Scattered here and there over southeastern Pennsylvania, especially in the Schuylkill Valley, trailing through the wide Susquehanna Valley, along the beautiful blue Juniata, and across the wooded Alleghenies, may still be found the ruins of old iron furnaces. Each ruin—a pile of large stones intertwined with leaves and the wild growth of bramble—was once the scene of great activity, the center of a community where the iron master and his dependents lived and labored. Here the pioneer iron workers of Pennsylvania, toiling hard, produced iron needed for manifold purposes, and played their part in laying the foundations of a great commonwealth. Although most of these communities, or "iron plantations," had their origins in the eighteenth century, many remained until the middle of the nineteenth, and even later. With the development of large capitalistic enterprises and industrial consolidation after the Civil War, they gradually disappeared and became mere memories.

In many places where iron plantations once flourished, nothing now remains except the stately old mansion house. Those who live there today can usually point out the site or the ruins of the old furnace, and the nearby "cinder" or "slag" heap, buried beneath a layer of soft earth and leaves. Such mansion houses as Warwick, Coventry, Stowe, Windsor, Hopewell, Pine, Pool, Spring Grove, Boiling Springs, Elizabeth, and many others, stand as monuments to a race of fearless iron masters who faced tremendous difficulties

* Copyright Arthur Cecil Bining, 1933.
in obtaining capital, securing skilled workmen, and dealing with metallurgical problems in an age of experimentation.

Scarcely a trace is left of the many forges which once prospered. As most of them were built of wood, time has taken her toll and few remain. One or two, built of stone, still stand, but the old water-wheels, forge hammers, and hearths, are gone. Within those walls the forging of iron has given way to the grinding of grain, or to the sawing of wood. Most of the houses or log cabins, where the iron workers lived and died, have also disappeared.

During the eighteenth century, the iron industry in Pennsylvania was organized largely on plantations. Many of these consisted of several thousand acres of land. The mansion house, the homes of the workers, the furnace and forge or forges, the iron mines, the charcoal house, the dense woods which furnished the material for making charcoal, the office, the store, the grist mill, the saw mill, the blacksmith shop, the common bake oven, the barns, the grain fields, and orchards, were part of a very interesting and almost self-sufficing community. In some respects, the iron plantations resembled small feudal manors of medieval Europe.

It is not strange that these plantations were of great extent. Much woodland was necessary for the thousands of cords of wood consumed annually in the form of charcoal by each furnace. Forges used somewhat less. Many acres were also needed for cultivating grain and raising the food required by the workers. Thus after Samuel Nutt began the manufacture of iron on French Creek, as the forests were cut down, he added thousands of acres to his vast estate.\(^1\) Elizabeth plantation consisted of 10,124 acres,\(^2\) Boiling Springs of

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\(^1\) *Pennsylvania Archives*, Third Series, I. 26, 55, 75.

\(^2\) *Pennsylvania Gazette*, December 5, 1765.
Iron Plantations of Early Pennsylvania

7,000 acres, Reading of 5,600 acres, Martic of 3,400 acres, Warwick of 1,796 acres, Pine of 1,280 acres, and Thornburg of 1,200 acres. During the latter part of the eighteenth century, Colebrook plantation comprised 7,684 acres, and the tract upon which Cornwall Furnace and Hopewell Forges stood, consisted of 9,669 acres. A few were much smaller, such as Mount Joy (Valley Forge) plantation, which about the middle of the century included only 375 acres, and Coventry, which in 1771 consisted of 600 acres. The iron plantations organized in western Pennsylvania during the last two decades of the century, were in general much smaller than those of the older southeast. The Alliance Iron Works, one of the largest, consisted of only a few hundred acres. On the smaller plantations, the iron masters were forced to buy most of their wood from farmers and owners of woodland in the neighboring districts.

