The Story of

CRYSTAL DOMINO

THE AMERICAN SUGAR REFINING CO.
"It's the sweetest thing in the world," said little Miss Crystal Domino, as she poised on the top step of the refinery entrance.

I paused a moment to get my breath. The trip through the Tube and the brisk walk through the city streets had brought us quickly to our goal. Across the river the towers and turrets of Manhattan rose like an Alpine height. The slanting sun threw the shadow of the great window-pierced refinery across the pavement. Against its dark walls little Miss Crystal Domino made a picture of sweetness and purity, her dazzling white apron and laughing face outlined against the sombre background.

"Say rather that you are the sweetest thing in the world," I ventured, gallantly. But she checked me with a warning finger pressed against two lips.
that tried hard to be stern. "I only represent its qualities and it is the sweetest, purest and most wholesome thing in the world."

A moment later I believed all she had said about sweetness. We stood beside a long tank raised above the floor in one of the few dark corners of the building. A six-inch pipe was pouring a flood of clear liquid into the tank. I confess that I was puzzled. "Why did you bring me here to see the end of a water pipe?" I asked. Miss Crystal Domino's laugh rang out clear and loud. In a moment she had mounted a short ladder and had dipped a glass tube full of the liquid. "Taste," she cried. I put it to my lips. "It truly is the sweetest thing in the world," was the only reply that I could make. It was liquid sugar, clear as spring water, just warm enough to keep it from crystallizing and sweet beyond description.

Then my little guide volunteered an explanation. "Across the street you may see the men unloading the ships. From Hawaii, the Paradise of the Pacific, from Cuba, the sun-kissed isle, from our own South and a score of world-scattered countries, comes the raw sugar, not white and glistening but brown and sticky as it has been crystallized from the juice of the sugar cane. Over across the street it is refined, filtered for forty-eight hours and then twice clarified until it comes through this pipe under the street as clear as water and absolutely pure. One hundred per cent pure sugar is what it is."
I was going to taste it again but little Miss Crystal Domino hurried me on. "They are going to drop a pan," she called over her shoulder as she ran up a steep flight of stairs. I struggled after her as best I could for I feared that I might be lost in a maze of glistening sweetness. They were going to drop a pan somewhere. I hadn't the slightest idea what that meant, but it sounded interesting and I wanted to see it done. As I climbed the stairs I thought of Milton's line, "linked sweetness long drawn out," and wondered whether he had ever visited a sugar refinery.

Miss Crystal Domino's voice woke me from my reverie. "Here we are, on the top floor," she said, "ready to watch Crystal Domino in its travels from attic to cellar. It's only a fifty-foot drop," she remarked, as she glanced out of one of the big windows through which a cooling breeze was blowing, "but it will take Crystal Domino between three and four days to make the trip." I looked at her inquiringly, but she did not volunteer an explanation and I decided that she would probably tell me later.

Then my attention was drawn to the big asbestos-covered boilers that stood on the floor. On the side of each was a thermometer and a long glass gauge in which a clear liquid was slowly rising.

"These are the boiling pans," my guide explained, "and in each is about two and a half tons of the clear sugar liquid you saw below. For three or four hours it is boiled here at a temperature averaging
180 degrees Fahrenheit. Didn't I say that big word nicely? The man here draws off a sample every few minutes and examines it on a glass slide before an electric light. He is so expert that he can tell just the minute the crystals are the right size for Crystal Domino. At first he only puts a little of the sugar liquid in the pan and boils it. When the crystals begin to form he slowly adds more liquid sugar and builds up the crystals to the right size. Why, when you and I can see nothing in the liquid on the slide, his sharp eye can see hundreds of tiny crystals forming and there are millions of others that will attach themselves to the larger ones if he handles his pan just right."

I looked on with interest while the tender thrust a long metal rod into the side of the "pan." When
he withdrew it he dropped a splash of sugary liquid on a glass slide. He held it before an electric bulb and turned it slowly, examining it critically and testing it with his fingers. The crystals were large and perfect, almost ready to mold.

