbed, among other names, the Venice of the North, the city of 300 bridges, the city of palaces, the outdoor museum of Neoclassicism (for those so inclined) and the fortress city.

It owes the latter moniker to the city's oldest building, the Peter and Paul Fortress, built in 1703 by Peter the Great, the city's creator who wished it to be his "window on Europe." The northernmost major city in the world, St. Petersburg is located on the delta of the Neva River and eastern tip of the Baltic Sea.

RUSSIA

No trip to the city would be complete without a visit to the Russian Museum and the Hermitage, Russia's answer to the Louvre.

St. Petersburg's Church of Our Saviour on the Spilled Blood is one of the city's most famous icons. The Alexander Column (right), in the center of Palace Square, is 155 feet 8 inches tall and weighs 600 tons. It was erected in under two hours without the use of modern cranes.

Today, the former capital is Russia's second largest city (population 4.7 million) and is considered the country's cultural heart. No wonder, as it boasts not just the nation's, but some of the world's greatest museums and art venues.

No trip to the city would be complete without a visit to the Russian Museum and the Hermitage, Russia's answer to the Louvre. Founded in 1764 by Empress Catherine II (later Catherine the Great) as a museum for the royal court, the Hermitage is home to, among other items, a nearly unmatched gold collection and thousands of sculptures, antiquities, drawings and paintings, including the works of such masters as da Vinci, Raphael, Rembrandt and Monet.

The city's most striking features are its green spaces (it has more than 200 parks and gardens), vast open courtyards, long and straight boulevards and its canals, hence both the Venice and bridge associations. It's actually built over 90 waterways and 42 islands, connected by more than 300 bridges. Katya Chilingiri, a photographer born and raised in St. Petersburg who now lives in the United States, said that perhaps the best, and most romantic, way to take in the city is by boat tour. "But stick to the small canals," she warns, unless you bring along some Dramamine.

Chilingiri says that the city illuminates at night unlike any other. It's hard not to be transfixed, she says, by the lights on the bridges or those that cascade down the facades of the city's many palaces, museums, churches and other architectural gems, built predominantly in the 18th and 19th centuries by Russia's elite.

One of the most popular attractions for sightseers is the Church of Our Saviour on the Spilled Blood, the multicolored, onion-domed church built on the spot where Emperor Alexander II was assassinated in 1881.

Visitors to the city might notice an almost split personality caused by the juxtaposition of St. Petersburg's Russian heritage and European leanings. Echoes of this can be found in the architecture, which, depending on the alley you turn down,

When to go: May to July during the "White Nights." The city stays up around the clock thanks to the twilight during these months. To avoid crowds, early fall is good. For those who can brave winter's chilling temperatures (average of 18 degrees Fahrenheit, minus 8 degrees Celsius), the city in December and January becomes a fairytale setting with frozen-over canals, glittering palaces, snow-blanketed parks and a town literally aglow.

What to do: When you're done with the museums and palaces (be sure to check out the Winter Palace, Peterhof, and Yusupov's Palace), head to Nevsky Prospect, St. Petersburg's lively main street and a prime place for shopping, entertainment and night life. Speaking of night life, a popular spot is Purga, where it's New Year's every night and it's never the same twice. When you're ready to eat, a good destination is Brodyachaya Sobaka, translated "Stray Dog," a literary landmark that features a large selection of Russian and European cuisine. Can't spend enough money? Go to Gostiny Dvor, the huge (165,000-square-foot) department store, one of the world's first.

Where to stay: The Corinthia Nevskij Palace Hotel (downtown) and the Grand Hotel Europe, a world-class luxury hotel in the center of the city. Even if you don't stay there, stop by its gorgeously appointed Lobby Bar, known by locals and tourists as the best place in town for a nightcap.

The people: Using a little Russian can go a long way with the city's residents, who are generally open and hospitable. But don't be put off by the lack of smiles, city native Katya Chilingiri says. "People might take this as a sign that people there aren't friendly or don't want to talk to you, but there is just no tradition to say 'hi,' smile and ask how you are, like there is in other countries. It's not unfriendliness, it's a sign of a serious people."

St. Petersburg's brightly colored buildings are a sharp contrast to most other Russian cities.

can make you think you're in Vienna, Venice or Moscow. What you won't find are many Lenin statues anymore, most of which came down in the 1990s. Yet symbols of the city's industrial and Soviet past can still be found everywhere.