The mansion house, where the iron master and his family lived, was usually built on a low hill overlooking the furnace or forge. In the surrounding flower garden, lilies, violets, pinks, hollyhocks, phlox and many other old-fashioned flowers bloomed. The house was stately and commodious, with large rooms, having wide, open fireplaces, and furnished with excellent

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*Pennsylvania Gazette,* September 7, 1769.
*Pennsylvania Archives,* Third Series, XII. 65.
*Pennsylvania Gazette,* January 5, 1769.
*Pennsylvania Archives,* Third Series, XII. 295.
Will of John Potts, Mrs. T. P. James, *Memorial of Thomas Potts, Jr.*, p. 65.
Cumberland County Tax Lists, 1769. (MSS.)
Ibid., p. 30.
*Pennsylvania Gazette,* August 4, 1751, September 26, 1751.
*Pennsylvania Archives,* Third Series, XI. 752.
Fayette County Rolls Office Patent Book, No. 15, p. 97. (MSS.)
*Alden's Appeal Record*, p. 139.
furniture often imported from Europe. In the kitchen, the large kettle, suspended from a crane over a wood fire; the candlesticks and glasses on the mantel-shelf above; and the pewter plates, china dishes and brown earthenware in the corner cupboard, gave a very home-like appearance. The other downstairs rooms contained oak or mahogany furniture including damask-covered couches. China cups and saucers, imported Delft ware, and tankards were carefully arranged on shelves. Fires were kept burning brightly in the huge fireplaces during the long winter evenings. The upstairs rooms, including the guest room, contained curtained beds, massive chests of drawers, and other heavy furniture of the period.

The houses of the iron masters, built in the west during the beginnings of the iron industry there, were not quite as pretentious as those of the older east, nor were they so well furnished. Yet, built only of wood and plaster, these homes stood in marked contrast with the crude workmen’s cabins which surrounded them. The large stone house erected by Nathaniel Gibson on his iron plantation at Little Falls, Fayette county, was an exception and was one of the first large and commodious mansion houses constructed in the Monongahela country before 1800.

In the east, the cottages of the furnacemen, forgemen, miners, farm-hands, and other workers, were usually small stone structures, or were built of log and plaster with stone chimneys. In the central and western parts of Pennsylvania, they were more often log cabins. All were poorly furnished. Until the end of the eighteenth century, rugs and carpets were un-

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15 Fayette County Tax Lists, 1789–1800. (MSS.) Westmoreland County Tax Lists, 1789–1800. (MSS.)
16 Cazenove Journal, p. 36.
17 J. Doddridge, Notes on the Settlement and Indian Wars of the Western Parts of Virginia and Pennsylvania, p. 108.
known in the homes of the workers. Sanded floors and whitewashed walls often made for cleanliness. In the living room, the cast-iron stove was always burdened with pots and pans. Pewter dishes, plates and spoons; iron knives and forks; and wooden bowls and trenchers were the utensils used at mealtimes. The bedrooms were bare and rarely contained mirrors, tables, wardrobes, drawers, or even chairs.\(^\text{18}\)

Just below the mansion house and not very far away from the dwellings of the workmen stood the furnace, a truncated pyramid of stone. Built into the side of a small hill in order that the ore, limestone flux, and charcoal could be put into the furnace at the top, 'it was an impressive sight when in blast. The intermittent roar of the forced blast could be heard a long distance away. From the top of the furnace stack a stream of sparks was occasionally emitted as the flames rose and fell. At night the almost smokeless flames cast a lurid glare upon the sky, visible for miles around, which illuminated the surrounding buildings. Within the main casting shed which was built directly in front of the furnace, the "mysteries" of casting were carried on. Here the molten metal was run from the hearth into the waiting molds of scorched and blackened sand. Creaking wagons drawn by teams of horses hauled the iron ore up the furnace road. From the "bank," the fillers carried their baskets of ore, limestone and charcoal across the bridge to the furnace top. Pig iron was the chief product of the furnace, although pots, pans, kettles, stove plates and fire-backs were also cast.

