The ironwork of the French Quarter is familiar to all who know New Orleans. Much of this is cast iron made in New Orleans and other cities during the 19th century. The balconies and verandahs of the French Quarter are but one use of the popular building material and are the products of a thriving business which supported many residents of the Crescent City.

Mass-production methods developed for casting iron made it a favorite material for use in buildings, machines, and tools in the 19th century. The development of the iron industry at that time was rapid, contributing to and profiting from the technological progress of other industries. By mid-century, decorative and structural cast iron was widely used as a building material, partially replacing wood, wrought iron, and other materials. Many utilitarian objects were produced for the home including stoves, garden furniture, cooking implements, irons, holloware, tools, and hardware. Cast-iron fences, statuary, fountains, and vases were widely available. Most important to technological progress was the manufacture of heavy machinery, steam engines, components for bridges and large buildings, and transportation equipment. Advances in foundry techniques made possible the production of these large, complicated items so essential to the economic growth of industrialized nations. In his book, *The Founding of Metals* (1877), foundryman Edward Kirk expressed the opinion of many Victorians:

> Iron has come into such general use in modern times that the development of the iron resources of a country may readily indicate the advancement of a nation; for iron has become the symbol of civilization; its value in the arts can be measured only by the progress of the present age, in its adaptation to the useful arts; it has kept pace with the scientific discoveries and improvements, so that the uses of iron have become universal; it is worth more to the world than all the other metals combined.

According to William Fairbairn, noted student of the iron industry, cast iron was first used in quantity in 1543 when a number of cannons were made in Sussex, England. By the early 1700s, the Coalbrookdale Ironworks was in operation, a firm whose leadership continued well into the 19th century. During the 18th century, experiments were made with equipment, fuels, and ores and by 1750, coke, prepared by reducing coal, was introduced to replace charcoal as a fuel for blast furnaces. Attempts were made in England to use cast iron in the construction of machinery. The first bridge using the new material was constructed in 1773 near Coalbrookdale. William Fairbairn, in his book *On the Application of Cast and Wrought Iron to Building Purposes* (1854), comments on the early use of structural cast iron in buildings:

> The first instance on record of the successful application of cast-iron beams to the purposes of building, is that of a fire-proof cotton-mill erected by Messrs. Phillips and Lee of Manchester. This mill was built in the year 1801...From 1801 till 1824 little or no variation took place in the form of beams, and for a quarter of a century Messrs. Phillips and Lee's mill offered the model for similar buildings.

In 1824 an Englishman, Nielson, received a patent on the hot-blast process, which revolutionized the iron industry. Previously, blasts, or streams of cold air, were used to fan the fuel in the furnace. The hot blast, achieved by preheating the air in an auxiliary chamber, created a hotter fire and allowed the use of coal as a fuel. The increase in the quality of pig iron was minimal, but the increase in quantity was

enormous. More iron could be processed at a time, and more cheaply, through the use of the hot blast. Steady demand for the improved product prompted foundrymen to develop better techniques, more scientific methods, and new applications. By the 1830s the cast-iron industry in England was developing rapidly. The catalog of the Crystal Palace Exhibition reported in 1851 that the annual production of iron in Great Britain was upwards of 2,250,000 tons.

American cast-iron production was greatly influenced by English technological advances. Although the adoption of new processes required considerable capital expenditure, American manufacturers began using the hot-blast process and mineral fuel. The production of pig iron increased, and by the 1850s large American cities had foundries capable of converting the pigs into useful and decorative objects.

Companies in New York, Philadelphia, and Baltimore were the leaders of the industry and many of their products were shipped to other cities. Their designs, circulated by catalog, were copied and their innovative ideas were used by other founders. Some Eastern firms had branch offices in other cities. In New Orleans, Wood, Miltenberger & Co. represented the Philadelphia firm of Wood & Perot. Local newspapers contain advertisements from companies in New York, New Jersey, Kentucky, and Alabama. Trade catalogs, so instrumental in spreading pattern designs, were produced by the most successful firms as advertising for their standardized items. Often catalogs listed prices as well as the most notable uses of their products. The ironwork catalogs of the Architectural Iron Works of the City of New York (D. D. Badger, pres.), the New York Wire Railing Company (Hutchinson and Wickersham), and the Philadelphia Architectural Iron Company mention their important jobs in New Orleans. American, English, and French catalogs were widely circulated and influenced foundrymen throughout the country. Some designs appear in more than one catalog and their widespread use indicates that these elements were not exclusively produced by the originating company. Unless marked or authenticated by records, it is impossible to be certain which company produced a cast-iron object.