History buffs will find plenty to discover in St. Petersburg, whether it's Decembrist Square, named after the armed revolt held there on December 14, 1825, or the city's many statues and monuments, the most instantly recognizable of which is the equestrian statue of Peter the Great. Those with a keen historical eye might catch the small blue signs, decorated by flowers, on the side of buildings that honor the nearly 1 million who died during the 29-month siege of the city by the German army during World War II.

The city is also the birthplace of many famous Russians, including Anton Chekhov. Aleksandr Pushkin, Piotr Tchaikovsky, Fyodor Dostoyevsky and, of more recent vintage, Russian President Vladimir Putin.

Blair A. Ruble, director of the Kennan Institute (covering Russia and surrounding states) in Washington, D.C., says that St. Petersburg has earned its reputation as one of the great cities of Europe and the world. Ruble says that those who visit might be surprised to find an active and eclectic music scene (jazz, classical, rock, etc.) and a certain magical energy in the air. "The city feels like it should be haunted," he says.

Ruble recommends trips to the Russian Museum and the Mariinsky Opera and Ballet Theater. Whatever you do, he adds, try to get from point A to point B by foot.

"It's one of the greatest cities to walk in," he says. "Whenever I go, I can just spend a whole day walking up and down the canals."

What's in a Name?

The city of St. Petersburg has a storied history and a series of different names.

1703 City of St. Petersburg founded.

1712 Decree issued ordering people to move to St. Petersburg from across Russia.

1724 Peter the Great moves state institutions to St. Petersburg and it becomes official capital of Russia.

1812 Large memorials are erected to mark victory over Napoleon.

1824 City seriously damaged in floods.

1914 Beginning of World War I, St. Petersburg's name changed to the more Russian-sounding Petrograd.

1924 Death of Lenin. Petrograd renamed Leningrad in his honor.

1965 Leningrad named City of Valor.

1991 Attempted coup against Mikhail Gorbachev hastens end of U.S.S.R. Leningrad is renamed St. Petersburg after referendum.

Travel Tips From a Local

St. Petersburg is dense with history, says Jeff Jones. You can't escape it, nor would you want to.

Jones, who is general manager of Dixon Russia and moved to the city with his family in April 2006 to help develop a Russian market for the company, says he still gets excited as he roams through Kolomna (Dostoyevsky's neighborhood and the setting for *Crime and Punishment*) and Palace Square, the city's main square that is dominated by the famous Alexander Column, a 155-foot-tall monument to the Russian military victory over Napoleon's France, and the sprawling Winter Palace, home to the Hermitage.

In the winter, be sure to wear gloves and a hat on these strolls, he says, as it's predictably bitter. The city's rivers and canals freeze this time of year and the temperature, even on an unseasonably warm day in January, will only creep up to the high 30s. Beyond the cold conditions, the lack of daylight also will take some time adjusting to.

"It's dark and gloomy [during the winter], but there is a unique charm to it," he says.

In contrast, the city's mood transforms completely during the summer's "White Nights," when everything and everybody moves outside. Visitors who come between late May to early July can expect an abundance of parades and festivals, he says. Nevsky Prospect, the city's main thoroughfare, in particular radiates a party atmosphere and thousands descend upon the area daily to eat and drink on restaurant patios.

Cruising the Neva River and the city's canals during White Nights is a must, Jones says. So, too, is marveling at the dozens of palaces the city has to offer, many of which have retained their original grandeur and are open to the public.

Jones cautions that St. Petersburg is not all palaces, museums and theaters, however. Fishing is great in the warmer months, he says, and the local soccer team, FC Zenit, provides great entertainment and has a rabid following. To get a sense of the citizens' attachment, the team's nickname is "bomzhi" (bums or hobos), referring to the fans' willingness to travel long distances for away matches and sleep in railway stations if need be.

Summer also draws both locals and visitors to the shore. Jones said there are a bevy of small, worthwhile towns to visit along the Gulf of Finland. He suggests Repino (45 minutes from downtown), named after the great Russian realist painter. It has a sandy beach and several outdoor cafes offering freshly grilled shashlik (Russian shish kebob) and cold Baltika beer, the local favorite.

Closer to the city's center is Krestovsky Island, located only about 15 minutes away by car. The popular island sports several quality oceanfront restaurants and bars, even one (Russia Rybalka) that allows you to catch your own fish, which is grilled on site. Jones's favorite island destination is a German beer restaurant called Karl and Frederich.

"It has lots of outdoor seating, good home-cooked meals and they brew their own beer," he says. It's family friendly, too, complete with petting zoo.