The forge, where the pig iron was refined and hammered into blooms, or bars of wrought iron, was generally not far distant. The dull, unvaried turning of the water wheel, the irregular splash of falling water,

\(^\text{18}\) J. Doddridge, *Notes on the Settlement and Indian Wars of the Western Parts of Virginia and Pennsylvania*, pp. 137–138; Cazenove Journal, p. 84.
the rhythmic thump of the hammer, and the droning sound of the anvil, were a part of life on the plantation. Within the forge half-naked human beings of strong physique, swung the white-hot pasty metal from the hearths to the great hammers by means of wide-jawed tongs. Under the steady strokes of the hammers, amid showers of scintillating sparks, the forgemen drew the bar to given sizes. Bar iron from the forges was used by blacksmiths to make tools, implements, and numerous iron wares.

In the midst of the community was the iron master’s store. All the necessities of life needed by the workmen and their families were secured there. It resembled in many ways a large country store of the present time, carrying supplies of all kinds. Grains and vegetables raised on the plantation, flour ground at the mill, the meat of cattle and animals bred in the fields, axes, shovels, chains, and hoes made by the plantation blacksmith, sugar and molasses from the West Indies, rum from New England, and imported goods from old England could be purchased. Broadcloth, linen, flannel, and other varieties of cloth, were kept, as well as shoes, deerskins, scythes, fireplaces, stoves and castings.\textsuperscript{19} The workers depended upon the store for drugs and medicines. Jesuits’ bark or Peruvian bark, medicines called “purges” and “vomits” were obtainable. Even coffins and funeral supplies were bought at the store.\textsuperscript{20}

On the stream far below the furnace or forge was the grist mill, built of logs, thick boards or stone. From the high gable, a rope, like a hangman’s, for raising grain swung in the breeze. On one side of the building

\textsuperscript{19} Pennsylvania Furnace and Forge Ledgers. (Historical Society of Pennsylvania.)

\textsuperscript{20} Potts MSS., XXIII. Pine Forge, 1748 (1748–1757), Day Book, pp. 45, 52, 88 ff. passim; \textit{Ibid.}, Coventry, III. 1734 (1734–1741), pp. 19, 23, 29, 54; also \textit{Pennsylvania-German} (1907), VIII. 126 ff.
the ponderous wheel, dark and green with slimy moss, was driven around slowly by the stream of water. The ceiling of the mill was covered with cobwebs and the walls whitened with meal dust. The sound of grinding that issued forth was soft and low for the machinery was all made of wood.

Almost all the iron plantations possessed a saw mill. Timber had to be prepared for erecting buildings and for other purposes. At the beginning of the eighteenth century, there seemed to be enough wood in the dense forests to last for ages. However, before the middle of the century, the traveler, Peter Kalm, commented on the high prices of lumber in the neighborhood of Philadelphia and predicted a shortage in the future. This was not due alone to the large quantities of staves, shingles, planks and boards which were exported, but also to the vast amount of wood consumed by furnaces and forges. This problem did not affect the west at this time, because in the Alleghenies and beyond the frontier lay vast forests.

Iron making was only a part of the work on the plantations. All the cereals—wheat, buckwheat, corn, rye, oats and barley, were grown. Plowing was mostly done with horses; occasionally oxen were used. The system of cultivation was poor. Land was sown with wheat until it would bear wheat no longer, then with barley until barley would no longer thrive, followed by oats, buckwheat and peas. The exhausted land was then forsaken and a new piece of ground cleared.

22 Peter Kalm, Travels into North America (1770 edition), I. 92–94.
23 Israel Acrelius, History of New Sweden, p. 145.
24 Peter Kalm, Travels into North America, I. 93.
25 Pennsylvania Furnace and Forge Ledgers.
26 Ibid.
27 Cazenove Journal, p. 33.
28 American Husbandry, I. 171; Peter Kalm, Travels into North America, I. 144–145.
Flax and hemp were cultivated to some extent and sheep were raised, chiefly for wool. In southeastern Pennsylvania, however, long before the close of the eighteenth century, efforts were made to improve agriculture and stock raising. The Philadelphia Society for Promoting Agriculture offered many premiums. There were other societies, such as the Blockley and Merion Society for Promoting Agriculture and Rural Economy.