The cast-iron industry in New Orleans began with the

establishment of the Leeds Iron Foundry in 1825. The industry expanded during the following decades and reached its peak just before the Civil War. Advertisements in local newspapers indicate that quantities of pig iron, from which any article could be cast, were entering the city regularly. An 1851 notice announces the arrival of 500 tons; another in 1858 advertises 300 tons of "Scotch Pig Iron." Such shipments were not unusual and illustrate the quantity of cast-iron objects being produced in New Orleans. Many local companies specialized in the manufacture of sugar mill equipment and other machinery, advertising architectural elements as a sideline. Other companies were chiefly occupied with architectural production. In addition to foundries, there were numerous companies advertising as manufacturers of iron, blacksmiths, sheet-iron workers, and dealers in stoves and iron. City directories of the 1850s list hundreds of ironworkers, including blacksmiths, pattern makers, moulders, and founders. Census listings show that many New Orleans ironworkers were recent immigrants from Ireland and Germany. In 1860 other ironworkers were listed as free men of color, while a number were from England or other areas of the United States.

Most of the architectural ironwork produced in New Orleans was used decoratively, rather than for structural purposes. Architectural cast iron was used in New Orleans by the 1830s in combination with wrought iron. Small decorative castings were incorporated into wrought-iron fences and railings. The use of cast iron was furthered by the long tradition of ornamental ironwork in New Orleans. Residents were especially receptive to the new material and used it to replace earlier wrought-iron decoration. Ornamental cast iron was most popular during the 1850s, a period of growth and prosperity in New Orleans. Many large homes and new commercial structures built at that time were enhanced by the fashionable material. The *Daily Picayune*, July 7, 1852, contains the following comment: " One of the most admirable innovations upon the old system of building tall, staring structures for business purposes, is the plan which we are glad to see is generally coming in use, of erecting galleries and verandahs of ornamental iron work." Although many 19th century writers favored cast-iron ornament, some architects disagreed because they found too much of the decorative material aesthetically unappealing.

Research indicates that much New Orleans ironwork was painted a bronze color or a soft, bright green. Several building contracts specify that cast-iron verandahs be painted bronze. The contracts for the fences at Jackson Square and Washington Square indicate that bronze paint was to be used. Archaeological investigation at the Pontalba Buildings has recently revealed a paint color which may be the bronze specified in building contracts. Many architectural drawings show a soft green on verandahs, fences, and balconies. Some iron fences were polychromed in naturalistic colors, while cast-iron building fronts were generally painted in imitation of stone.

The large-scale production of ornamental cast iron was interrupted by the Civil War when many foundries began manufacturing war materiel. The *Daily Delta,* March 3, 1862, comments on Bennett & Lurges, a foundry greatly affected by the Civil War: "From such works as casting and building the Free Market, their attention has been directed to the preparation of munitions of war, and now you will see in their extensive establishment any quantity of shot and shell." Although some decorative elements and building fronts were made in New Orleans during the late 1860s, depressed economic conditions reduced the output of many foundries. Some firms failed and others turned to the production of machinery. By the last quarter of the century, renewed prosperity encouraged the opening of new foundries. However, public taste had changed and ornamental cast iron was no longer in such great demand. Steel began to replace iron in many phases of manufacturing and construction. Some New Orleans foundries remained in business well into the 20th century, but never produced in quantity the ornamental ironwork so popular in the 1850s.

New Orleans is fortunate to have retained so much of its decorative cast iron, now lost in many other cities. A growing awareness of our architectural heritage should make possible the continued preservation of these superb examples of 19th century taste.

