NO. 1

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Houston is a high-tech hotbed for industry and fabrication

Tour the new old economy

ehind a dialysis clinic in a row of warehouse spaces in southwest Houston is a company that uses computer-controlled routers to carve woodwork ornate enough for the Alhambra. In a metal warehouse on a back street in southeast Houston is a sheet-metal fabricator with the largest for-hire water-jet cutting table in the United States. In the middle of a residential area just south of the Houston Heights is a 117-year-old company that has created ornamental metalwork for three presidential libraries and the Getty Villa in Malibu, California.

While the rest of the country is complaining about the loss of manufacturing jobs to overseas markets, Houston is a hotbed for a host of talented fabricators who work with everyone from heavy industry to architects to artists. Houston's no-zoning free-for-all, whatever its real and perceived drawbacks, fosters an incredibly flexible and creative business climate. All over the city, there are strips of warehouses and random buildings that house companies doing remarkable work. Blair Satterfield, principal of the award-winning architecture and design collaborative HouMinn, has an informed appreciation of Houston's fabricators. Formerly Visiting Critic at Rice University and a research assistant professor at the University of Houston, Satterfield is now on the faculty of the University of British Columbia in Vancouver, and he believes that Houston is one of the best cities in the United States in terms of fabrication. "The fact that Houston has oil and energy as essential business informs a lot that can be done there. Offshore drilling adds a layer of scale and sophistication to what can be produced. The medical center means that scale can shift down and then you add on top of that the space industry and the port. It's a strange nexus of highly sophisticated, highly technical types of business."

Satterfield explains that the doors are open to new collaborations: "I've always found in Houston that folks are usually really gracious with their time. Say you are trying to do some surface that looks like the belly of humpback whale, they are intrigued because it is not what they do in their day-to-day, and it's a challenge, and my experience has been that fabricators like to rise to that challenge."

1 *Ernest Tamayo at Berger Ironworks is checking the fit up of his stainless steel rails prior to welding. These rails are for the 39th-floor sky lobby in one of the city's newest structures, Main Street Place.* **2** *Campo Sheet Metal has the largest water-cutting table for hire in the US at 10-by-40 feet.* **3** *Paul Davila is the mastermind of Dept. #1. He has worked for Berger Iron for 27 years now and has his handy work on display in many of the buildings that we see in downtown today.* **4** *A stamping press, operated by Ruben Hill, is one of the oldest and largest pieces of production equipment at Crow Corporation.* **5** *These balusters were custom-carved using computer-driven CNC routers at Camcraft 3D.* **6** *Diverse drill bits accomplish a range of finishes.* **7** *Product of Crow Corporation stamping press.*

[redacted]

ilbert Freitag of Campo Sheet Metal shows me the largest water-jet cutting table for hire in the United States. "Maybe Boeing has something bigger, but they don't hire it out," Freitag says. Campo Sheet Metal will cut any size of sheet metal; it charges by the inches cut and the quality of the edge, not by the size of the piece. There are five different edge qualities available: the slower the cut, the finer the edge.

Freitag's grandfather, Sam Campo, founded the company. He was the son of an Italian immigrant from Sicily. Campo began his business making gutters in a building on Harrisburg Boulevard in Houston's East End. Campo's son Vincent took over the shop in 1972 and moved it to its current location in 1978. Then in 1988 Vincent's son Samuel talked him into buying the company's first CNC plasma cutting table. Samuel and Charles Campo are the current owners of the business; Freitag is their cousin. With degrees in computer science and electrical engineering, Freitag was working for a NASA subcontractor when his cousins prevailed upon him to come work for them. The company's current shop is 30,000 square feet, but they have just acquired Reed Young, a metal-forming company with the ability to roll metal up to three inches thick, and in 2011 both operations will move to a 52,000-square-foot building on Telephone Road in Houston's East End.

8 *Campo Sheet Metal used its water-cutting table to fabricate wind turbine lookouts.*

A jack-of-all-trades shop, the company has fabricated everything from giant chemical tanks, to the flashing and gutters for the Astrodome, to public art projects for the Houston Arts Alliance. Campo has the ability to work with a host of exotic metals, including titanium, Inconel alloys, and even tantalum, which, Feitag says with a shudder, "is like working with gold. We do that about once every other year."

