

An Integrated Curriculum For The Washington Post Newspaper In Education Program

Making Money



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Crane's money maker

BY YLAN Q. MUI

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The story of how a family-run company became the linchpin of currency in America — and increasingly the world — is steeped in the lore of the midnight ride of Paul Revere.

The legendary patriot stabled his horses at the Massachusetts paper mill run by Thomas Crane, a staunch supporter of independence from Britain. So it was only fitting that Revere turned to him for a way to assure colonists taking up arms in the American Revolution that they would be paid.

Crane accepted the challenge and crafted bills of credit for the soldiers that bore the motto “Issued in defence of American Liberty” — giving birth to what is now a multibillion-dollar global industry.

For seven generations, the Crane family and its eponymous company have been the sole supplier of the special blend of linen-and-cotton paper that gives U.S. money its distinct feel. Repeated attempts by competitors to dethrone Crane have failed. It has survived attacks by counterfeiters, coins and credit cards.

Now, this all-American company is undergoing a revolution of its own, fighting to make its name in the multibillion-dollar market

for manufacturing currency. It has 1,400 employees and has made its international headquarters in Sweden. It supplies paper to Mexico and Thailand, prints bank notes for Tanzania and sells high-tech 3-D security features to South Korea and Lebanon — making it one of the fastest-growing players in the insular and intensely competitive business of making money by making money.

“In order to survive, we had to become global, and we had to become a technology leader,” said Lanse Crane, former chief executive and sixth-generation family member. “That’s where there was opportunity, and that’s where at the end of the day we really staked our future.”

A rise and fall

Crane enjoyed its golden era in the decades after World War II.

The company’s heavy-weight cotton paper dominated markets that demanded high-quality material. Architects used its drafting paper to draw blueprints. Wall Street turned to Crane for stock certificates. Businesses bought carbon copy paper and official letterhead. Even Queen Elizabeth II used it to send dispatches.

At that time, Crane employed roughly 1,000 people and operated six mills along the banks of the Housatonic River, whose headwaters lay in the Berkshire Mountains, not far from Crane’s

headquarters. Currency paper was a small but stable part of the company’s business. It didn’t make much money, but it was a tremendous source of pride for the family.

Though Thomas Crane made history by printing the first colonial currency in Massachusetts, the enterprise did not blossom until a century later when the United States moved to a single system of paper money and put out a call for suppliers. Twenty-six-year-old Murray Crane traveled to Washington with a mission to win that business — and unknowingly laid the foundation for the company’s future.

“It had to be huge,” said Peter Hopkins, a consultant to Crane and its de facto historian. “It was a big, big deal.”

Crane never let go of its early lead in the currency business and vigorously defended its monopoly. As the process grew increasingly specialized, it became harder for other companies to enter the market. U.S. money is now printed on a blend of 75 percent cotton and 25 percent linen that once relied on scraps from the denim industry.

The paper is crafted to ensure the surface stays smooth and the material is durable. A normal sheet of paper can be folded 400 times before it breaks; a dollar bill must withstand at least 8,000 folds.

International powerhouses such as De La Rue in England and

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Giesecke & Devrient in Germany began eyeing the United States in the 1980s. Improved technology was enabling counterfeiters, and the foreign companies promised enhanced security features that threatened to outpace Crane's capabilities. Lawmakers questioned the company's long-standing monopoly, leading to congressional hearings and federal investigations.

A 1987 law sponsored by longtime U.S. Rep. Silvio Conte protected Crane. Its headquarters lay within his Massachusetts district, and he counted the family among his close friends. The legislation prevented companies with foreign ownership from supplying paper for U.S. currency and also limited any contracts to four years, making the bids less attractive to domestic competitors.

"We don't take that relationship ever for granted," said Stephen DeFalco, Crane's current chief executive. "We're every day trying to rewin that business."

