

Etienne de Boré's Sugar Kettle: A sweet chemical engineering story by Louis Joseph Thibodeaux



Etienne de Boré



de Boré's Sugar Kettle

Standing aside the sugar kettle in your cap and gown graduation regalia with diploma in hand, you had your picture taken with family and maybe a professor or two. Commemorative plaques in both French and English set in the crepe myrtle trees with their Sugar Kettle inscription. You walked past it daily, going to and from class and read the inscription at least once during your time on campus. But soon you were overcome by the familiar "spell" of living in the present and you completely ignored it, thereafter. Ignored it to the point if someone asked, you likely couldn't recall why the fuss with the kettle and who was Jean Etienne Boré anyway? And such a spell I was under; it sits just beyond the windows of my office I have occupied for nearly a quarter century. A few days visit to New Orleans on LSU spring vacation this past April changed all that.

One of my hobbies is reading Louisiana History and at the time I was re-reading George W. Cable's 1884 book entitled "The Creoles of Louisiana" (Cable, 2000). Chapter 15 was on how Boré made sugar. An interesting read but, what happened coincidentally, jolted me out of my lingering sugar kettle familiarity spell. Whit and Maureen Huguley offered their New Orleans, Vieux Carre, 525 St. Louis Street apartment to me and Joyce for three days. They are extended family members, Whit is a molasses commodity trader. Molasses is that dark, syrupy, sweet food by-product of sugar making in addition to bagasse. He is a Tulane graduate but, their son Whitfield Jr. and wife Maureen McLindon, are LSU Alumni. She is the daughter of Professor Gerald McLindon, deceased and former Dean of LSU School of Landscape Architecture.

The apartment on the ground level is one of three in the building. It is beautifully decorated with sugar sacks and related antique objects with a New Orleans flare. Inside is a document folder with information on its history and the early property owners. Whit thought it was interesting to learn that the condo, which was also used for the molasses business, is located on property once owned by Boré and being so retains a connection to the history of the Louisiana sugar industry. A brass plaque attached to the front entrance is inscribed with the title "Jean Adrien Delpit House" and reads: "Erected together with the adjacent building at 525 St. Louis Street by Etienne Deban who acquired both properties in 1807 from Jean Etienne Boré, Claude Gurlie and Joseph Guillot, builders."

The trading business with which Whit is employed, now goes by the name of ED & F Man Liquid Products and molasses remains a main product, other big businesses are sugar and coffee. In 1940 his grandfather, Authur Whitfield Huguley Jr., and a Harvard classmate started a sugar beet molasses company, Industrial Molasses Company. Building storage tanks at factories accommodated the seasonal, very erratic huge surpluses being given away during the harvest but in short supply in the off season. Molasses was deemed a "strategic" commodity for the war effort. After WWII, in 1945, the company was consolidated with a New Orleans cane molasses company. With the growth of business in 1950s the company became the first tenant in the Port of Baton Rouge, building a molasses terminal. Whit convinced his father, the then President in 1988, to consolidate offices in New Orleans because he was "pretty sure Maureen would not move to New Jersey." Eventually, the company headquarters was moved from the New York City Area to New Orleans. In 1995 it became a totally owned subsidiary of ED & F Man, based in London, which is the largest global molasses trader/distributor and one of the largest sugar and coffee traders. The molasses tanks still used for storage may be seen today from the I-10/Mississippi River Bridge in-between the bridge and the grain elevator to the south. Whit's office is on Canal Street in New Orleans.

Now back to Etienne's Story, not sure when and for what reason the "de" was added to Boré. Nevertheless George W. Cable tells it best, the following is a quote from Chapter 15:

"...Still the Creoles, every year less than the year before to make rash experiments, struggled against the misfortunes that multiplied around the cultivation of indigo, until 1794 found them without hope.

"At this juncture appeared Etienne de Boré. He was a man of fifty-four, a Creole of the Illinois district, but of a distinguished Norman family; he had lived in France from the age of four to thirty-two, had served with the king's mousquetaries, had married a lady whose estate was in Louisiana near New Orleans, and returning with her to the province, and had become an indigo planter. The year 1794 found him face to face with ruin. His father-in-law, Destrehan, had in former years been one of the last to abandon sugar culture. His wife and friends warned him against the resolution he was taking; but he persisted in his determination to abandon indigo, and risk all that was left to him on the chance of a success which, if achieved, would insure deliverance and fortune to himself and the community. He bought a quantity of canes from Mendez and Solis, (Spaniards who raised the seed cane) planted on the land where the Seventh District (late Carrollton) now stands, and while his crop was growing erected a mill, and prepared himself for the momentous season of grinding."