When I meet with Freitag, he is in the middle of fielding calls about an eight-and-a-half-foot metal cone they are fabricating with a three-day turnaround. Campo is used to such tight deadlines, often fabricating parts for ships while they unload at the Ship Channel—with a four- to six-hour turnaround.

"We do the internal components for the towers in chemical plants all the time," says Freitag. But he's also one of those guys who will take on and shepherd through non-traditional projects—the kind that don't make his life any easier, but that he finds interesting. He has worked with the architecture/fabrication group Metalab on diverse projects, like off-grid solar-powered offices made out of shipping containers.

Freitag explains. "We have no product line, but we stay busy. When oil is down, wastewater treatment is up. If you see the guys making barbecues, you know business is really slow. We make those and donate them for auctions to groups like the Knights of Columbus." When they're not doing something in tantalum, that is.

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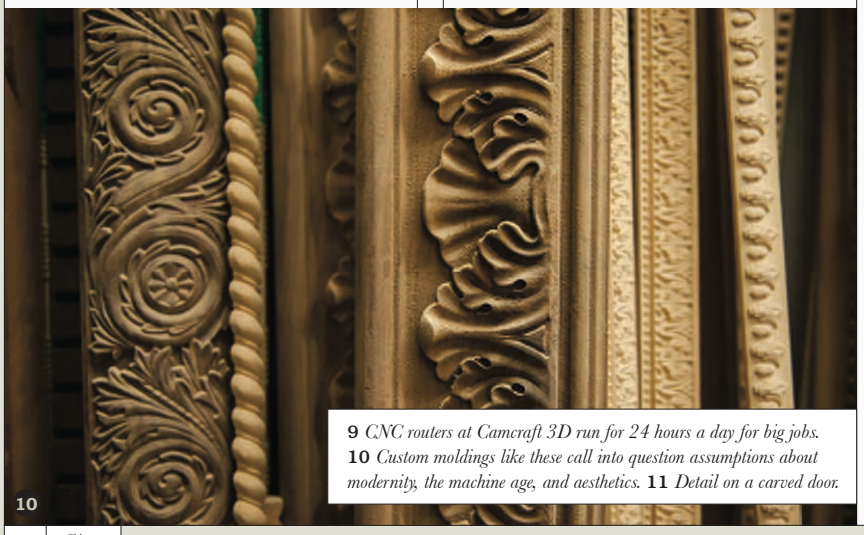

9 *CNC routers at Camcraft 3D run for 24 hours a day for big jobs.* **10** *Custom moldings like these call into question assumptions about modernity, the machine age, and aesthetics.* **11** *Detail on a carved door.*

amcraft 3D is located in southwest Houston on Bissonnet Street behind the Houston Dialysis Center. Its shop is in a drab strip that also houses a church, a prosthetics company, a wedding décor center, and a sign and awning company. Jerry Frederick, Camcraft's founder and owner, is just as impressed as I am by the strip's eclecticism.

"You know," he says, "the people in the building next door [ADI Athletics] do the logos for the helmets of all the NFL teams and most of the college teams as well. They're right here, just stuck in a little hole in the wall. Isn't that amazing?"

Camcraft 3D, which carves custom woodwork using computer-controlled routers, is pretty amazing as well. "Most of my work isn't in Houston," Frederick says. "It's all custom work with architects and designers." And he can pull off just about anything: he recently created structural elements for an epic installation at Rice Gallery by artist Sara Oppenheimer. Most of the work he does is extremely ornate and extremely high-end.

"I've done a lot of work for the Iranian and Indian communities." Frederick has carved columns for the prayer room of a Houston Indian family. For the Iranian-American owner of an auto repair franchise, he duplicated column capitals and friezes from the 2,500-year-old ruins of Persepolis.

Frederick started Camcraft 3D ten years ago. Trained as a machinist, he was born in Erath, Louisiana, near Lafayette. "I spoke Cajun French until I was about six years old. When I left school, I went to several different shops as a foreman and ended up as a plant manager for Texas Ironworks; we built oil field equipment. I transferred to Houston in '85 when oil went down, and I was managing 150 people when I decided to get out of the oil field. I had been in manufacturing all my life, and one day I happened to visit a little wood shop, and there was a Hispanic guy carving roses and vines across this door. It

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was really beautiful. I asked the supervisor how long the guy had been working on it. He said three months. I said to him, 'So if I could do that in three days, that would be pretty good, huh?'"

