

hen Thomas Edison told an afterdinner audience in 1906 that he was going "to live to see the day when a working man's house can be built of concrete in a week," few doubted his ability to deliver on the vision.¹ After all, the 59-year-old "Wizard of Menlo Park" was celebrated worldwide as a culturechanging visionary. Not content with merely revolutionizing the house construction industry, Edison hoped to apply some Progressive social engineering by altering the domestic landscape. "If I succeed," he said, "it will take away from the city slums everybody who is worth taking."² Edison dreamed of endless possibilities but he also knew



there were endless ways to discover how not to make something work. With that, "Edison launched himself into a quest that would prove more elusive than the development of his incandescent lamp."³

Edison's concrete endeavors were inspired by unprecedented urban-industrial growth in the United States at the turn of the 20th century. Five years before Edison's concrete vow, the town of Donora, Pennsylvania, appeared seemingly overnight. Located 30 miles south of Pittsburgh on the western bank of a horseshoe bend in the Monongahela River, Donora was a typical steel mill boomtown, with a population that grew from 12 to 4,000 in less than one year.⁴ RIGHT: Workers set nine-inch panels in place by hand, using clips and wedges. The standard thickness was set at seven and one-half inches. The wider bump-out in the middle of the photo is to support the weight of the chimney.

Donora Historical Society, Bruce Dreisbach Photograph Collection.

BELOW: A straw-hatted foreman watches his crew set floor panels on one of the last houses poured at the corner of Bertha Avenue and Walnut Street. Note the "knockouts" in the wall panels on the left. Knockouts were used to create a space through which to run plumbing, heat ducts, and electricity. Donora Historical Society, Bruce Dreisbach Photograph Collection.





The Union Improvements Company, a real estate development and investment group whose members included Andrew W. and Richard B. Mellon, Henry Clay Frick, and William H. Donner, had provided for nearly every need for their growing industrial community-except adequate worker housing. Early employees of Union Steel Company, and later American Steel and Wire Company, moved to Donora without their families, renting space in tents, boarding houses, private homes, hotels, ethnic clubs, and churches. The company built two bunkhouses, then bought the former Indiana Hotel at the corner of Sixth Street and Meldon Avenue, renamed it the Tri-Plant Club, and rented rooms to workers. The Donora-American wrote regularly of "Mill Men Desperately Seek Housing," offering a free clearinghouse section in the paper listing rooms for rent.5 The oft-told story of three steel workers sharing a single bed by sleeping in shifts did not originate in Donora but was routinely practiced there. By 1916 Donora's population had topped 10,000 people.6 The Donora-American warned, "the housing and boarding famine [is] becoming more acute with each passing day," affecting worker turnover, production, and efficiency.7 The mills employed 6,200 men and over 300 women. Predictions of 10,000 workers by 1920, and a community of 25,000 people would never be realized without more housing.8

On June 23, 1916, American Steel and Wire Company, hoping to stabilize its workforce and community, announced plans to build 100 new homes with more to follow. The 8.8-acre site at the southern end of town was less than a mile up the hill from the blast furnaces. The location took advantage of prevailing winds to push smoke and pollution away from the site, while providing much-needed housing for foremen and lower management employees. The plan attracted interest not only for relief of the housing shortage, but also because the main building material was to be Portland cement, an idea from the laboratories of Thomas Edison.⁹

Concrete had been used as a building material for centuries, and using it specifically in home construction began in France in the 1840s.¹⁰ Concrete homes were marketed as "fireproof," an attractive selling point in an era of open flames in the home and costly fire insurance. Early interest lagged mostly because of the prohibitive expense of concrete construction. In 1844, Joseph Goodrich built one of the first concrete houses in the United States in Milton, Wisconsin. To improve the tensile strength of concrete, a steel or iron rod was added, creating reinforced or "Ferroconcrete." The first Ferro-concrete house built in the United States was in Port Chester, New York, in 1879.11 As concrete building techniques evolved, individual concrete homes began to appear nationwide.