The contract was a lifeline for Crane by the 1990s. Technology was eroding its other businesses: Copy machines made carbon paper obsolete. Computer design software replaced blueprint paper. Company letterhead and stock certificates were going electronic.

By the time Lanse Crane took over in 1995, revenues were down as much as 50 percent, and profit margins were shrinking. Currency was Crane's last hope — but it would still require reinvention.

Expanding their market

To do a better job at home, Crane looked abroad.

Currency production is a niche industry, partly because of the inherent security issues and partly because it's essentially a zero-sum market. There are a limited number of countries and currencies, so winning new business almost always means displacing someone else.

Rick Haycock, president of Currency Research, which develops industry conferences, estimated between 130 billion and 160 billion bank notes are printed across the world each year.

Many governments handle the process themselves. Some places, such as Australia, not only manufacture their own money but also print other countries' currencies as well — turning them into yet another source of competition. Commercial production accounts for about 15 to 20 percent of currency production, Haycock estimated, but the share is growing as security demands increasingly high-tech products. He estimates the revenue of commercial printers and suppliers is between \$5 billion and \$7 billion.

"The technology of a bank note has actually changed quite dramatically and quite significantly over the past 20 years," he said. "The cost of keeping up with that has also been quite significant."

Lanse Crane spent more than a year traveling the world to find

an opening for the beleaguered company. The opportunity emerged in 2001 when Sweden's Riksbank decided it could no longer handle its own currency production. Officials arrived to scope out Crane's suburban Massachusetts headquarters on Sept. 10 — and wound up staying for nearly a week after the terrorist attacks grounded air travel. But the time provided the Swedish central bankers and the Crane family a chance to bond, and the trip ended with an agreement that gave the company entry to the world stage.

The deal turned Crane from a family papermaker into a global printing press. In the States, Crane was responsible only for making currency paper. The contract with Sweden required Crane to both manufacture and print the kronor — and not just for Sweden, but also for a portfolio of other countries that used the printing facilities at Tumba Bruk.

"It's a manufacturing business," Lanse Crane said. "You want to be able to run that machine around the clock. That's where you get your efficiencies."

Currency has now grown to 80 percent of Crane's business with 50 countries, though the company doesn't release revenue figures. It remains the sole supplier of currency paper domestically but is still a small player internationally. Since Crane is privately held, it does not disclose revenue figures, but Haycock estimated its market

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share at about 2 or 3 percent. “What we could provide up to that point was trust, reliability, consistent quality.... But the demands were changing,” said Lanse Crane, who began wearing both the American and Swedish flags on his lapel after the acquisition. “We had to raise our game to be a world-class supplier.”

Necessary changes

Taking Crane international transformed not only the company’s business model, but its culture as well.

There were complicated tax implications, at home and abroad. The Swedish printing plant was unionized, presenting a new labor challenge. Working within the European Union required new governance and operational strategies.

And after generations in the business, some members of the Crane family were ready to cash out. The pipeline to lead the company was dwindling as the Cranes perused other fields, such as wildlife conservation and cross-country ski racing, instead of paper-making.

Lanse Crane realized that the final step in the company’s revolution was to hand over the reins.

“For me, sitting in the CEO’s chair, I could see that the business needed it,” he said.

Lanse began scouting for outside investors, and his successor, Charlie

Kittredge, finished the process. In 2008, after a quarter-century of family ownership, private-equity firm Lindsey Goldberg acquired a 49 percent stake in the company for an undisclosed sum. Kittredge remained on the board of directors, which now consists of family members, representatives from Lindsey Goldberg and outsiders.

Since then, the company has had to defend itself from both old-school and high-tech threats. It successfully fought several efforts to replace the dollar bill with a \$1 coin, including a lobbying effort dubbed “Americans for George.” Recently, the Federal Reserve issued a report that deemed the dollar bill “currently the more efficient payment instrument compared with the \$1 coin.”

Meanwhile, the company used cash from the buyout to invest in cutting-edge technology that it hopes will spark another revolution in currency: three-dimensional money.