Fredrick, who says he had "picked up" computer programming somewhere along the way, set up shop in his garage. He used the computer-assisted design (CAD) software AutoCAD for the first year. Then, he says, "I found some jewelry software and adapted it to my routers." He got his first big job, building and carving trim on doors for the computer billionaire Michael Dell, while still working out of his garage. "Can you believe that? I did Michael Dell's doors out of my garage, a hundred of them."

Frederick also has artists create clay models for decorative elements, which he places in a 3D laser scanner. He shows me a 19th-century wood-framed mirror, pointing out where they are replicating (and inventing) tiny pieces of applied decoration.

I ask Frederick how he's weathering the recession. "We had to become creative. You know things are bad when the wealthy people stop spending money," he says. "We had a whole year's worth of projects canceled on us last February." That casualty was a big Las Vegas project that involved high-end trim companies from across the country. Frederick had already done a whole year's worth of prototypes when they shut it down. "They redesigned the whole interior and scrapped everything we did," Frederick says. "Trim people from Florida, Ohio, and Colorado got sent home, and then they started laying people off."

Frederick is currently at work on decorative elements for a church in South Dakota, and he just picked up two new projects in Miami.

Like a surprising number of companies I interviewed, Frederick relies on word of mouth and recommendations for his business. "I tried advertising of all kinds, and nothing worked. It's been word of mouth for ten years."

JERRY FREDERICK'S MOST **CHALLENGING AND ELABORATE PROJECT TO DATE WAS NEVER FULLY INSTALLED. "WE DID A MUSIC ROOM OUT OF BRAZILIAN BLOODWOOD FOR A TEXAS RANCHER DOWN AROUND CORPUS CHRISTI. WE USED ALL THE BLOODWOOD WE COULD FIND IN THIS COUNTRY FOR THAT ROOM. HE SPENT $1.2 MILLION ON IT. BLOODWOOD IS SO HARD THAT YOU CAN'T NAIL IT; YOU HAVE TO DRILL IT, GLUE IT, AND SCREW IT TOGETHER. WE BUILT ALL THE COMPONENTS FOR THE ROOM; IT TOOK SIX MONTHS OR BETTER. THE INSTALLERS WERE CONTRACTED, AND THEY WERE ONE WEEK FROM FINISHING WHEN THE GUY DIED. HE NEVER GOT TO SEE THE ROOM. IT WOULD HAVE BEEN THE MOST BEAUTIFUL ROOM. NOW THE WOOD IS JUST STACKED THERE; IT'S JUST A STORAGE ROOM. ALL I HAVE ARE PICTURES OF THE PARTS."**

ondon-based Foster + Partners looked all over the world to find a company to fabricate the dramatic red glass for the "drum" of Dallas's Winspear Opera House, says Lori Ellis, CEO of Vision Products. It turned out the company that could do it was a mere 240 miles south, in Houston. When the Houston architectural firm Kendall/Heaton Associates needed a massive piece of laminated and etched glass for the James Turrell tunnel installation at The Museum of Fine Arts, Houston, Ellis says, "They spent four or five months searching the entire country for someone who could do it." The company that could was only a few miles away. Vision Products can, according to Ellis, "laminate, bend, cast, and etch glass larger than any firm in North America can handle. We were the first company in this hemisphere to have automated etching equipment."

The family-owned company opened in 1966 as the Gulf Coast Glass and Erection Company. Current president Bobby Gilbert started out at age 14 working for his grandfather, sweeping floors in the shop, and learning how to cut glass. He came back after he graduated from college to work as an accountant. He explains that the company started out as a glazier, doing glass for storefronts. His grandfather had gone broke with three previous companies before he opened Gulf Coast. The company took off when it got the contract to do the glass for 30 Jack in the Box franchises.

Gilbert recalls the pre-CNC technology days back in 1982. "There was this guy, Miller, who would moonlight cutting glass. He would come in to work for us at five, and all he wanted was a 12-pack of Lone Star. He'd work until nine, doing all the intricate cuts no one else could do. He had the shakes—until he started to cut the glass."