When Thomas Edison had an idea, people listened to it. One of the people listening to Edison's address in 1906 was steel magnate Henry Phipps, the first industrialist to embrace concrete as a solution to the issue of providing sanitary, affordable, fireproof housing for his employees. "Better living conditions made for better workers," reasoned Phipps, joining Edison as the most prominent advocates of concrete housing.¹² Typical worker housing of the era had poor lighting, ventilation, and heat, inadequate sanitation, no running water, and presented fire hazards. Phipps hoped improved living conditions might help relieve labor problems like absenteeism, turnover, and unionization. Edison's reasons for advocating concrete housing were also not entirely altruistic; the Edison Portland Cement Factory opened in 1899 near Stewartsville, New Jersey, with equipment recycled from a failed iron ore business. Still, by building concrete houses using his own highly refined and finely ground Portland, Edison felt the houses could be durable, sanitary, less expensive, fireproof, and profitable (although Edison told the press he would not accept any profit from the project).13 The problem with concrete was (and remains) its expense. Edison was not deterred; by combining innovation and technology he believed that the cost of building with concrete could be less than building with wood, setting a target price of \$1,200 per house.14

After building several small-scale prototypes (his employees dubbed one "the chicken-coop") and experimenting with the mix, Edison built a garage and a shed on his Llewellyn Park estate and set to work.¹⁵ Confident he was ready to begin production, the inventor had two of his draftsmen, George Small and Henry Harms, develop plans for worker housing, while Edison himself focused

The Lambie field office at the corner of Modisette Avenue and Walnut Street, August 1916. Edison's steel panels scattered around the site created an Erector Set effect. Donora Historical Society, Brue Dreisbach Photograph Collection.



his attention on lowering costs.¹⁶ To replace the expensive wooden forms, he developed a reusable, more durable, 36-square-inch interlocking cast iron form, calling it a mold.¹⁷ Edison's original plan called for a single monolithic pour, creating a unified and incredibly sturdy structure. That plan worked well on the prototypes, but in the field it quickly proved to be unwieldy, so pours were broken into component parts.¹⁸ Initially a single set of forms cost \$25,000 to produce. They were also heavy, requiring a crew of 30 men with a crane a full day's labor to set up. A single set of forms could build 144 two-story homes per year, but the cost remained five times greater than wood construction.¹⁹ Edison replaced the heavy cast iron with a lighter, more durable steel. Now each 8-foot by 9-inch panel form could be secured into place by two or three men, reducing the 30-man crew to 10 and eliminating the crane. The cost of the forms was reduced to \$12,000 per set, lowering the expense to only twice the cost of building with wood.²⁰ Edison remained confident, reasoning that economies of scale—building dozens of houses or entire neighborhoods—should reduce the cost to at least that of building with wood—though ultimately, it did not. Franklin D. Lambie, a neighbor and business associate of Edison, agreed to move the idea into the field, building the first Edison concrete house on Hixson Street in South Orange, New Jersey.²¹ Lambie secured much of his financing through Charles Ingersoll, who made his fortune selling "the dollar-pocketwatch."²² Together they formed the Lambie Concrete House Corporation to build the houses, and the New York Steel Form Company (later the Lambie Steel Form Company) to produce the forms.²³ The exteriors were based on a simplified version of Frank Lloyd Wright's Prairie School architecture: low, shallow-

ABOVE: The evolutionary process of concrete construction is evident on Modisette Avenue in the shadow of the guide wires of the derrick and sluice.

RIGHT: The derrick and sluice at work on Bertha Avenue along with draft horses delivering supplies to the mixer. In the right background the smoke of the Open Hearth rises above drying laundry. Donora Historical Society. Bruce Dreisbach Photograph Collection. pitched hip roofs; overhanging eaves with box gutters; and long, simple, straight-line details, combined with an American-Four-Square floor plan.²⁴ Although not a financial partner of Lambie and Ingersoll, Edison was the inspiration and face of concrete construction. "I do not wish to be remembered as the father of ugly housing," explained Edison after hiring the prestigious New York architectural firm of Mann and MacNeille as design consultants.²⁵

The Lambie Concrete House Corporation began building houses in 1915 in Montclair, New Jersey, two of which are still immaculately kept on North Mountain Avenue.26 The corporation's first jobs were single-family houses and two planned communities of less than a dozen dwellings, including one named Ingersoll Terrace in Union, New Jersey.²⁷ Lambie officials agreed with Edison's and Phipps' philosophy that the initial expense of building concrete houses was worth the investment, and workers could feel secure and take pride in their sanitary, fireproof homes. "The man who lives in a concrete house has little cause to worry over the cost of upkeep and risk of fire," boasted one Lambie advertisement.28 In March 1916, American Steel and Wire Company in Donora contracted Lambie to build 60 single houses and 20 duplexes. If building went well and costs were kept down, American Steel and Wire planned to build more concrete houses.29 Lambie was ready to create Edison's "City of Cement."