While the workmen toiled at furnace, forge, or mine, the women in the homes spun thread and wove cloth on spinning wheels and looms. In haytime and harvest, the women and children turned out to work long hours on the fields. Days were appointed for husking bees, in which old and young participated. The women even did the harder farm work also. They made hay, pulled turnips, reaped the grain, and in fact did almost all the harvesting.

The workers handled little money. The English, French, German, Dutch, Portuguese and Arabian gold and silver coins, the bills of credit and other paper currency used in Philadelphia and occasionally in the scattered boroughs and villages, were rarely seen on the plantations. The iron master credited his workers with the amount earned by them each day on one side of the ledger; on the debit side he made entries of merchandise and goods bought at the store. Likewise the iron master often received in exchange for iron sent to Philadelphia, barrels of rum, dozens of pairs of shoes.

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29 Cazenove Journal, p. 33.
30 Columbian Magazine (1787), I. 34–39.
82 Pennsylvania Furnace and Forge Ledgers.
88 Pennsylvania Gazette, September 16, 1742; Thomas Cooper, Some Information Respecting America, p. 145; Cramer's Pittsburgh Almanack, 1812.
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and other merchandise, which he placed in his store to be sold to his workmen.\textsuperscript{34}

As most of the iron plantations were some distance from the boroughs, settlements, and villages, the workers did not travel far. On many of the isolated plantations, they knew little of what was happening in the world outside. All their interests were bound up in their community. Not often did many of them have the opportunity even to see the stage coaches and stage wagons which ran from Philadelphia to such centers as New York, Baltimore,\textsuperscript{35} Harrisburg, Reading and Bethlehem.\textsuperscript{36} As time went on and some of the regions of Pennsylvania were built up, this isolation tended to disappear. The iron plantations in the Schuylkill Valley, for instance, by the end of the eighteenth century, were in a fairly populous district.\textsuperscript{37}

The iron master often employed a tutor or an old schoolmaster to teach his children.\textsuperscript{38} The children of the workers did not have the opportunity of receiving the smallest amount of training, although occasionally, those of the better paid workmen obtained instruction from the schoolmaster.\textsuperscript{39} The inadequate number of church schools, or even the neighborhood schools which developed later,\textsuperscript{40} were too far away from the plantations. This was true not only in the west, but also in the more settled southeast.

\textsuperscript{34} Pennsylvania Furnace and Forge Ledgers.


\textsuperscript{37} Duke de la Rochefoucauld Liancourt, \textit{Voyage dans les Etats-Unis d'Amérique}, I, 3 ff.


\textsuperscript{40} A. S. Bolles, \textit{Pennsylvania, Province and State}, II. 435–436.
Churches were too few in all parts of Pennsylvania during the eighteenth century. If five or ten miles away, church could be attended occasionally by traveling there on horseback or in wagons. Some iron masters, like "Baron" Henry William Stiegel at Elizabeth, conducted their own sacred services. Many itinerant preachers called at the different plantations. According to tradition, the famous George Whitefield preached at Warwick. The rough iron workers threatened to kill him, but his life was saved by the appearance of Mrs. Robert Grace, the iron master's beautiful wife, who became a Methodist herself. She allowed one of the buildings on the plantation to be used as a chapel. Years later, Benjamin Abbott, a follower and imitator of the great preacher, wrote of his visit to Warwick in 1780. He stated that Mrs. Grace, who was now old, sent a person to the meeting when he preached at Warwick to prevent the iron workers from killing him, and that he was shown every courtesy by her.

John Cuthbertson, the first Reformed Presbyterian minister to arrive in America (1751) traveled on horseback through the forests from one community to another. He visited Reading Furnace, Warwick, Codorus, and others. Not only did he preach and comfort his people, but he also butchered their cattle at the various places where he called.