Gilbert joined the company full-time in 1984, and Vision Products (a less regional marketing name) was started in 1995 when Ellis came on board. Miller is long gone, and there is now a lot of technology at hand. The company has even acquired a NASA surplus autoclave for its cast glass. Ellis and Gilbert seem to be having a lot of fun exploring fabrication capabilities. For instance, they're sealing patterned fabric or handmade paper between layers of glass.

In perhaps the biggest coup for a glass company, Vision Products fabricated glass for the headquarters of Corning Glass in Corning, New York, including glass staircases and bridges and a two-story glass time line.

When Vision Products contributed to the METRO light rail stations and it came time to install the glass for the stations—all in tight, high-traffic locations—the company actually built one of the steel canopy structures to practice on over and over again. The practice paid off: they installed almost 1,000 pieces of glass and only broke two. "Not bad," says Gilbert with a smile, "considering we usually allot five percent for breakage."

12 *Vision Products fabricated the glass for the signature red column for the Winspear Opera House in Dallas designed by Foster + Partners.*

PHOTO COURTESY AT&T PERFORMING ARTS CENTER

Vision Products uses a giant autoclave acquired from NASA surplus for its cast glass.


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riginally a Houston blacksmith shop opened in 1893 by a German immigrant, Berger Iron Works fabricated ornamental metal projects for places as far-flung as Saudi Arabia and Guam, but the company is deeply integrated into Houston's history. "We had someone come in and ask us to replicate some missing ironwork for an old River Oaks home. They had a copy of the original shop drawings, and it turns out they were ours," says Belk Null, general manager at Berger. Most of the projects come in CAD files these days, but Berger will still create the occasional project from a sketch on a napkin.

For eight years the company was part of an exacting historical restoration of the ironwork at the Texas State Capitol. Other high-profile projects include the bronze curtain wall and doors for the Getty Villa and ornamental metal for the L.B.J., George H. W. Bush, and William Jefferson Clinton presidential libraries. Berger just put in its bid for the George W. Bush library in Dallas. I ask if they still do small projects from time to time. "All the time," says Null, "We just did a 700 dollar frame for some stonework."

Berger moved to its current spot from its original downtown location at 310 Preston Avenue in 1927 after the bayou flooded its shop one too many times. "Mr. Berger decided to boldly move west to the Houston Heights," Null wryly explains. Today, Berger president Joe Rigano tells me, the company is at "ground zero" for the highly controversial Heights Walmart. Their shop is on the corner of the open 16-acre lot slated for the store. Null and Rigano are ambivalent about the development and say they're not looking forward to the traffic. However, one obvious upside is that the company's land is now more valuable. Selling it could facilitate a move west into a much-needed larger space—there hasn't been room to expand much beyond the 1927 warehouse.

Today, Berger Iron Works is no longer a family-owned business but a privately held corporation owned, managed, and operated by longtime employees who have been promoted to partner-owners. (Berger's five working partners have a total of 157 years of experience at the company among them.) Null started working at Berger in a summer job and has been with the company for 29 years. Rigano came to the company in 1977 when he answered an ad for an estimator trainee, and he says that worker loyalty and permanence is what distinguishes Berger Iron Works.

The current recession is nothing new for a company more than a century old. As Rigano explains, the slump in 1984 was worse: "What the rest of the country experienced as a recession, Houston experienced as a depression. There was no work in Houston. We normally carry a workload of 65 percent of our work in Houston, 25 percent throughout the state, and ten percent out of state. During that period, 90 percent of our work was out of state. Now, luckily for us, in this recession most of the work is here in Texas." Berger is weathering the economic downturn with no layoffs so far, and as of January 2010, the company was actually still hiring people. Rigano isn't making any predictions about 2011, but he says, "The company is like a family, and we feel a responsibility to our employees and their families."