American Steel and Wire chose eight home styles. On June 23, 1916, a full-page advertising broadside appeared in *The Donora-American* describing model type #206: Two-story single family dwelling, six rooms and a bath, fireproof reinforced concrete construction, asbestos shingles, hip roof, box gutters, full cellar, southern yellow pine floors and trim, stained and varnished, walls plastered and papered or painted, natural gas fired heat, [switched to coal in 1924] city water, laundry, sewage, separate storm sewer, knob and tube electrical supply, electric lighting.³⁰

Editorial pages described the houses as a domestic utopia. The "builder designed them to require the least possible number of steps for the housewife ... as well as furnish a comfortable and commodious home to which the workman will be glad to return from his day's toil."³¹

Lambie named Louis Brandt as general manager of the Donora project and chose Brandt-Clepper Company of Pittsburgh as onsite engineers, developing specifications from plans drawn by Lambie draftsmen as well as Edison, Small, and Harms.³² (Thomas Edison is credited with designing the shed roof that covers the back porch of each unit, the same roof design over the front entrance of the Ingersoll Terrace houses.)³³ Construction began in August 1916 using Edison's recently developed reusable steel panel forms and the newly patented Poured-In-Place concrete construction method featuring a mobile 70-foot derrick, which hydraulically pumped the mix into the forms.³⁴

Before the first barrel of Portland was opened, the people of Donora were calling the site "Cement City."³⁵ The Portland was supplied by the Universal Portland Cement Company, a subsidiary of United States Steel Corporation.

10,000 barrels of Portland, each weighing 376 pounds, were mixed with 5,400 tons of sand and 6,500 tons of slag to create over 12,000 yards of concrete, about 125 yards per house.



In August 1917, the sluice delivers concrete to the first two houses at the corner of Modisette Avenue and Walnut Street. Typical wood frame housing of the era fills the background. In the bottom photo's left foreground, floor panels are stacked and ready for use.

Both Donora Historical Society, Bruce Dreisbach Photograph Collection



The mill provided the slag and sand to complete the matrix. During the next year 10,000 barrels of Portland, each weighing 376 pounds, were mixed with 5,400 tons of sand and 6,500 tons of slag to create over 12,000 yards of concrete, about 125 yards per house.³⁶ The mix was transported by horse-drawn wagons and motorized vehicles nearly a mile to the site and dumped into the derrick hopper. Later, concrete was mixed in the unpaved streets of the job site. Edison's panel forms made the site look like a giant Erector Set. The steel panels were set into place by hand and held together with clips and wedges-less timeconsuming than nuts and bolts. Only horizontal pours were reinforced. Each level was aligned by a visible belt course, creating a pleasing structural and aesthetic effect. The belt course broke up the two-story mass of concrete at each floor level with a one-foot high extension around the entire house, complementing the Prairie Style design.³⁷

Glenn Howis, an engineer for American Steel and Wire, bought his Cement City house in 1952 and discovered "some houses have paper and plaster interior walls with [wood] studs but they aren't on center. Some houses have lathe and plaster walls. It comes down to who [which construction company] built your house."³⁸ Howis marveled at the craftsmanship of the workers: "It's hard to get concrete perfectly square, plumb, and level. Those old-timers had to custom fit everything like the cabinets and woodwork without modern power tools."³⁹

The timeframe predicted 12 houses to be poured in the first eight weeks, then, as the crews gained expertise and proficiency, 12 houses every three weeks afterward. The portable hydraulic derrick had the capacity to pour four units per day. Edison cut curing time in half by adding gypsum to the mix and solved the problem of aggregate settling to the bottom with bentonite clay, which suspended the slag evenly through the liquid Portland. Each pour took three days to cure before forms could be removed and the next story begun. The average unit could be poured then ready for roofers, carpenters, electricians, and plumbers, in about nine days. The entire job was to be completed "before cold weather set in."⁴⁰