The differences between wrought iron and cast iron are caused by a variance in carbon content. Wrought iron contains approximately .04 percent carbon while cast iron contains from 2 percent to 6 percent carbon. Wrought iron is a malleable substance

which may be shaped by hammering, stretching, or rolling. Available in bars, rods, and plates, wrought iron is made into decorative forms by individual craftsmen who form the heated iron on an anvil. The final product is strong and very dense. Wrought iron is most suited to geometric or curvilinear designs which reflect the form of the original material. Wrought iron may be waxed for protection as it is quite resistant to rust.

Cast iron is a brittle substance which fractures easily upon impact. The material, available in pigs, is melted in a furnace and the molten iron poured into a prepared mould. After cooling and finishing, the product is ready for use. Cast iron is suitable for many designs, especially the complex and naturalistic patterns popular with the Victorians. Many pieces can be cast from the same pattern and repetitive designs are easily manufactured. Cast iron can usually be recognized by its poured or moulded appearance, and by its rough surface on unfinished interior parts. The product is more susceptible to rust than wrought iron and should be painted for protection.

A number of books were published during the 19th century to instruct foundrymen and provide technical information on iron ores, pattern making, finishing, new equipment, and methods of production. During the 19th century, most iron was smelted from its ores in blast furnaces located near the sources of ore and fuel. The largest class of furnaces in the 1850s produced from 120 to 160 tons a week. The hot-blast furnace, using anthracite coal as fuel, was widely used, producing an economical iron suitable for light castings. As the iron was smelted from its ores, it flowed to the bottom of the furnace and out through channels cut in the sand floor. From the main channel, where it was known as the sow-pig, the iron flowed into moulds, or pigs. The final product, called pig iron or cast iron, was removed from the mould and shipped to foundries which re-melted the iron and cast it into the desired shape. The iron could also be cast directly from the furnace. The manufacture of pig iron was a large industry centered in Pennsylvania and the Ohio River Valley. There were numerous grades of pig iron determined by the chemical content, the kinds of ores and fuels used, and the process by which it was smelted. In 1885 Thomas D. West wrote in his book *American Foundry Practice:*

> Twenty-five or thirty years ago pig iron was not so easily procured as at the present day; much of the iron used was imported, and what few brands of iron were in the market were generally well known. At the present day, however, we find the home production so large that it would occupy pages to even mention the different kinds, and the importations are so small that we seldom hear of any.

When the pig iron reached its destination, it was again melted, at from 2000 degrees to 3000 degrees, and poured into moulds prepared from laboriously carved patterns. Skilled pattern makers were essential to the operation of a successful foundry. The pattern maker's task, combining the skills of a joiner and turner, was to carve a wooden pattern of the design. Pine and mahogany were the best woods for most patterns, although other woods were used for special purposes. Smooth, straight-grained, well-seasoned wood insured a good pattern that, with proper care and storage, could be used repeatedly. Patterns were treated with various substances to make them draw more easily from the sand. Treatment depended on the type of wood, the size and complexity of the pattern, and how often the pattern had been used. Other materials, such as cast iron, brass, zinc, plaster of Paris, wax, and glass, were occasionally used to make patterns. If a pattern was needed for repetitive castings, a cast-iron pattern, more durable than wood, was usually made. Iron tended to shrink in casting, sometimes as much as a quarter of an inch to the foot, and patterns were designed to compensate for this. According to Edward Kirk, *The Founding of Metals* (1885), "The average shrinkage always counted on in making patterns, is one eighth of an inch to the foot."

After the pattern was completed, the moulder's work began. The moulder packed the pattern in the appropriate medium, usually sand, and designed the vents which allowed the escape of gas when the mould was poured. Each mould required one or more gates, the openings through which the iron was poured, and the moulder was responsible for the positioning of these channels. The pattern was removed, leaving an accurate impression of the design in the moulding material. The mould was further prepared by tightly packing the sand and dusting it with coal dust or other substances,