Crane acquired two Georgia laboratories that create microscopic lenses. When combined, the lenses create the illusion of 3-D movement on static surfaces that is tough for counterfeiters to replicate. The company debuted the technology in Sweden with a strip in the center of the bill embedded with images of a crown and the denomination that appear to move when the bank note is tilted. After several delays, the

motion strips appeared stateside on the newly designed \$100 bill this fall.

“You don’t stay in business for over 200 years by ignoring trends,” DeFalco said. “This was like Star Wars versus the stuff they had been doing.”

DeFalco took the helm of Crane in 2011, the first person outside the family to hold that position. Though he had little experience in currency production, DeFalco had been an executive at several medical technology firms and experienced firsthand the rapid pace of innovation.

Since his arrival, the company has moved into manufacturing technical materials from products other than cotton that are used in energy, water and environmental filtration. This year, it doubled the size of its “nonwoven” production facility and the number of employees. Though the division is still just a sliver of Crane’s overall business, it is growing fast — much like the currency did back in the 1800s.

“There’s this kind of picture of Crane: It’s an old family-owned company, always gets the contract,” DeFalco said. “There’s another part of Crane, which is probably a more modern version, that says a company that came from family values and believes in customer service, has reinvented itself.”

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Denim scraps to dollars

It has long been said that fashion comes at a price, but who knew that it would claim our entire monetary system?

Since American money was consolidated into a single system of currency in the late 1800s, U.S. dollars have been printed on a unique cotton blend paper. That paper has been supplied by a single company, Crane, for more than a century. And Crane relied on scraps of denim sold in bulk by the garment industry for its cotton.

The company bleached and processed the unwanted fabric, then rewove the fibers into the George Washingtons and Benjamins that graced our wallets. About 30 percent of Crane's cotton came from leftover denim, making it one of the largest single source of the fibers, according to Jerry Rudd, managing director of global sourcing. The rest of the cotton came from a hodgepodge of other textile wastes.

But something strange began to happen in the 1990s: Denim became tainted.

The stretchy fabric commonly known as spandex (and trademarked as Lycra) had been invented in the 1960s for use in women's lingerie. By the 1990s, the fashion world had discovered that blending it with denim created a curve-hugging — and yet still forgiving — fit. It never looked back.

"Everybody's into it. Denim and lycra are all over," Rudd said. "It's just incredible what's happened to the industry."

The trend was bad news for Crane. Even a single fiber of spandex can ruin a batch of currency paper, degrading the strength of the material. But separating the spandex from the cotton would



CRANE MUSEUM

Crane enjoyed its golden era in the decades after World War II. Shown here is a rag room staffed by women left at home during WWII while their men went off to fight.

be a Herculean task, Rudd said. By the early 2000s, almost every pair of jeans contained at least a hint of stretch — rendering them useless to Crane.

"There's no denim products out there that we can find that's basically not contaminated," Rudd said.

Crane had to adapt. Instead of using cotton from denim, the company now looks "beyond the waste stream," Rudd said, to "the natural fiber itself." In other words, they buy cotton straight from the source and leave the world of fashion to its own devices.

"It's a sign of the times," Rudd said.

— *Ylan Q. Mui*

Fine Cotton Paper for Dollars, Bahts and Wons

In “Crane’s money maker” *Post* Business reporter Ylan Q. Mui tells the story of the Crane paper company, a family-owned, all-American business. Thomas Crane began the business in Massachusetts before the American Revolution.



CRANE MUSEUM

In this 1891 photo, currency is being shipped from the Crane paper mill in Dalton, Mass. For seven generations, the Crane family and its eponymous company have been the sole supplier of the special blend of linen-and-cotton paper that gives U.S. money its distinct feel.