During the period under discussion, most of the inhabitants of Pennsylvania drank much liquor and

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44 He wrote in part: "Next day I set off to my appointment at Potts (Warwick) Furnace, which for wickedness was next door to hell. Here they swore that they would shoot me. Mrs. Grace, hearing of their threats, and being herself unwell and not able to attend, sent a person to moderate the furnacemen and colliers." Benjamin Abbott, *Experience and Gospel Labors*, pp. 80-81.
45 John Cuthbertson, Diary. (MSS.)
strong drink. The iron masters could afford Sherry, Catalonia, Madeira, French and Teneriffe wines, Jamaica spirits, Bourdeaux claret, and bottled porter. The workers on the plantations drank much rum, whiskey, gin, cider and beer. Drunkenness among the furnace workers was common. It was for this reason that the legislature passed acts in 1726, and 1736, prohibiting the sale of liquors near the furnaces. By the first act, no public house could be licensed within two miles of a furnace unless the iron master gave special permission at the time application was made for the license. The act of 1736 increased the radius to three miles. There was always a shortage of founders and skilled workers, and it was imperative that the furnaces be attended continually, or serious damage might result from the furnace running cold, from explosions, or from other mishaps. The first act stated that the "selling of rum and other strong liquors near the furnaces" had "proved very prejudicial and injurious to the undertakers." The large consumption of liquors continued throughout the eighteenth century and into the nineteenth.

46 It was computed that more than 200,000 gallons of rum alone were brought into the colony in 1728. Of this amount, only 11,400 gallons were re-exported. More than £25,000 worth of rum was drunk in Pennsylvania during that year. Pennsylvania Gazette, 11 mo. 7, 1728–29. For the latter part of the century, see J. D. Schoepf, Travels in the Confederation, 1783–1784, I. 363; F. A. Michaux, Travels to the West of the Alleghany Mountains (second edition), pp. 39–40. Before the close of the century, the manufacture of whiskey had become very profitable in the western country. Tench Coxe, View of the United States, pp. 51, 52.

47 Pennsylvania Packet and Daily Advertiser, July 12, 1788, etc.

48 The ledges of the furnaces and forges contain a large number of entries of liquor, especially rum, bought by the workmen.

49 Pennsylvania Statutes at Large, 1726, c. 293.

50 Ibid., 1736, c. 344.

51 Ibid., 1726, c. 293.

52 F. A. Michaux, Travels to the West of the Alleghany Mountains, pp. 39–40.
While the lot of the workers on the plantations was one of toil, they found some amusement and relaxation in occasional barn dances, corn huskings, and country parties. Once or twice a year some of them were fortunate enough to be able to travel to the fair held at the nearest borough.\(^{53}\) By virtue of their charters, the boroughs were allowed to hold a market each week and two fairs a year. The fairs became centers of attraction. General merchandise, supplies and live stock were sold. Many people attended them and there was much excitement and pleasure. Some went to make purchases; others planned a wild frolic. Horseracing, drinking and gambling often prevailed. At Bristol in 1773, the council resolved that the fairs were useless on account of the large number of shops and stores in the borough, and because "debauchery, idleness and drunk-

\(^{53}\) In Pennsylvania, the term \textit{borough} applies to incorporated units below the rank of cities. Before the Revolution, only a few boroughs were chartered: Philadelphia soon after 1784 (\textit{Colonial Records of Pennsylvania}, I. 117); Germantown in 1691 (\textit{Pennsylvania Archives}, First Series, I. 111–115); Chester in 1701 (Samuel Hazard, \textit{United States Commercial and Statistical Register}, III. 264–265); Bristol in 1720 (\textit{Ibid.}, III. 312–314); Wilmington, which is now in Delaware, in 1739 (\textit{Ordinances of Wilmington}, pp. 145–150), and Lancaster in 1742 (Samuel Hazard, \textit{United States Commercial and Statistical Register}, III. 397–398).