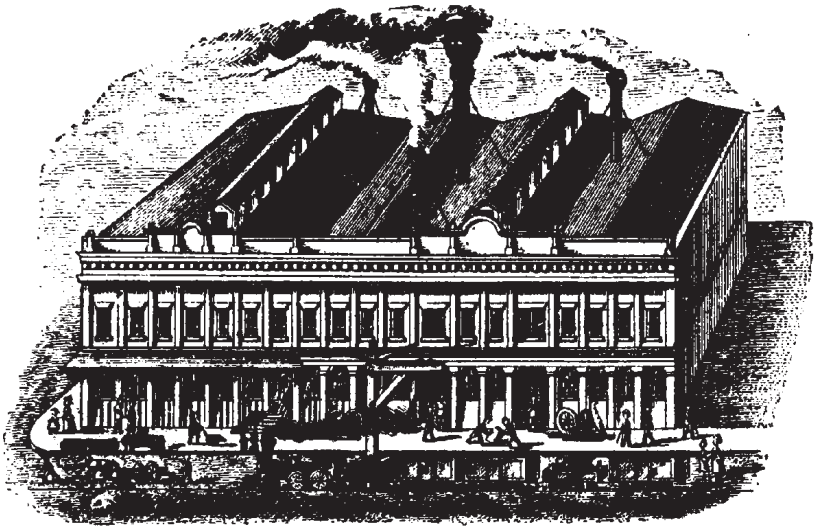
which resisted the intrusion of the iron into the moulding material. The molten iron was poured into the mould and allowed to cool completely. Castings were removed from the mould and smoothed with files, grindstones, or emery wheels before they were assembled into the final product. The moulder's skill was essential. A number of choices had to be made to insure a good casting, including the type of moulding material, the location of vents and gates, and the state of the iron when poured. Books of the 19th century recommended apprenticeship training for moulders and stressed that few moulders were skilled at all types of casting.

The size of a foundry, its structure, and the variety of materials and craftsmen necessary to the operation depended, during the 19th century, on what type of work was being done. Thomas D. West, *American Foundry Practice* (1885), commented:

> Shops that do heavy and light work should have the light work done in parts of the shop entirely separated from the heavy floors, for the reason that grades of sand better adapted for each class of work can then be used, and the work done to pay better. The portion of the building to be used for moulding of heavy castings should be constructed with a view to strength, while the portion for the light casting can be constructed more cheaply.

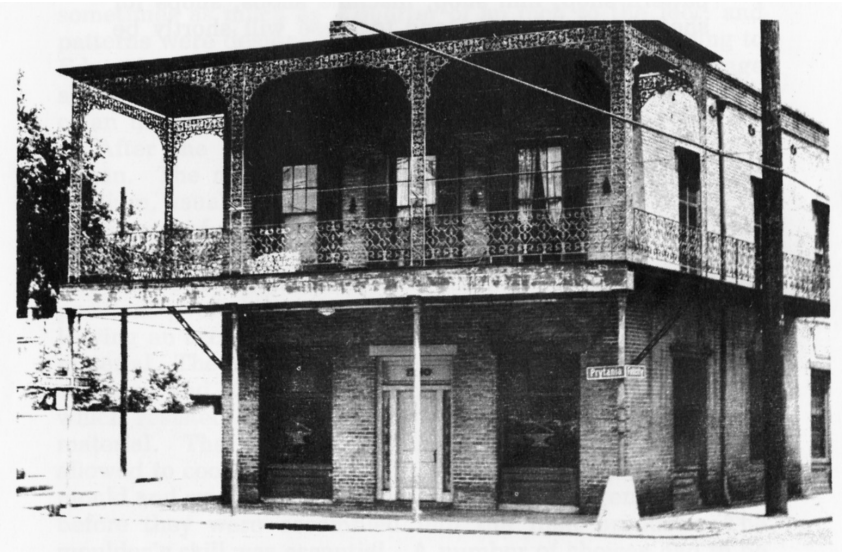
From this and other descriptions, it is evident that foundries were often large establishments, sometimes requiring a city block to accommodate their numerous departments. In 1888 *New Orleans and the New South* gave this description of H. Dudley Coleman & Co.'s facilities:

> The works include departments as follows: Carpenter shop, blacksmith shops, moulding floors, pattern shop, mill shop, machine shops, shops for sheet-iron work, etc., and to these will shortly be added a boiler shop.



EDWARDS & HAUBTMAN.

From *New Orleans and the New South* (1888).



Hinderer's Iron Works, 1780 Prytania Street.