A Dangerous Double-Edged Sword

Steam has been used for centuries in both industry and households, but when misused, it can be deadly

By Phil Kimble

Steam bath. Steamed vegetables. Steamed clams. When most of us think of steam, we think of the household uses for the vapor that rises from water when it begins to boil. But harnessing the power of steam has been useful in more than just the kitchen. It has been a catalyst for the growth and development of civilizations around the globe.

The invention of the steam engine was the driving force behind the Industrial Revolution. Steam energy is the main form of propulsion found on large ocean-going vessels. It has also been used to lift heavy objects during the construction of ships, as well as to drive the pilings into the riverbed to build a wharf where that same ship would dock.

In factories, steam is used to process foods, and clean and sanitize workstations; it also heats buildings, supplies hot water, and serves a myriad of other purposes. When handled properly and safely, steam is a most efficient form of energy. When mishandled, the results are often disastrous and sometimes deadly.

Steam is a double-edged sword.

It is a compressible product that, when suddenly released, does so in an explosive, and often destructive, manner. It is also extremely hot. Steam at 250 psi is 406 degrees Fahrenheit (208 degrees Celsius). You can fry an egg at about half that.

Any process involving steam in the workplace has the potential for danger. Anyone working with or around steam should have the proper safety gear, adequate training and the correct products to perform the task. Quality industrial hose and coupling manufacturers are very specific about the products they recommend for steam service. Because of the inherent dangers of steam, the product lines offered by hose and coupling manufacturers are very limited. For example, out of hundreds of product lines that Dixon carries, only seven are recommended for steam service and three of them have been around since the 1920s!

Many industrial accidents involving steam are a result of using hose or couplings that are not designed for the dangers that steam presents. Everyday assemblies utilizing products that are not recommended for the rigors of steam are pressed into steam service. Every time one of these assemblies is used without incident is like winning the lottery. The question to ask is: "How long do you think your luck will hold out?" When one of those assemblies fails, and it will fail, anyone or anything within its scope will get fried like an egg. For safety's sake, only use quality hose and couplings that are designed and recommended for the intended product and application.

WHAT TO LOOK FOR

Air Chief Fittings:

- Also known as Quick Connects / Disconnects
- Primary use is connecting pneumatic tools to hose
- Available in brass, steel and stainless steel
- Attaches as a threaded connection or to hose with ferrules, pinch-on clamps, or band clamps
- Universal coupler available in some sizes
- Look for these features:

Spinning Your Wheels to Get in Shape

By Sue De Pasquale

Think back to the fun times you had as a child, and chances are you'll remember your first bike: pedaling as fast as your little legs could pump as the wind rushed past your face. For most of us, that long-awaited "two-wheeler" represented our first taste of independence.

Now, as adults, we can recapture that heady feeling—and get in shape at the same time. Whatever your age and fitness level, cycling offers a superb cardiovascular workout and strengthens your lower body, notes cycling enthusiast Barbara Bushman, a health and physical education professor at Missouri State University. Today, more than 9 million Americans are active in cycling, making it the fastest growing amateur participation and spectator sport, according to USA Cycling. And around the world, cyclists are taking to the roads in record numbers "to discover the joys of exploration, alone or as a family," reports the International Cycling Union (UCI), which promotes the sport in every country and at all levels.

If you haven't taken a spin in a while, chances are you'll want to invest in a new bike. Bushman recommends starting with a hybrid-style bike, suitable for riding on both pavement and trails, rather than the more aerodynamic road bike with dropped handlebars. "The hybrid has handlebars out to the side and a slightly wider seat. It's a little more comfortable — great for trails or to buzz around town," says Bushman, a fellow of the American College of Sports Medicine.

The good news? "You don't need to go out and buy a $3,000 bike." But, she emphasizes, "getting the right size bike is pivotal." Your best bet: Visit a specialty bike shop, where the clerks are experienced in helping new riders get the best fit. (For a listing of bike shops, clubs, instructors and events in your area, visit the Web site of the League of American Bicyclists at: www.bikeleague.org.)

Proper adjustment of the handlebars and seat height is paramount. Rule of thumb: Strive for a comfortable reach to the handlebars ("You don't want to be bunched up," says Bushman) and a 5 percent bend in your leg at the bottom of the pedal stroke.

"Don't go shopping in your dress clothes—go ready to bike. Hop from bike to bike in the store. You really want to try them out," Bushman advises.