Production was slow over the fall and winter of 1916-17. By spring, only 14 units had been completed: at that rate it would take five years to finish the project. Brandt had not anticipated the unusually cold, wet weather; he also underestimated the labor needed, and the mobile derrick had limitations. Lambie was far behind schedule and losing money.⁴¹ To bring the project under control, two construction companies experienced in large-scale concrete work were called in: Aberthaw Construction Company of Boston and Nicola Building Company of Pittsburgh.⁴² Aberthaw already had 40 men subcontracting with Lambie, and sent more labor and equipment to Donora. Brandt had worked with Nicola when he was general manager on the Forbes Field project. By November 1917, there were 80 structures complete: 60 single houses and 20 duplexes.43 Plans for additional houses were abandoned. Even with division of labor and economies of scale, building with concrete was proving too costly. Each Cement City house cost, on average, \$3,386.44 to build.44 A similar wood



framed house of the time cost about \$2,000.⁴⁵ (Construction of a Cement City house today would cost over \$250,000.)⁴⁶ The entire Cement City project cost American Steel and Wire just over \$300,000. The company had only part of what it hoped to construct, yet an entire neighborhood had risen in 14 months—one with a unique identity.⁴⁷

"Those guys [construction companies] all went broke building Cement City," observes longtime Cement City resident Bob Turnbull.⁴⁸ Everyone lost money but no company became insolvent. Lambie was hit the hardest, but continued to build concrete homes into the late 1920s before abandoning Edison's vision.

In the summer of 1932, baseball Hall-of-Famer Stan Musial was 11 years old when he led his neighborhood Heslep All-Stars baseball team to the top of the hill in south Donora to face the Cement City Cardinals. Years later Stan "The Man" fondly recalled the 22-4 victory, not only for the win but mostly because "Cement City was where the rich kids lived."⁴⁹ Eventually Musial realized that, "The rich kids weren't really so wealthy either."⁵⁰ It was the houses themselves, more than the people who lived in them, that made Cement City a unique and enviable place to live.

The houses were rented to foremen and middle management at American Steel and Wire who were mostly Scots or Scots-Irish, one of the only ethnic exclusive neighborhoods in Donora.⁵¹ Employees called residents "silvercheck-men" because of the color of their mill identification badge.52 The company gave tenants the option to buy the houses, which no one accepted.53 Rent ranged from \$22.50 per month for half of the smallest duplex, to \$42 per month for the largest single, including utilities.54 Tenants were responsible for little in the way of maintenance. The company maintained and monitored its property closely, issuing a comprehensive and detailed list of rules for Cement City tenants. Nothing was to be hung or attached to the walls. Inside, tenants accepted the company's choice of paint or wallpaper.

Rooms were papered or painted every three or four years, as was exterior trim. The company provided gas stoves, iceboxes (residents had the option of purchasing an electric refrigerator), light fixtures (including bulbs), and a pencil sharpener placed on the side of the basement steps. American Steel and Wire provided a maintenance crew working from a shed on Walnut Street where rent was paid and repairs scheduled. Outside, maintenance crews kept the streets swept, trimmed bushes and trees, raked leaves, cut grass, shoveled snow, and painted fences and handrails. Personal landscaping required company approval. The crews maintained flower gardens, playgrounds, a ball field, picnic pavilions, and tennis courts in the neighborhood. There was even talk of building a swimming pool. A security guard kept track of visitors, especially children trying to use the facilities.55 "When I was a kid you just didn't walk into Cement City to play," recalls current resident Nicholas Uhriniak. "Someone who lived there had to invite you."56

In 1917, Cement City builders used cuttingedge technology and simple craftsmanship. The home furnaces were fired by natural gas (unusual for the time), though switched to coal in 1924. "The company paid for everything," explains Turnbull. "I don't remember if you [renters] paid for your own coal.... I don't think so. The houses were built with fruit cellars and those were converted into coal cellars."⁵⁷

William Bush was born, raised, and continues to live in Cement City, one of the last remaining residents to claim that distinction. Bush remembers nearly running over Stan Musial and his wife with his sled on Chestnut Street. "They must have been walking up to his sister-in-law's house; she lived on Modisette Avenue. I came close to Stan—he had to jump out of the way."⁵⁸

During and after its construction, Cement City generated significant attention in the engineering, architectural, and construction disciplines. Because the Pouredin-Place technique had not yet appeared in any



ABOVE: Model #203 around Christmas 1917 (note wreaths in windows). The recessed porch allowed for more living space on the second floor.