IN THE KNOW

Acquisition
Adapt
Bank note
Beleagured
Buy out
Certificate
Coin
Counterfeit
Currency
De facto
Degrading
Domestic
Durable
Embedded
Eponymous
Erode
Herculean
Insular
Legislator
Monopoly
Niche
Obsolete
Portfolio
Production
Profit margin
Revenue
Security
Zero-sum market

1. Paul Revere knew Thomas Crane. In what ways did they support each other and American independence?
2. How many companies supply paper for the Bureau of Engraving and Printing?
3. Crane expanded its business with international headquarters in Sweden. What product does it supply the following countries:
 - a. Lebanon
 - b. Mexico
 - c. South Korea
 - d. Tanzania
 - e. Thailand
4. What makes Crane paper right for the printing of money?
5. What other products did Crane paper produce?
6. What political move by a Massachusetts congressman saved Crane paper’s monopoly on printing American money?
7. In what ways did technology threaten the company’s profits and existence?
8. Summarize the change of Crane from a family papermaker to a global printing press.
9. What were the most recent changes in the family-owned business?
10. Read the sidebar article, “Denim scraps to dollars.” Explain how denim moved from “in” to “out” in the manufacture of paper.

ABC's of U.S. Paper Currency

Federal Reserve notes comprise 99 percent of U.S. paper currency in circulation. The Federal Reserve Board issues \$1, \$2, \$5, \$10, \$20, \$50, and \$100 notes. They are printed at the Bureau of Engraving and Printing.



FEDERAL RESERVE BANK OF ATLANTA

Anti-counterfeiting Feature

The Federal Reserve, U.S. Department of the Treasury, U.S. Bureau of Engraving and Printing, and the U.S. Secret Service partner to redesign currency to incorporate the latest security devices. In October 2013, the Federal Reserve released the most recent U.S. \$100 note. It has a blue 3-D security ribbon with images of bells and 100s and a color-changing bell in an inkwell. "The new design incorporates security features that make it easier said Federal Reserve Board Governor Jerome H. Powell.

Back

The reverse side of a note. The face is considered the front side.

Denomination

The monetary value of the currency. This amount is found both as a numeral and a word on the currency. Beginning July 14, 1969, the \$500, \$1,000, \$5,000 and \$10,000 denominations were withdrawn from circulation.

Face

The side that is considered the front of the note.

Great Seal of the United States

Approved in 1782, the Great Seal of the United States appears on the back of the one dollar bill. Its features reveal the values of the new nation.

Legal Promise

"This note is legal tender for all debts, public and private" is a legal statement. The Federal Reserve Banks that issue the bank notes state that the paper currency is good for the denomination indicated.

Paper and Ink

The distinct paper used for printing U.S. paper currency is made by Crane Paper Company. It is composed of 75% cotton and 25% linen. All bills use green ink on the backs. On the face, specially formulated black ink and specific colored inks are used.

Portrait

The individual who is featured on a particular denomination. The Secretary of the Treasury is responsible for the prescribed portrait and back design. You are not likely to see portraits of McKinley (\$500), Cleveland (\$1,000), Madison (\$5,000) or Chase (\$10,000).

Seal

A round seal with a large letter in the middle indicates the Federal Reserve bank that placed the order for the one dollar note. A = Boston, B = New York City, C = Philadelphia, D = Cleveland, E = Richmond, F = Atlanta, G = Chicago, H = St. Louis, I = Minneapolis, J = Kansas City, K = Dallas and L = San Francisco. A black number corresponding to the bank is repeated on the bank note (four times on the face of the \$1 bill). For example, for a Richmond, Va., order, the number 5 is used.

Look carefully at the one dollar and notes of other denominations to find the other seals found on these bills.

Series

The series number indicates the first year that bills of the particular design were printed. The redesigned \$20, circulated in 2003, is the first note in the most recent series printed. A letter following the note's number indicates a minor design change to the series. The \$100,000 Gold Certificate, Series 1934, printed from Dec. 18, 1934, through Jan. 9, 1935, was the largest denomination printed; these notes were used only by Federal Reserve Banks for transactions between them.