“We must hurry down stairs,” said Miss Crystal Domino, and down stairs we went. She called up
as I followed, "The most interesting thing, is that he is so expert that when the crystals are just right he has the pan just full." But I discovered that there were several more "most interesting things" in store for me.

On the floor below a warning whistle from above had brought the men swarming about the outlet pipe coming from the pan above. Two little cars stood on the rails just below the valves. On each was a body consisting of two concentric steel cylinders. Between the inner and outer cylinder of each was a set of eight double molds,—a framework with plates of steel dividing it into compartments. Eight funnels or cones topped the molds and each was set beneath a spout connected with the tank above. The whole arrangement mounted on wheels was called by the men a "Crystal Domino Wagon."

Miss Crystal Domino beckoned me to climb a short flight of stairs to the big tank that stood just over the waiting wagons. We peered over the edge and saw a gigantic paddle wheel idly turning about in the bottom. "That's to keep the sugar from solidifying while in this tank," she remarked, "if it got cold and solid while the men were drawing it off into the wagons, they couldn't get it out of this with dynamite."

There was a shrill whistle from below and an answering one from above.
There was a "whish," almost at my elbow, and a thick stream of white semi-liquid sugar began to pour into the tank from the pan above. The paddle was stirred into activity, it rose with the rising tide of sweetness and waves of sugar splashed against the walls of the tank and almost on my hands. Down below there was a bustle of activity. One by one the wagons were being filled. Men with metal paddles worked to let the air escape from the tops of the molds. As fast as a wagon was filled another was rolled into its place from the great stove or steam room in which the clean wagons are kept clean and hot so that the sugar shall not cool and crystallize too quickly. At the further end of the stove we could see men steriliz-
ing wagons with live steam so that no trace of dirt could possibly touch the sugar.

"What are those other men doing with the paddles," I asked, pointing to a group of men again working the liquid sugar which rose to the tops of the cones above the molds. Miss Crystal Domino explained. "They are making an extra stirring so that no air bubbles may be left in the sugar. One air bubble would make honeycomb sugar and spoil the piece. They don't take any chances here. There are lots of things that might happen and don't. On every side are opportunities for the sugar to be spoiled and the day's work lost. But they take no chances. They take extra precautions. It pays in the end. Why, they might put any sugar into the Crystal Domino instead of only the cream of the sugar. They might save a lot of sterilizing and washing and still have fairly clean

Cleaning the Tops of Wagons
sugar. But they don’t take any chances here and that is why Crystal Domino Sugar is the cleanest, purest, wholesomest, sweetest thing in the world.”

Miss Crystal Domino stopped short, and blushed. “Here I am spending valuable time praising my namesake. But you’ll have to excuse me. I really can’t help it. We are all Crystal Domino enthusiasts over here, everyone of us. We know it is pure and clean and good and somehow”—laughing—“we can’t help saying so.”

Then we picked our way over a maze of little railway tracks on which were standing rows of
numbered Crystal Domino wagons. "If you like statistics," remarked my guide, "you might make a mental note of the fact that there are 390 of these wagons constantly in use passing through the circle from stove to filling station, to stirring, to cooling room, to cleaners, to removal of molds, to steam sterilizing room and to stove again. Twenty-six wagons are filled at each dropping of the pan and there are 1040 pounds net of sugar in each wagon. There is quite a little railway system in this building, with about a mile of narrow gauge track and switches and turntables too."

Over at one end of this big airy, sunny room were men with chisels cleaning the surplus sugar from the tops of the molds. I was informed that the sugar stands in the wagons from forty to fifty hours before it is thoroughly cool. The cleaned wagons are then rolled along a track to the other side of the room where each is placed over a compressed air pipe. An electric traveling crane is set over the wagon and the mold is hooked on.