BELOW: Decorated living room of model #213. The lamp on the table is plugged in to one of the overhead sockets. Like most houses of the era, the number of electrical receptacles in each room quickly proved to be inadequate.





textbooks, Cement City became a regular field trip for engineering and construction students. Carnegie Institute of Technology students came to study the project on several occasions.⁵⁹ The Engineering Society of Western Pennsylvania sent 200 members and a large group from the Society of Women Engineers.⁶⁰ Multiple newspapers, magazines, and trade publications covered the Cement City story.⁶¹ The January 1918 issue of *Popular Mechanics* featured the neighborhood as "a model of an innovative method of rapid concrete construction."⁶²

Similar concrete housing was built across the state around the same time as Donora's Cement City. Cambria City in Johnstown contains 89 units with a similar four-square floor plan as Donora's Cement City. Concrete City, located in Hanover Township, Luzerne County, was built by The Lackawanna and Western Railroad Company. The 20-duplex plan hoped to improve living conditions for the company's miners; unfortunately it was a halfhearted effort. The plan included a common courtyard, concrete sidewalks, and the luxury of a swimming pool, although the units lacked indoor plumbing and electricity. The development was abandoned in 1924 because it was too costly to retrofit the houses with plumbing and central heating.63 Other

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concrete housing developments built during this time in the United States include: Bridgeport, Connecticut; Newark, Stewartsville, New Village, Phillipsburg, Montclair, and Union, New Jersey; Staten Island, New York; Akron and Newark, Ohio; Duluth, Minnesota; Kenosha, Wisconsin; and Gary, Indiana, which, with its 110 houses, is the largest cement city ever completed.⁶⁴

The Union Improvement Company investment group held the deeds to Donora's Cement City until 1934, when ownership transferred to American Steel and Wire Company. Real estate mogul John W. Galbreath bought the houses in 1943 and immediately began selling to individual buyers, most selling for around the original building price of \$3,300.⁶⁵ By 1950 all Cement City houses were in the hands of individual owners.66

Over the years colors have changed (original colors included cream, buff, slate gray, and chevy chase), pergolas and lattice trim were removed, box gutters covered over, flat porch roofs gabled, porches taken in as living space, and small additions added along with garages and sheds.⁶⁷ The overall uniformity, character, and integrity of the original plan remains with all 80 structures and the maintenance shed surviving in varying states of repair.

In 1996 Cement City was placed on the National Register of Historic Places largely through the initiative of Ringgold High School student Justin Shawley, who said, "I've always been interested in history. I wanted to do something for the community."⁶⁸ Shawley had undertaken the project at the urging of his mother, Patricia, then president of the Donora Historical Society.

The idiosyncrasies of concrete construction require modern-day Cement City landlords to adapt conventional renovation and repair skills. "Nothing is easy [to fix or repair] in one of these houses," says Bob Turnbull. "Simple things turn into major projects. Some contractors just won't work on them. Some will ask, 'Is that in Cement City?' Oh, maybe they try it once, but most say, 'never again.""69 Nick Uhriniak, another veteran of repairing cement houses, well knows the learning curve: "The first thing you realize is you can't run wires or pipes through the walls. Drilling through that concrete takes a lot of time and makes a lot of dust ... seven and one-half inches of concrete dulls a lot of bits; it's not like [drilling through] wood."70 Making an opening for a window or door in a wood-framed house may take several hours; in Cement City it takes several days. "We drilled two doorways in my daughter's house to make a duplex into a single," recalls Uhriniak. "It took three days for each one, when we got to the basement [to drill a doorway] we said forget it."71 There is never a shortage of difficult jobs to perform in Cement City. "Patching the eaves

is the hardest," claims Uhriniak, as "getting cement to stick upside-down is tough. I put up scaffolding and make a form to let the cement setup ... it's a major project."⁷²

The social and economic dynamics of Cement City are currently in a third transition. From 1917 to 1943, Cement City was a community of mill foremen and middle managers, with similar ethnic, economic, and religious backgrounds. The last half of the 20th century witnessed a more diverse and upwardly mobile resident moving in. Slowly but steadily in the 21st century, the neighborhood is transitioning into an uncertain future. Fewer homes feel the consistent care of resident owners, as absentee landlords allow property to fall into disrepair.

Several obstacles hinder Cement City maintaining itself as a viable, attractive neighborhood. The narrow streets, small lots, and proximity of the houses severely limit the amount of parking and expansion available to the homeowner, a major drawback in an era of multiple vehicle households. "One of the biggest problems is parking. I'm lucky, I have a place out back in the alley," says Turnbull. "Back then not everyone had a car. The company would send up a jitney at shift changes ... most of those old guys would walk."⁷³ Another problem is the reasonable selling prices, which invite real estate companies and investors to buy the units as rental property, creating a transitory rental neighborhood. Consequently, Cement City is blighted by houses in various stages of disrepair. Finally, the neighborhood's infrastructure, though innovative in 1917, is outdated and desperately in need of upgrading.