Signature

The signature of the Secretary of the Treasury and the Treasurer of the United States at the time of the printing of the paper currency appear on the face of the note.



PHOTODISC

Symbols of Freedom

The American eagle is the symbol of freedom. Look for it on the different series.

Look carefully at a \$1, \$5 and \$10 bill. Make a list of the features. Have you found an example of each of the defined terms? How are the notes alike and how do they differ?



Currency Designs

Although the Continental Congress in 1775 authorized currency to finance the Revolutionary War, the U.S. government did not issue paper money until 1861. Paul Revere made the plates to print the “Continental Currency.” This was followed in 1792 with the “Mint Act” that established the coinage system based on the decimal system. Martha Washington received the first U.S. coin which was struck in 1793 at the Philadelphia Mint. The 1861 Demand Notes were printed in the U.S. Treasury building. In 1877, The Bureau of Engraving and Printing became the only producer of U.S. currency.

With the creation of the Federal Reserve in 1913, Congress authorized the Federal Reserve Banks to issue Federal Reserve Bank notes. These Federal Reserve notes were first issued in 1914 and continue to be manufactured by the Bureau of Engraving and Printing.

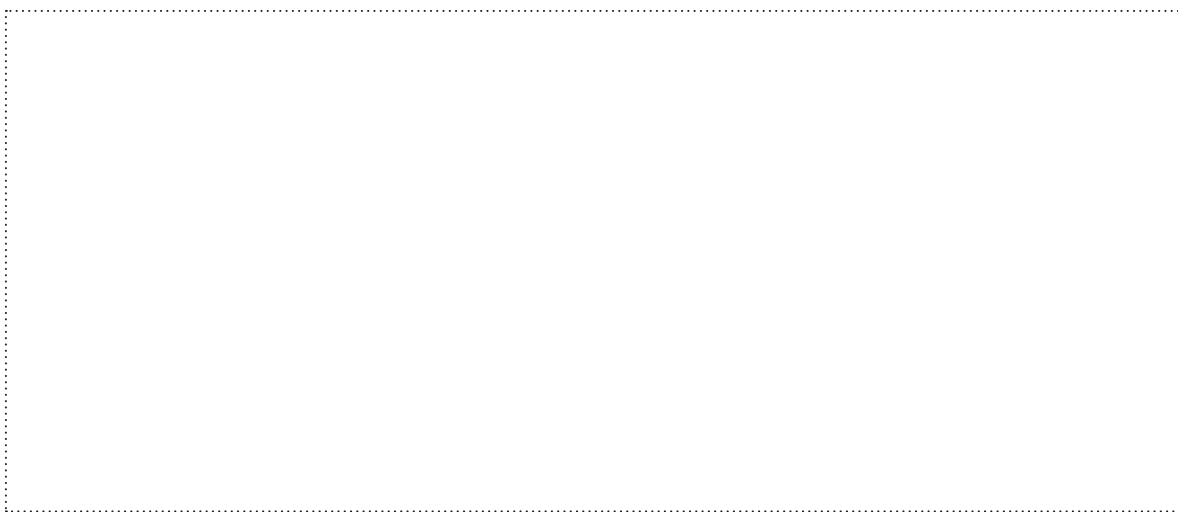
The design of U.S. money begins with sketches made with pencil, pen and ink or paint brushes. Digital technology more recently has been used in getting concept to paper. Designers are expected to consider the emotion or tone conveyed about the country through the design.

YOUR ASSIGNMENT

You are one of the artists whom the Secretary of the Treasury has selected to design a special commemorative series. You can decide what event will be honored in the limited edition.

Features to include in designing new paper currency:

- Back and front layout and design
- Colors of ink
- Denomination
- Image(s) on the back
- Portrait on the face
- Seal
- Security measure
- Series designation



U.S. currency measures 6.14 inches by 2.61 inches