It was at this point that my skeptical nature, which had been rather suppressed by the revelations of cleanliness and care, again asserted itself. I had read in some of my college text books something about friction and vacuums. "It must take a lot of power to pull that tight fitting mold from those cylinders," I ventured. "Why didn’t you fix the outer
cylinder so that you could take it apart?” The next minute I started back quickly for Miss Crystal Domino had put her dainty hand on the lever that released the compressed air connected with the bottom of the wagon and with a long “whish-sh-sh!” the mold rose in the air with hardly an effort from the crane.

Miss Crystal Domino had a mischievous twinkle in her eye as she tripped along ahead humming a familiar air.

Quickly as we had hurried to the other end of the room, the crane with its sweet burden had beaten us. We had a momentary glimpse of edges of great slabs or “plates” of sugar all around the circumference of the mold as it was quickly lowered into the cylindrical centrifugal machine. In the center of this was a pipe and from it a “spider-web” of ducts led to the compartments in which were the plates of sugar.

**Sterilizing Wagons with Steam Before Refilling**
The cover was clamped down and an electric motor began to whirl the mold around at a terrific rate.

My guide saw the questioning look in my eye. "In that pipe is more of the liquid sugar we saw when we first came in. As the mold whirls the liquid sugar is forced through the hard sugar and washes it thoroughly, forcing all air out. The terrific speed drives the liquid through every bit of the plate. It whirls for about twenty minutes."

"But," I protested, "that sugar was as clean and sparkling as any one could wish when it went into
From Mold to Stove—Inspecting Plates

those clean and sterilized molds on the steam sterilized wagons fifty hours ago, and it has been kept there, air-tight, ever since. Why should you wash it again with pure liquid sugar?"

Miss Crystal Domino was handing me a plate or slab of sugar from those the men were taking from the mold just out of the centrifugal. She held it up to me, white and scintillating like a slab of diamonds. Her eyes were perfectly serious as she said, "There's the reason. Beautiful, isn't it? And we're not through with it yet. But it is more than beautiful. It is clean, and pure and good and sweet. And we don't take any chances here at all."
I took the plate in my hands. It was indeed beautiful and white. I took it rather awkwardly and it broke leaving only a small corner in my fingers. My little guide laughed merrily. "It hasn't been in the stove yet," she said, and pointed behind her to what looked like a succession of racks on a system of endless belts. On each rack was a row of twenty or thirty white plates of sugar about fourteen inches long, ten wide and an inch thick. They stood on edge and as the men filled a row the whole arrangement moved back into a heated compartment and left a new rack ready to be filled.

"It is only twenty feet to the opposite end of this
stove,” remarked my guide, “but so winding is the route of that belt and so slowly does it move that it takes those plates of sugar ten hours to make the trip. Even if the belt traveled continuously instead of pausing for each load it would take five hours to make the journey.”

I had begun to appreciate what Miss Crystal Domino meant when she said that it was but fifty feet from attic to basement but a three or four day trip for Crystal Domino sugar.

Over the “stove” was a sort of mezzanine floor and here we found great cauldrons of boiling water. One at a time the molds were being sterilized (twice)
hoisted up and immersed in the cauldrons and rocked about until they actually shone with cleanliness. Then each was lowered and the steel plates were inserted, each in its numbered place, dividing the molds into sections the size of a sugar plate. Once more the molds, this time with the plates, were raised and immersed in the cauldrons and washed again in boiling water. Then they were run across the floor and lowered into the wagons which had just been sterilized with live steam. Now they were ready to begin the process over again.

We were walking down the stairs to look at the back of the stove when something occurred to me. "Why do you sterilize the mold without the plates and then with the plates," I queried. Miss Crystal Domino's lips showed a trace of a smile and her eyes just danced. "Well, you see," she began, "that mold has to stand for a few minutes while they are loading the sugar so they don't like to leave it idle. And besides," she was really smiling now, "we don't take any—" The rest of the sentence was lost in a burst of merriment in which I joined.

"I have learned my lesson," I admitted, "I always was skeptical as to the purity of food products manufactured in 'big' factories, but you have me
converted entirely. I never saw any 'home made' food that was kept as clean as this."

On the further side of the stove the plates of sugar were coming out with monotonous regularity after their ten hour trip.