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CAPITAL AND TEXAS CHILDREN'S HOSPITAL PHOTOGRAPHS COURTESY BERGER IRONWORKS; ALL OTHER PHOTOGRAPHS THIS SPREAD BY JACK THOMPSON

13 *The old Mubea Ironworker is a 100 ton shear and punch which in its early days could cut through ¾ inch carbon steel plate like butter.* **14** *The gate to the Capital in Austin was replicated at Berger Ironworks.* **15** *Rubber mallet, prybar, and wedge.* **16** *The stair becomes a monumental feature of the Texas Children's Hospital Neurological Research Institute.* **17** *Vicente "Papa Smurf" Navarrette is grinding down his welds on a guardrail for Lone Star College on the north side of town.*

18 *Woozy Blossom misting tree (Matthew Gellar, artist; Crow Corporation, laser cutting; Haden Garrett, assembly).* **19** *This button engages a large stamping press.* **20** *A CNC lathe shapes a spinning piece of steel that will be used to create rubber molding components.*

t laser marks NASA components and medical industry products. It fabricates parts for offshore drilling rigs and frames for solar panels. As president Keith Jennings explains, "Crow Corporation is a contract manufacturer. We work with a lot of different companies. We never know what kind of call or request we are going to get from one day to the next.

"A lot of what we do is big, industrial stuff. Other things are more cosmetic and identifiable, but serving Houston industry is something we've always been good at." In the past, says Jennings, Crow was mainly a parts supplier, but today it is "more of a turnkey shop. We not only make the parts, but can weld the unit up, sandblast it, paint it, assemble it, and send it to you as a completed item."

Jennings worked for his stepfather's manufacturing company as a teenager but didn't find it that interesting then. "I just saw it as kind of a big, dirty shop. When I was young, I saw myself as more of a guy with a downtown office." He went to college, studied business and computer science, and served in the military. But when he began working for the company as an adult and found that he was able to use his technology skills, Jennings says, "I began to develop an appreciation for manufacturing and the vast amount of it in Houston. It was really becoming a high-tech business. I saw how you could implement and utilize technology in a facility like this and dramatically improve your productivity. That kind of lit a fire under me."

Jennings started ramping up the company's internet marketing ten years ago. "That's how a lot of people from outside this region were able to discover us," he says. "Basically, if you can make life easier for the engineers, purchasing people, and buyers, you are probably going to get some business. I love calls from a company that is in a jam with something and that says, hey, can you get us out of a bind and make this stuff? Those are good calls, and we try to accommodate as many of them as possible."

Business last year and in 2010 was down by 40 percent from 2008, and Jennings says he has given up on trying to figure out what will happen next. They have dropped from around 55 employees to 47, but are hanging on to key people. "The world of architecture and design has opened up some new opportunities, and our equipment is really well suited for that." A few years back, Crow did some manufacturing for a Manhattan architecture firm that couldn't find anyone in their area who would do the job. "We are really too big for many small jobs, however," says Jennings. "When we get calls for a 'cute cutout' for somebody's fireplace, it's usually more costly than they anticipate. If so, we try to recommend a different option or a better source."

Crow Corporation opened in Houston in 1962 in a building down by the Ship Channel. In 1996 the family decided they needed more space and moved the company northwest to a huge facility in Tomball. There they have enough room to not only stock raw materials and produce products but also inventory parts for ongoing customers.

"I've been to a lot of other cities where there is a lot of concern about high-profile, visible locations," says Jennings. "Here, people don't care. They just want to make their stuff—get a shot at doing it." And, Jennings says, that climate makes it easy for him to get the materials he needs to do fast turnarounds: "There is rarely a raw material that I can't find here."

"Given the sheer magnitude of stuff going on here," he adds, "if I can't do it, somebody around here can."

PHOTOGRAPH MISTY BLOSSOM COURTESY MARGARET FOX; CROW CORPORATION SHOP PHOTOGRAPHS BY JACK THOMPSON

ocated in a 52,000-square-foot building in Missouri City, Cangelosi Company has a lot of state-of-the-art equipment, like CNC water-jet cutters, but founder and owner Vito Cangelosi still places a high value on handcraftsmanship. A recent high-end residential project in Austin put the skills of Cangelosi's fabricators to the test. The project called for a curved wall of stone made from blocks of black granite eight inches thick. The front and the back of each block required hand tooling into precise radiuses. The edges of each block were minutely scored to create the 1/16-inch joint line required by the architect.

"We had to go in and do a lot of fine tuning and hand tooling after the blocks were set in place, checking it with a laser," says Cangelosi. "People often bring drawings to us that require handwork because there aren't machine tools to execute their ideas."