From the Revolution to 1800 the State legislature granted charters to the following boroughs:

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\[(\textit{Pennsylvania Statutes at Large}, 1777, c. 750.)\]

\[(\textit{Ibid.}, 1782, c. 909.)\]

\[(\textit{Ibid.}, 1783, c. 1031.)\]

\[(\textit{Ibid.}, 1787, c. 1182.)\]

\[(\textit{Ibid.}, 1787, c. 1315.)\]

\[(\textit{Ibid.}, 1789, c. 1488.)\]

\[(\textit{Ibid.}, 1791, c. 1570.)\]

\[(\textit{Ibid.}, 1794, c. 1771.)\]

\[(\textit{Ibid.}, 1795, c. 1806.)\]

\[(\textit{Ibid.}, 1795, c. 1811.)\]

\[(\textit{Ibid.}, 1796, c. 1892.)\]

\[(\textit{Ibid.}, 1796, c. 1910.)\]

\[(\textit{Ibid.}, 1797, c. 1938.)\]

\[(\textit{Ibid.}, 1799, c. 2016.)\]

\[(\textit{Ibid.}, 1799, c. 2044.)\]

\[(\textit{Ibid.}, 1799, c. 2045.)\]

\[(\textit{Ibid.}, 1800, c. 2123.)\]
enness, consequent on the meeting of the lowest people together is a real evil and calls for redress." It urged the legislature to abolish them. This was done in 1796. Other boroughs had the same experience. In York, Lancaster, and Harrisburg the fairs were abolished in 1816. Not long afterwards they disappeared from all the boroughs. Agricultural and mechanical fairs took the place of the borough fairs which were a remnant of the medieval days.

The highways which led from the plantations to the outside world and connected the boroughs, towns and villages were picturesque. Quaint signboards of taverns along the road, and of inns and shops in the boroughs and villages added to the attractiveness of the natural scenery. The Three Crowns, King’s Head, Grayhound, Black Horse, Unicorn, Golden Eagle and Swan were but a few. Every craftsman and shopman had his sign representing his calling. After the Revolution many changes were made in the tavern signs. The British Union Jack became the Flag of the Thirteen United States of America, while the Golden Lion was changed to the Yellow Cat.

Along these roads and highways long before the middle of the eighteenth century, the famous covered wagons, which later played so great a part in the westward movement, were transporting merchandise, goods, and produce, to and from Philadelphia, and between the boroughs and towns. These “freight wagons,”

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55 *Pennsylvania Statutes at Large*, 1796, c. 1904.
56 Ibid., 1816, c. 4148.
59 Ibid., pp. 8-9, 11.

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or Conestoga wagons as they came to be called, were strongly built, the body sloping forward. They were covered with coarse cloth stretched over hoops. More than 7,000 were in use by 1750. Pig iron, bar iron and castings were hauled from the furnaces and forges in heavy open wagons over tortuous roads to the main highways. The cost of transportation under these conditions was exceedingly high. For instance, the cost of taking one ton of pig iron which sold for £5-0-0 from Colebrookdale Furnace to Philadelphia, a distance of about forty miles, varied from £1-0-0 to £2-0-0.

Until long after the close of the eighteenth century, the roads west of Carlisle were extremely poor. Pack-horses carried all merchandise along Indian trails, centuries old, to the frontier. Bar iron sent from the Juniata regions to the Monongahela country was bent into the shape of the letter “U” to fit the backs of horses. These horses were led over the mountains in divisions of twelve or fifteen. Each horse carried about two hundred-weight. They traveled in single file in charge of two men, one leading and the other at the end. For many years, Mercersburg, Franklin County, was an important center of trade with the Indians and the western frontiersmen. As the century advanced, iron works were built farther and farther westward, following the trail of the moving frontier. By the close of the eighteenth century iron plantations had been established as far as the western borders of the state, and even beyond. These did not supply the west with all the iron which was needed and for many years after,

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63 Potts MSS.: Colebrookdale Ledgers. The books of all other iron works show the same high rates for transporting iron. Potts MSS. B II. Coventry, 1728 (1727-1734), p. 80, etc.
66 A furnace and forge had been built in the Ohio country before 1799. *Pittsburgh Gazette*, February 2, 1799.
pack-horses plodded wearily over the mountains bearing their loads of bar iron.