"Take one in your hand," commanded little Miss Crystal Domino. I obeyed but took a firm grip on top and bottom, remembering my former experience. But she laughed again. "It is hard and dry now," she said, "and it won't fall apart."

Over at one side men were testing each plate
before a powerful and special electric light. If the slightest tinge of yellow appeared the plate went into the discard. I didn’t ask any questions. I could see from Miss Crystal Domino’s eyes that she was ready with that “We take no chances,” and I decided to take no chances of another laugh myself.

If the plates of sugar glistened before, they fairly blazed with scintillating light now. Piled in snowy white stacks they attracted my eyes so that I could hardly tear myself away. Beneath the rays of electric lights the place blazed out like a wild exaggeration of an oriental monarch’s gem-studded throne room.
Miss Crystal Domino’s voice called me from across a mountain of diamonds. “It is getting late and we must see the rest of the process before dark,” she said. I obediently followed.

There was a long room filled with girls, attractive, happy faced girls with scrupulously clean faces and hands and the neatest of dresses and aprons. Perched on the top of each attractive head was a dainty cap—the Crystal Domino Cap.

On one side were the cutters. One girl was feeding plates into the machine and three circular buzz saws were sawing them into strips, which moved along a belt to the chopper. Two knives, one above and one below, quickly snipped the strips into completed dominoes. Here stood another girl who threw every imperfect or broken domino into a barrel. None of these are permitted to go into the Crystal Domino boxes. “We take no—.” I knew she wanted to say it so I headed her off with a question. “What becomes of this sugar? It is perfectly good and pure; it is perfect in every way except that it is broken. Do you sell it as broken dominoes?” “Oh! no,” she explained in haste. “It might get into the market and hurt the reputation of Crystal Domino for perfection. It is granulated before it goes out of the place. We can’t afford to take any chances.” She had said it in spite of me.

“But the sugar dust, that is being drawn off into this other barrel by an electric fan,” I persisted, “is
The Light Test—"Is the Sugar Pure White? Is it Perfect?"
that used for fine powdered sugar?" She laughed at me. "Of course not, it's too fine to see."

Down the other side of the room ran an endless belt, and at a table before it a long line of girls were packing boxes from big square pans of sugar brought to them from the cutters. With a deftness that was wonderful, a girl filled a metal box that fitted on one beam of a pair of scales. At the further end of the room was a girl who made the accurate weights. The packers were filling the boxes with approximately two or five pounds of sugar dominoes. When the requisite amount was found the metal box was inserted in a pasteboard one and the sugar

Cutting the Plates Into Strips,
Then They Are Clipped Into "Dominoes"
transferred. A ticket with the packer’s number was placed on top and the box went on the endless belt to the final weighing. Here an expert girl weighed each box and if it was short so much as a fraction of an ounce put an extra domino in.

“That’s why we find an extra piece in the side of the box sometimes,” I remarked. “But why not pack just so many pieces in each box?” “Because,” said Miss Crystal Domino, looking rather severely at me, “the boxes say 2 and 5 pounds net and two and five pounds net of sugar is what goes into them. A plate weighs from 4.80 to 5.00 pounds and a box just packed full may weigh just over or just under the
right amount. So we put in or take out pieces to equalize the different weights of the sugar and the sugar in any box is never less than what the label says. We don’t take any —"

But I had caught sight of the girls who were putting on the familiar Domino box covers and sealing up the boxes. One of them was wiping the outside of the boxes with a damp sponge as she placed them on the carrier belt that took them down cellar. It was my turn to laugh. “You don’t take any chances, do you?” I almost roared. Miss Crystal Domino looked at me severely. "We would sterilize the boxes if it wouldn’t melt the cardboard,” she said. And I am not sure yet whether she was in earnest or joking. At any rate I went down stairs expecting to see them spraying disinfectants on the cases.

As we passed along my guide called my attention to a few boxes coming back along the lower side of the endless belt. These are boxes that were not packed accurately and are on their way to the packer for adjustment. We saw the empty boxes coming down a chute from the box machine, and the clean and sanitary wash rooms and lunch rooms used by the girls.