Cangelosi's parents emigrated from Sicily to the United States in 1917. His father, who had been a shoemaker in Poggioreale, opened up a store in College Station, Texas, where he did shoe repairs and made Aggie senior boots as well as the first bridle for Texas A&M University's mascot, Reveille. Cangelosi started helping out in his father's shop at age seven, doing little repairs. "One thing he taught us—he instilled a sense of pride in your work. He would check our work, and if we didn't do it properly, he would take it apart, and we would do it again."

Cangelosi's son Christopher and daughter Donae are in the business now. Donae Cangelosi Chramosta handles all the marketing and is involved in the company's growing number of LEED-certified products: in many cases, Cangelosi Company uses stone quarried in the Texas Hill Country, which is within the 500-mile LEED limit. Christopher Cangelosi is involved with the fabrication and installation side of things. I ask him about the company's range of projects.

"We do things as small as someone coming in and asking for a cheese board from a sink cutout," says Cangelosi. The company also does high-end residential projects (a current River Oaks project is so large it rivals some light commercial projects) as well as commercial interiors and exteriors, and Cangelosi has provided the stone cladding and paving for a number of Houston skyscrapers, including the former Enron building, and is presently completing work on downtown's 46-story MainPlace.

Vito Cangelosi remembers being called to a meeting in New York with Philip Johnson when the architect was designing the Transco Tower (now the Williams Tower). "We talked about putting stone on the exterior of it, and we talked about the weight problem. It ended up being a glass building." Creating the structure to carry the weight of the stone was too pricey. "But it was great to meet such a wonderful architect and to be able to work with people like him and I.M. Pei and César Pelli and some of the older great architects."

During the building boom, Cangelosi Company expanded its facilities to serve the production builder market. Today, with a lot of inexpensive finished granite coming from China, it often uses those facilities to step in for companies whose orders have been held up in customs or were fabricated incorrectly.

Vito Cangelosi takes me through the fabrication facility with its rows of gorgeous slabs. He shows me the edges on the counters and a bench that have been loaded up and slated for delivery the next morning. With its edges mitered so the seams are practically imperceptible, the bench convincingly appears to be a massive block of stone. (Having gone through a number of kitchen remodels during a house-flipping phase, I felt as if I were seeing the difference between ready-to-wear and couture.)

In Christopher Cangelosi's point of view, the Houston economy seems to be recovering. Vito Cangelosi explains to me, "We pay our people whether we've got work or not." The result is an egalitarian sense of belonging. His fabricators and installers have been with the company an average of 25 years, and five longtime employees recently became owners in the company. Vito Cangelosi adds, "You might see somebody who makes $50,000 a year sweeping the floors when there is little to do. We hope that doesn't happen too often."

21 *At Cangelosi Company, rows of marble slabs await fabrication into walls, countertops, and other uses.*

THE JANUARY AFTER KATRINA, CHRISTOPHER CANGELOSI SET UP AN OFFICE IN NEW ORLEANS, PUTTING AN AD IN THE PAPER THAT SAID, "GRANITE COUNTERTOPS IN THREE WEEKS." HE SOLD TO 14 HOUSES THE NEXT DAY. HIS CUSTOMERS TOLD CANGELOSI THAT HE WAS DOING STONE COUNTERTOPS FASTER THAN THEY COULD GET LAMINATE OR CORIAN COUNTERS. WITH AN HOUR-AND-A-HALF WAIT AT THE FEW RESTAURANTS OPEN IN THE CITY, PEOPLE WANTED WORKING KITCHENS WITH COUNTERTOPS, AND THEY WANTED THEM FAST. CANGELOSI'S TEAM BEGAN TAKING LASER MEASUREMENTS, THEN EMAILING DIGITAL TEMPLATES TO HOUSTON FOR FABRICATION. (DIGITAL TEMPLATES CAN BE LAID OVER A PHOTO OF A GRANITE SLAB TO SHOW WHERE THE GRAIN OF THE SLAB WILL FALL.) USING THE SAME DIGITAL TECHNOLOGY, CANGELOSI IS NOW DOING PROJECTS IN AREAS AS FAR AWAY AS THE BAHAMAS AND WASILLA, ALASKA—PLACES WHERE THERE ARE NO GRANITE FABRICATORS.