Thomas Edison never judged any experiment to be a failure, as negative results yielded lessons on how not to solve a problem. Concrete construction, even on a mass scale, proved to be too expensive to solve the problems of substandard slum housing. Concrete houses are everything Edison had promised: durable, sanitary, secure, solid, and nearly fireproof. They were just not affordable for the buyer or costeffective for the builder, and remain so to this day. "Edison wanted to work out the technical aspects and then license the patents to anyone who wanted to help humanity," concludes Edison scholar Michael Peterson.74 Even the inventor's genuine altruistic vision of "rescuing" people from the slums experienced a backlash of rejection when consumers balked at building and



FACING PAGE LEFT: An unidentified mill foreman and his wife pose in front of their model #206 on Ida Avenue. The potted plants were the limit of tenant landscaping options; the company chose all other shrubs, bushes, trees, and flowers.

FACING PAGE RIGHT: A rear view of model #203 features added second floor living space with a bump out. The Edison-designed shed roof looks out on a backyard with an open storm sewer.

RIGHT: Decorated living room of model #203, one of only three in Cement City. The piano, an incredible luxury at the time, sits amid the modern conveniences of a gas fireplace and electric lighting. The renters could only hope the wallpaper and paint color, chosen by the company, matched their furniture, carpets, and curtains. All Donge Historical Society. Bruce Dreisbach Photocraph Collection. living in houses intended for "slum-dwellers."⁵ Concrete construction became the matrix of modern urban infrastructure. The slum dweller continues to wait to be "rescued from squalor and poverty."

Brian Charlton, educator and historian, has been a Cement City resident since 1984 and is a volunteer at the Donora Historical Society. To learn more about Cement City and to see the large collection of Bruce Dreisbach glass plate negatives, visit the Donora Historical Society at donorahistoricalsociety.org or email them at donorahistoricalsociety@gmail.com.

- ¹ Michael Peterson, "Thomas Edison's Concrete Houses," *Invention And Technology* (Winter 1996): 50.
- ² Ibid.
- ³ Ibid., 52.
- ⁴ "House Famine is Keeping Down Population of 20,000 or Over," *The Donora American*, 10 March 1916, 1.
- ⁵ "Mill Men Desperately Seek Housing," *The Donora American*, 16 February 1915, 1.
- ⁶ Bureau of Census, 14th Census of the United States (Washington: GPO, 1920); Sandra Bavuso, The Cement City (California, Pa.: California University of Pennsylvania, December 1994), 4.
- ⁷ "House Famine is Keeping Down Population of 20,000 or Over"; Clinton Piper and Terry Necciai, *National Register of Historic Places Nomination* (United States Department of the Interior, 1994), section 8, page 2.
- ⁸ "House Famine is Keeping Down Population of 20,000 or Over."
- ⁹ "Contract Let for 100 New Houses," *The Donora American*, 23 June 1916, 1; Karen Peters, "Donora: Cement City One of a Kind," *Monongahela Valley Review* (December 1990), 4.
- ¹⁰ James C. Massey and Shirley Maxwell, "The Case for Concrete Houses," *Old House Journal* (May/June 1994), 27.
- ¹¹ "Thomas Edison Failure," *Invention & Technology* (Winter 1991), 23.
- ¹² "America Has Lagged in Industrial Housing: Big Field for Local Development by Dealers," Universal Portland Cement Company (December 1917); Richard W. Steiger, "Edison's Concrete Dream," The Aberdeen Group (1999, Publication #C99G039), 42.
- ¹³ Steiger, 27; Piper, et al., 5.
- ¹⁴ Peterson, 51; Steiger, 28; Bavuso, 4; Peters, 1.
- ¹⁵ Peterson, 51; Piper, et al., 4; Steiger, 27.
- ¹⁶ Bavuso, 4; Piper, et al., 8.
- ¹⁷ Leslie H. Allen, "Industrial Housing Problems," *The Iron Age*, 27 December 1917, 14.
- ¹⁸ Allen, 14; Peterson, 51; Piper, et al., 7; Steiger, 21.