We also passed through rooms devoted to the packing of various packages of granulated sugar. There were wonderful machines here which accurately weighed out the correct amount of sugar, filled
the bags and sewed them with only one girl's aid. There were other more wonderful machines—mechanical marvels that weighed, packed and sealed the clean and sanitary packages of granulated sugar, with almost human intelligence and deftness. At one end a girl opened the flat boxes and at the other end another girl checked the weights and packed the cases. I was so fascinated that Miss Crystal Domino had to fairly drag me away to see the final act in the Crystal Domino process.

As we threaded our way about the cellar where a moving platform was bringing barrels of sugar from across the street she gave me a glimpse of other phases of the sugar industry.

Packing Crystal Dominoes Under Careful Inspection. The Eternal Test—"Is It Clean?"
"There are about thirty-six different grades of sugar," she said, "but the average grocer only carries three or four. The grades range from the very finest powdered sugars used by the confectioner, through the various grades of granulated and the various forms of lump sugar to the big broken lumps that tickle the palate of the African savage. They range in outward attractiveness from the plain, but delicious and much used brown sugar to the glistening white Crystal Domino. That is the very apex of sugar perfection, but — do you know? — every grade of these sugars represents of its kind the very best and the very purest. Crystal Domino is only one kind of sugar but Crystal Domino Sugar Quality runs through every grade and kind of these sugars."

Making the Packages Exact Weight
We had reached the corner of the basement just below the packing room. The endless belt elevator was delivering the boxes, two by two—"for all the world like the animals in the ark," as my guide laughingly put it. They quickly made their way along another endless belt to the men who were packing them in their cases and nailing down the covers.

"So this is the end," I remarked.

"No," replied Miss Crystal Domino, "you have seen neither the beginning nor the end. This is but the merest incident in the great Industry of Sugar."
We had climbed the short flight of steps leading to the street. The sun had gone down and the bravest of the stars were just beginning to venture out. The lights of Manhattan were twinkling cheerily across the dark river. Across the pier we could hear the rattling of chains as the stevedores made the derricks fast for the night.

But my mind was filled with the thought suggested by the words of my little guide. Beyond it all I seemed to see the canefields of Hawaii, green in the semi-tropic sun, the cloud-wreathed mountains and the turquoise waves thundering into foam on the coral bound shore. I could see the swarthy laborers cutting the cool, green cane and almost

Cutting the Sugar Cane
Unloading Raw Sugar at the Refinery

hear them singing at their task. Then at the other end I could almost look into the homes of the world which sugar has made more attractive, happy and healthful in a thousand ways. Between the two were the many processes, the mills, the railways, the laden steamers, the great structure of manufacturing, wholesale and retail business.

The realization was borne strongly home to me that what I had seen was but one episode of a great drama which in itself was but one historic and romantic act in the great world-drama of Industry.
Miss Crystal Domino was waiting patiently. The spluttering arc light on the corner threw her dainty figure in sharp relief against the wall.

"It is indeed," I began, "the sweetest thing in the world, and the purest, and cleanest and the most wholesome. But it is more than that. It is part of one of the greatest things in the world. It is hard to say where the sphere of its good influence stops."

"Because we don't take any chances," she laughed over her shoulder as we walked together down the crowded street.

_Casing Crystal Domino_
WHOLESALE PRICES
ACCORDING TO
U.S. BUREAU OF LABOR

100% IS THE AVERAGE
PRICE 1890 TO 1899

----- COMPOSITE
PRICE OF MILK, EGGS,
BUTTER, BREAD AND
POTATOES

PRICE OF SUGAR

AVERAGE PRICE
Good Home Makers will be pleased to know they can obtain Granulated Sugar, of Crystal Domino quality, in clean, economical cartons, by merely asking the grocer for EAGLE BRAND ("H. & E.") GRANULATED STANDARD GRANULATED or FRANKLIN GRANULATED All made under the direction of The American Sugar Refining Co., Makers of Crystal Domino.