PHOTOGRAPH KELLY KLAASMEYER

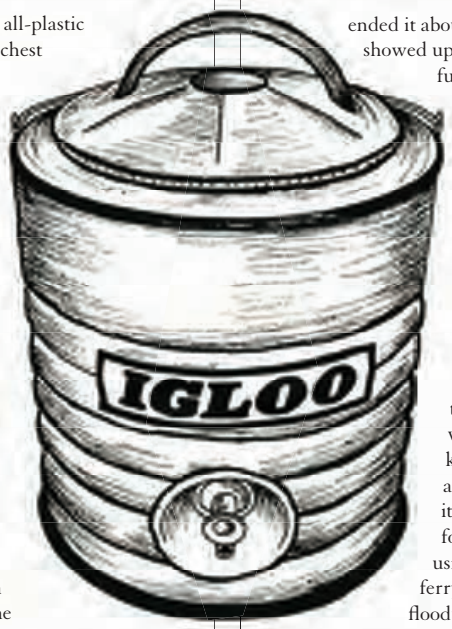
gloo Products Corporation has its own exit off Interstate 10 west in Katy, but most of us don't realize that Igloo, a company that sells 33 million coolers a year, still makes all of its plastic coolers here in the Houston area. That Igloo is still here is testament to Houston's viability as a manufacturing and fabricating center.

Produced in 1947, the first Igloo cooler looked a little like a miniature stock tank. Fabricated by a two-person sheet metal shop in east Houston, it was a double-walled, corrugated metal cylinder with a spigot. The air sealed between the two layers acted as an insulator. Replacing wooden buckets, it was a boon to oil field workers laboring in our subtropical climate. The shop struggled to keep up with demand, producing 50 coolers a day. (The original logo depicted a cartoon Eskimo next to his igloo along with the words, "Houston, Texas.")

Today, according to Igloo, 74 percent of all US households own at least one Igloo cooler. To test this, I went out into our garage. We have four Igloo coolers. Cancel that, five: my husband drives around with one in his car. The coolers in our garage include one with wheels and a pull handle, one that plugs into the car's cigarette lighter, and an Igloo Playmate, the best-selling Igloo cooler ever. Fred Schmidt, Igloo's director of product engineering, relates that an Igloo engineer named Jesse Quiroz suggested the Playmate's swing-top design. Originally from Mexico, Quiroz had worked as a shoeshine boy in Mexico City, carrying his supplies in a box with an attached top that had a handle and rotated, allowing the box to be carried with one hand. He suggested the feature be incorporated into a cooler design, and the Playmate debuted in 1972.

Igloo's roots in the Houston area and its connections to the Gulf Coast are strong, but the company has been through no fewer than nine owners. Why is a company that makes as much stuff as Igloo does still doing its manufacturing in Houston?

As Jim Vaughn, Igloo's vice president of engineering, puts it, the reasons Igloo is still here are tied to the reasons the company developed the products that it did in the first place. According to Vaughn, Phillips Petroleum contacted Igloo in the late 1950s and said it had this new thing called plastic. It knew there was some kind of application for plastic, but its engineers couldn't figure out how to form it. Igloo, Phillips, and Dow then worked together to develop different shaping methods, and the first all-plastic Igloo products, an ice chest and a water cooler, were introduced in 1962. Houston remains a leading center of plastic production, benefiting from the readily available raw materials.



Schmidt and I tour Igloo's manufacturing and warehouse facilities on a golf cart. I at first think the cart is a little excessive until I register the massive scale of the place. Pallets upon pallets of coolers are kept in stock in the facility. In stations throughout the warehouse, sheets of polystyrene plastic are vacuum-molded to create the cooler interiors, while heated tubes of high-density polyethylene are extruded and blow-molded into cooler exteriors. In another station, expanding polyurethane foam is poured into the exterior shell, and then the liner is placed inside. The two pieces are held in place in a mold while the foam rises and cures. The inner and outer layers are flexible until the injected foam seals them together and makes them rigid, giving them pretty impressive structural integrity.