"His fellow-planters looked on with the liveliest—not always with the most hopeful—interest, and at length they gathered

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about him to see the issue of the experiment in which only he could be more deeply concerned than they. In the whole picturesque history of the Louisiana Creoles few scenes offer so striking a subject for the painter as that afforded in this episode: the dark sugarhouse; the battery of huge caldrons, with their yellow juice boiling like a sea, half-hidden in clouds of steam; the half-clad, shining negroes swinging the gigantic utensils with which the seething flood is dipped from kettle to kettle; here grouped at the end of the battery, the Creole planters with anxious faces drawing around their central figure as closely as they can; and in the midst the old mousquetaire, dipping, from time to time, the thickening juice, repeating again and again his simple tests, until, in the moment of final trial, there is a common look of suspense, and instantly after it the hands are dropped, heads are raised, the brow is wiped, and there is a long breath of relief—"it granulates!"

"The people were electrified. Etienne de Boré marketed \$12,000 worth of superior sugar. The absence of interdictions that had stifled earlier trade enabled him to sell his product to advantage. The agriculture of the Delta was revolutionized; and, seven years afterward, New Orleans was the market for 200,000 gallons of rum, 250,000 gallons of molasses, and 5,000,000 pounds of sugar. The town contained some twelve distilleries—probably not a subject of unmixed congratulation—and a sugar refinery which produced about 200,000 pounds of loaf sugar; while on the other hand the production of indigo had declined to a total of 3,000 pounds, and soon after ceased".

Jean Etienne Boré was a chemical engineer, surely. The existence of crystals formed while boiling cane juice was well known for a long time by chemists. Prior to de Boré, sugar was made but not of a sort to ship to world markets, it was poorly granulated and very wet, only good for local consumption. Half the first cargo in 1765 headed for France leaked out of the packages before the vessel made port.

Engineering chemicals requires a clever series of connected process steps, for sugar heat transfer from a fire under the kettle drives off much of the water quickly. Mass transfer in the thick and hot liquor that is slowly stirred just so, to encourage a "reaction," in this case the initiation and growth of solid sucrose from tiny specks to large crystals. They solidify from the supersaturated liquor solution. The next step was one of fluid dynamics, it removes the surrounding, sugar-exhausted liquor (aka "molasses") residue that clings to hard crystals. It is "filtering" and washing with a little fresh water removes the final bits of the residual liquor yielding raw sugar. And then finally drying (aka, heat transfer, again) the product gently, and placing the elegant golden crystals in cloth bags. Sugar refining would be developed later to produce white crystals. Raw sugar however, is still available.

The exclamation "it granulates" was the response to note that large crystals could be produced but only by a lengthy series

of individual process steps. Sugar factories are complex machines that connect and integrate sequential chemical engineering processes, it's more than just boiling a batch of syrup, clearly. I know because in the fall semester of 1961 I took Chemical Engineering 161, a two semester-hour course required of all undergraduates, entitled Chemical Engineering Practice Laboratory. It was held in the Audubon Sugar Factory adjacent to and on the east side of the old chemical engineering building. A Sugar Engineering Degree was still popular.

Cane is harvested in the winter months. At that time mules still pulled wagons full of canes into the factory yard from the LSU farms where they were grown. Strained from the effort, their exhaled breath condensed in the cold morning air. Wood and bagasse fired in steel barrels gave warmth to black field workers gathered about. The wagons were lined up in the street front of the factory, waiting their turn at the crane to be unloaded into the hopper with rotating blades that sliced the stalks prior to crushing and squeezing between heavy rollers. Inside the factory workers made sugar, we watched, took notes and learned how a sugar factory operated. The golden sugar granules were taken away in a railroad hopper-car. It was a magical time for me.

de Boré's kettle is at the root of this sweet story but it doesn't end there. The sugar industry remains economically significant in the State of Louisiana. The story continues and has a special meaning, not just to the current graduating class as an excellent place for a photo-op, but also to us older LSU Alumni who return for a brief visit after a football game or whatever, and notice it. Then it becomes a catalyst which causes us to reflect on what a magical time it was being a chemical engineering student at this place called LSU.

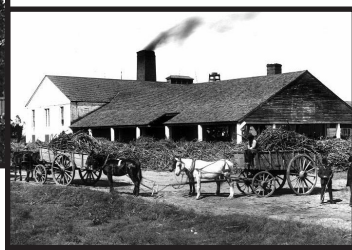
It is an iconic symbol of the Cain Department of Chemical Engineering at Louisiana State University. Hopefully the kettle will be moved and installed in a prominent place adjacent to the site of the new building that will house the Department.

Louis Joseph Thibodeaux, BS 1962

Literature cited: Cable, G.W. 2000. THE CREOLES OF LOUISIANA. Pelican Publishing Company, Gretna, LA. [Copyright 1884 First Edition by Charles Scribner's Sons.]



Laboratory and residence of the LSU sugar experiment station at Audubon Park in 1899



Burnside Plantation Sugar Mill