- ²⁰ Steiger, 21; Piper, et al., 7.
- $^{\scriptscriptstyle 21}$ Peterson, 51; Piper, et al., 7.
- ²² Peterson, 52; Steiger, 21.
- ²³ Piper, et al., 5.
- ²⁴ Peterson, 52; Steiger, 22.
- ²⁵ Steiger, 22.
- ²⁶ Peterson, 52.
- ²⁷ Peterson, 53; Steiger, 22.
- ²⁸ The Donora American advertisement, 28 June 1916.
- ²⁹ "Contract Let for 100 New Houses." ³⁰ Ibid.
- ³¹ Ibid.
- ³² Allen, 14; Piper, et al., 4.

- ³⁵ "Contract Let for 100 New Houses."
- ³⁶ "America Has Lagged in Industrial Housing: Big Field for Local Development by Dealers."
- ³⁷ Piper, et al., 4; Peterson, 51; Steiger, 23.
- ³⁸ Glenn Howis, Cement City resident, interviews by author, Donora, Pa., 1984-2005.

- ⁴⁰ Leslie H. Allen, "Concrete Housing Development," *The Iron Age*, 11 October 1917.
- ⁴¹ Piper, et al., 4; Steiger, 23.
- ⁴² Piper, et al., 4; "Steel Works Houses Very Attractive," *The Donora American*, 15 December 1916, 1.
- ⁴³ "Tech Students Visit Donora," *The Donora American*, 17 November 1917, 1.
- ⁴⁴ Piper, et al., 5; Peterson, 53.
- 45 Piper, et al., 5.
- ⁴⁶ Allen, "Concrete Housing Development," 8; Bavuso,6; Piper, et al., 4.

⁴⁸ Robert Turnbull, Cement City resident, interviews by author, Donora, Pa., 1984-2010.

⁵⁰ Robert Broeg, Stan Musial: The Man's Own Story (New York: Doubleday, 1964), 33.

- 52 Howis; Turnbull.
- ⁵³ Howis and Turnbull; "Rental Unit Policy," revised: 1922, 1924, 1935, 1942, microfilm of American Steel and Wire Company, Donora Historical Society, Donora. Pa.; "Steel Works Houses Very Attractive."
- 54 Ibid.
- ⁵⁵ Nicholas Uhriniak, Cement City resident, interviews by author, Donora, Pa., 1982-2010.

56 Ibid.

- 57 Turnbull.
- ⁵⁸ William Bush, Cement City resident, interviews by author, Donora, Pa., 7 February 2010.
- ⁵⁹ "Engineers Society in Donora Tomorrow," *The Donora American*, 16 November 1917, 1; "Tech Students Visit Donora," 1; "Visit by Society of Women Engineers" *The Donora American*, 14 May 1918, 1.
- 60 Ibid.
- 61 Ibid.
- ⁶² "Hundred Residences Built at Record Pace," Popular Mechanics (January 1918): 6.
- ⁶³ E. T. Gray, "Cambria Steel Company Completes 89 Hollow Wall Houses," *Concrete* (January 1922): 5; Robert. A. Janosov, "Model Company Housing for Anthracite Workers in an Age of Industrial Efficiency: The Case of Concrete City," *Canal History and Technology Proceedings*, 22 March 1986, section 2, 14; Piper, et al., 8.
- 64 Ibid.
- 65 Piper, et al., 8.
- ⁶⁶ Piper, et al., 7; Howis.
- ⁶⁷ Piper, et al., 4; Howis.
- ⁶⁸ Scott Beveridge, "Cement City Broke the Mold," *Mid-Mon Observer*, 6 July 1994, section B, 1.
- 69 Uhriniak.
- 70 Ibid.
- 71 Ibid.
- 72 Ibid.
- ⁷³ Turnbull.
- ⁷⁴ Peterson, 54.

75 Ibid.

The overall uniformity, character, and integrity of the original plan remains with all 80 structures and the maintenance shed surviving in varying states of repair.

¹⁹ Allen, 14; Piper, et al., 7.

³³ Ibid.

³⁴ Ibid.

³⁹ Ibid.

⁴⁷ Ibid.

⁴⁹ Turnbull.

⁵¹ Ibid.

Cement City children and their invited guests pose in the playground along the baseball field fence. An adolescent Stan Musial gave birth to a unique Cement City ground rule due to the short distance to the houses behind the right field fence: a ball striking a house was a double; a ball breaking a window was an out. Denora Historical Society, Bruce Dreisbach Photograph Collection.

A model #203 house in Cement City today. Photo by Brian Charlton.

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