Igloo's marine chest has long been a favorite of Gulf Coast sport and commercial fisherman. Shrimpers love it. (Originally the marine chest had a lifetime warranty, but Igloo ended it about the time a guy showed up with an 18-wheeler full of old coolers he had bought up from Gulf Coast fishermen.) Not only are the marine coolers large enough to keep commercial catches cold, but the coolers are essentially unsinkable: people have clung to them and survived in open water. Vaughn even tells me about a wrecked boat that was kept above water by a cooler lodged in its bow. Katrina footage showed people using Igloo coolers to ferry people through floodwaters.

In fact, natural disasters can influence cooler sales as much as the economy. Before a hurricane, local big box stores call up for extra coolers as people in the hurricane's path frantically try to keep those freezers full of deer meat from going to hell while the power is out. (Igloo's MaxCold line claims that it can keep ice for five days.) The economy has its own counter-intuitive effect: cooler sales go up during a recession. Vaughn says he was a little puzzled by it until he talked to the people at Anheuser Busch, who said, well, of course, that makes sense. Beer sales are up, too. Vaughn summed up the recessionary growth phenomenon, "When times are bad people will sit down on the dock of the bay with a cooler full of beer."

22 *Two women work in the Igloo factory, a facility so expansive that an exit off of I-10 is named Igloo.*

ILLUSTRATION MIKEY TEHRANI, PHOTOGRAPH KELLY KLAASMEYER

23 *Two fabricators operate on Harold Street out of what was a duplex and a garage, now sandwiched between a Randall's grocery store on Shepherd Drive, mid-rise apartments, and Admiral Linen.*

ERIC HESTER

Houston is an acquired taste; it is a city whose charms are neither obvious nor conventional. Houston has the sprawl of Los Angeles unmitigated by any perceived attitude of coolness. Mention that you are from Texas, and people will say, "Oh, I love Austin." Austin souvenir T-shirts may proclaim, "Keep Austin Weird," but in fact Houston is far, far weirder—and thinks it's completely normal. Houston is humid and swampy (almost the same latitude as New Delhi, India), and if we were to abandon it, downtown in a few short years would look like Angkor Wat on the bayou. The petrochemical industry that has driven Houston's economy for decades is the raison d'être for any number of area fabricators, as well as a major contributor to our poor air quality.

Houston's port is second in the nation in shipping tonnage. Houston's skyline is supposedly the third largest in the nation, although I'm not sure how that is figured, since we have a number of different skylines scattered around the city. Houston boasts the world's largest medical center (with advanced cancer research and treatment centers—see "air quality" above). Houston is brimming with engineers of all kinds, including a rich sprinkling of NASA-brand geekery. In addition to year-round resident companies in all the major performing arts, Houston has what is arguably the best contemporary art scene in the country after New York and maybe Los Angeles—and hardly anyone realizes it. It has a rich culinary scene—ditto. Houston is also incredibly international and diverse, with a "majority minority" metropolitan service area (a population that is 63 percent "non-white"). I have always loved Houston's lack of zoning and the erratic and eclectic nature of its landscape, but my love is not unquestioning. It was tested during the last housing boom, when slapped-up, synthetic stucco "Tuscan" townhomes began to surround my little bungalow, blocking out the sun. It was tested when my three-year-old attended a Montessori school next to an auto body repair shop (nothing like inadvertently huffing paint at recess). But while Texas's notoriously lax approach toward environmental regulation should undoubtedly be tightened, I don't think laissez-faire zoning attitudes and pollution regulation have to be mutually exclusive.

I can't argue that anyone should intentionally pattern a city after Houston, but I find something raw, resourceful, and ultimately endearing about it. In any number of Houston neighborhoods, you can throw up a steel building in your backyard and no one will bat an eye. (Or, in the case of one of my previous neighbors, you can build a 5-story "Victorian" observation deck in your back yard.) You can also throw up a house that looks like a steel building and no one will bat an eye. You can start fabricating steel buildings in your garage and no one will bat an eye. It may not make for a conventionally pretty city, but it's an interesting one, a dynamic, creative, and ambitious place. You can make things here.

Blackwell Plastics, located in the Third Ward, has produced everything from the first heart pumps to ice machine parts. The company was born out of a failed attempt by L.A. Blackwell in 1936 to reheat a used tooth brush and shape it into a slip cork for fishing river bottoms.