While you're at the store, be sure to stock up on other key pieces of equipment:

- **a helmet**
- **a water bottle or water pack (which can be worn on your back with a tube that extends to your mouth, leaving your hands free to remain on the handlebars).**
- **cycling gloves**
- **pedal "cages," which attach to the pedal and go over the front of the foot, allowing you to pull up—as well as push down—giving you more power.**
- **cycling shorts or pants to reduce chafing (for those who don't like spandex, newer styles look like "regular" pants but have a padded insert).**

Once you're equipped, you're ready to hit the road or trail. Start modestly, with rides of 15 or 20 minutes, says Bushman, even if you're someone who walks or jogs regularly. "You're using your muscles in a different way," she points out. "It's much better to start out slowly and feel like you could have done more than to head out too far and realize: 'Oh no, I have to come back!' That can be very discouraging."

Initially, pick paths as level as possible, then gradually work in some small hills. Remember: Even a small incline can feel huge when you're riding a bike. Eventually work up to rides of an hour or more, several times a week.

While riding outdoors can be exhilarating, providing a chance to forge new friendships (by joining a cycling club) and explore new areas (visit UCI's Web site at www.uci.ch to find non-competitive events around the world), cycling indoors has one major advantage: convenience. In rain, sleet or snow, "you can roll out of your bed in the morning, pedal while you watch the news, and you've got a great workout in," says Bushman.

When purchasing a stationary bike, look for one that's sturdy and offers varying resistance levels. Or, if you love your road bike, opt for a "trainer"—a fluid- or magnetic-based device that clamps to the back wheel and provides resistance. These are available for much less than a stationary bike, Bushman says.

The Helicopter

Early visions of a 'flying screw' led to the ubiquitous bird that zips through our skies.

By Sue De Pasquale

Though it wasn't until the late 1930s that the design of the modern helicopter was perfected, the idea behind it was one of the earliest ideas for achieving flight, historians say, originating nearly 2,000 years before the concept for fixed-wing aircraft. "Inspired by the flight of birds, even ancient humans dreamed of soaring at high speeds, stopping on a dime, and hovering in place, much like a hummingbird or dragonfly," notes aeronautical engineer Doug Jackson, an expert in aircraft survivability.

The earliest prototype for the helicopter—originating from the Greek words elikoeioas (helical or spiral) and pteron (wing or feather)—may have been the Chinese Top, a propeller attached to a stick, which children rubbed vigorously between their hands to send soaring. In the early 1500s, inventor and artist Leonardo da Vinci penned beautiful drawings of a "flying screw," a concept that would inspire thinkers over the next three centuries. What da Vinci and the others lacked, in addition to a true understanding of vertical lift, was an adequate engine.

Historians credit Spaniard Juan de La Cierva with creating the precursor to the helicopter, an aircraft he called the "autogiro." It relied on a powered propeller to send air upward to an unpowered rotor, giving the rotor life for takeoff. Because it allowed for shorter takeoffs and landings than fixed-wing aircraft, the autogiro was appealing to the military—witness the U.S.S.R.'s powerful front-line warplane, the TsAGI A-7, fully in use by the mid-1930s.

The helicopter was trickier to perfect, because it required the engine to be permanently connected to the rotor system. Though the French and Germans had some limited success in developing rotor-driven crafts that stayed aloft, it was aircraft pioneer Igor Sikorsky who produced the first commercially viable helicopter.

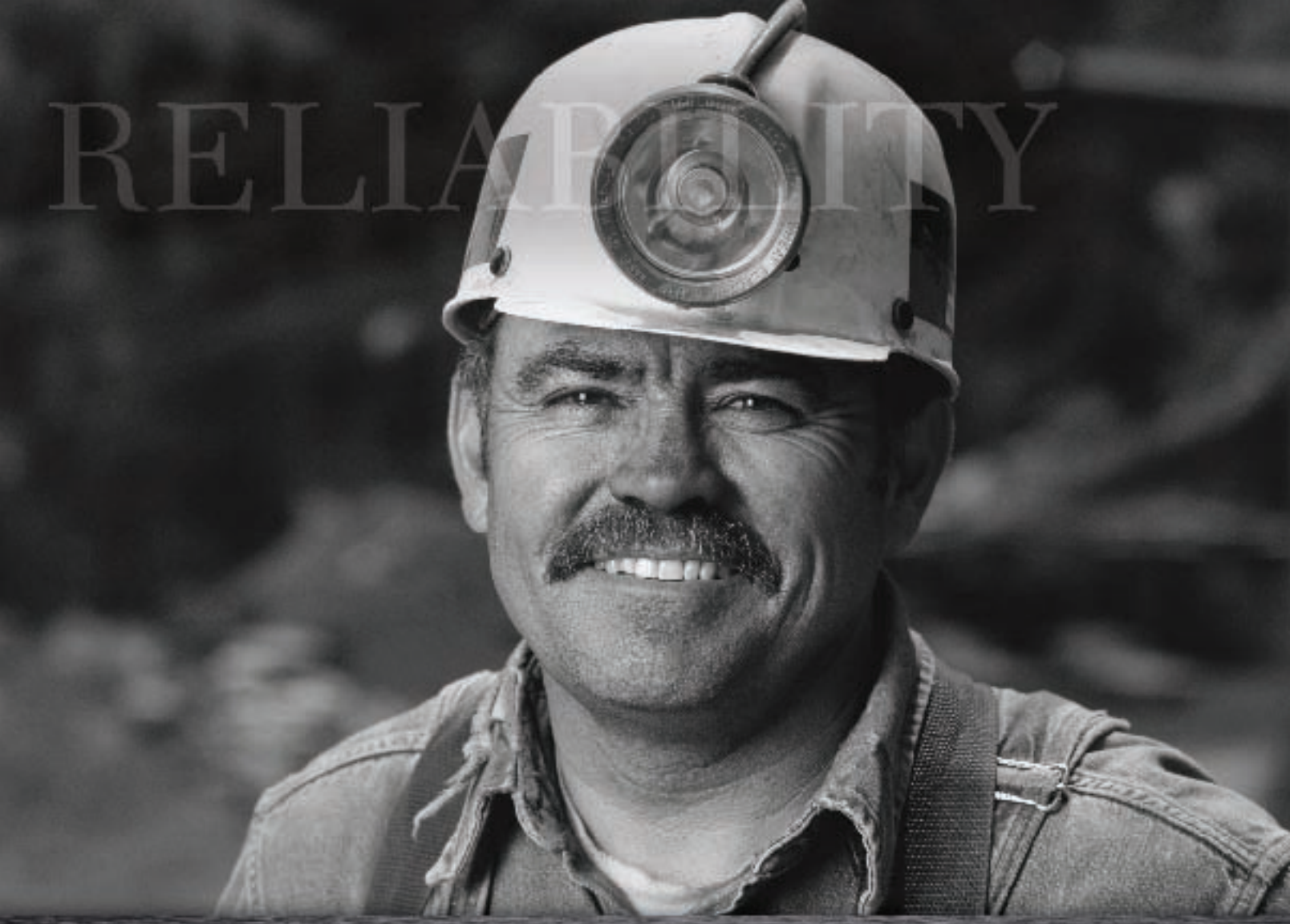
In his design, Sikorsky, who was Russian-born but became a U.S. citizen in 1928, used one main "screw" or rotor atop the craft, and a small tail rotor to counteract the torque produced by the main rotor—an innovation that solved the last major hurdle in making helicopter flight practical. Sikorsky spent more than a decade experimenting with 19 configurations before ultimately settling on the R-4, which quickly garnered military contracts and went into large-scale production in 1943.

During this decade, American Larry Bell also saw great commercial success with his light observation helicopter—immediately recognizable by the round Plexiglas bubble on the front. (Bell would go on to create the UH-1, made famous during the Vietnam War as "the Huey.")

The advent of the turbo shaft engine, first used in the Kaman K-225 in 1951, meant a new age for helicopters. It offered more power for less weight than gas-fueled engines, used cheaper fuel (kerosene rather than gas), eliminated the need for engine-cooling fans, and made it newly possible to move the copter's critical parts to the top of the craft, leaving the fuselage free for the cockpit and payload. Soviet designer Mikhail Mil capitalized on this opportunity with his gargantuan Mi-6, unveiled in September 1957, which offered space for 90 passengers or 12 tons of cargo.

In the decades since, the helicopter has become an increasingly common sight in skies around the world. Its unparalleled ability to take off and land vertically, and to hover over a point on the ground, make it the only choice for many challenging missions; from search and rescue in remote areas; to hospital "medevac" in busy cities; to the movement of military troops and supplies over difficult terrain.

"As the political climate of our world continues to change and military conflicts approach the small-scale urban warfare of recent years," predicts Jackson, "the importance of the helicopter will continue to grow."



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