Those plantations which were not far from the rivers could send their iron and produce to market by water. The Schuylkill River was used to some extent, but difficulties in navigation prevented its extensive development as a waterway during this period. Iron was sent from Durham down the Delaware River to Philadelphia in boats first designed by Robert Durham, manager of the furnace, about 1750. Washington used these boats when he crossed the river with his depleted army at the crucial time in 1776 amid the snows and ice of winter. Pig iron, bar iron and castings from the iron works at Bedford and other works in the Juniata Valley were shipped down the Juniata River to Middletown on the Susquehanna. From that point the iron was sent by road to Philadelphia, or down the Susquehanna to Baltimore where some of it was exported to Great Britain and to the West Indies. Nor was iron the only commodity sent from the iron plantations to Philadelphia or Baltimore for export. Furs

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66 The iron works situated near the Schuylkill River sent part of their iron to Philadelphia in small boats. The records show that these boats carried from ten to fifteen tons. The cost of transportation was but slightly lower than by road. Potts MSS. LXX. Pine Forge, 1774 (1744-1781), pp. 55, 56, 114; Ibid., LXXI. Pottsgrove, 1772 (1772-1789), pp. 272, 273; Ibid., B II. Coventry, 1728 (1727-1734), p. 56. A memorandum of goods sent by boat down the Schuylkill River for the Philadelphia market from December 20, 1800 to June 20, 1801, includes 20,000 barrels of flour, 600 barrels of bread, 110 tons of iron, as well as great quantities of country products. Pittsburgh Gazette, July 10, 1801.


68 George Washington to President of Congress, December 8, 1776, J. Sparks, Writings of George Washington, IV. 206-207.

69 Boats of from twelve to fifteen tons burden could navigate the Juniata to within a mile or two of Bedford. It took four men to push such a boat up the stream. J. D. Schoepf, Travels in the Confederation, 1783-1784, I. 229.

70 Israel Acrelius, History of New Sweden, p. 165. See also A. C. Bining, British Regulation of the Colonial Iron Industry, Chapter V. and Appendix.
and skins were often shipped with the iron.\textsuperscript{71} By the last decade of the century, many improvements of the roads and waterways of the state were planned.\textsuperscript{72}

Of the many European travelers who journeyed through Pennsylvania during the eighteenth century, only a few visited the iron plantations. This was chiefly because these communities were usually a great distance from the main highways. They were established in the more remote regions because of nearness to ores and vast woods. In 1734, Emanuel Swedenborg, Swedish preacher, theologian and philosopher, wrote of the iron works on the Christiana River (Lower counties) and of the first iron works erected in the Schuylkill Valley by Thomas Rutter and Samuel Nutt. His account contains the earliest description of the Pennsylvania iron works.\textsuperscript{73} Before the middle of the century, Peter Kalm, Swedish naturalist and traveler, writing of his travels, noted Crum Creek Forge, which was not far from the main highway to Baltimore.\textsuperscript{74} Israel Acrelius, sent to the Swedish parish of Christiana on the Delaware River as minister in 1749, and who remained there until 1756 when he returned to his native land, had the opportunity of visiting many of the Pennsylvania iron plantations, especially those of the Schuylkill Valley.\textsuperscript{75} Dr. John D. Schoepf, a surgeon who accompanied some German troops to this country during the American Revolution, saw many of the iron works in southeastern Pennsylvania.\textsuperscript{76} In the western

\textsuperscript{71} Pennsylvania Furnace and Forge Ledgers.
\textsuperscript{72} As early as 1769 attempts were made to improve the inland navigation of Pennsylvania. American Philosophical Society Transactions, I. 298–300. It was not until the last decade of the century, however, that internal improvements were really begun. For a list of proposed improvements of roads and waters, see Thomas Cooper, Some Information Respecting America, pp. 39–47.
\textsuperscript{73} Emanuel Swedenborg, Regnum Subteranneum sive Mineral de Ferro, Part I. Section 13.
\textsuperscript{74} Peter Kalm, Travels into North America, I. 167.
\textsuperscript{75} Israel Acrelius, History of New Sweden, pp. 164 ff.
\textsuperscript{76} J. D. Schoepf, Travels in the Confederation, 1783–1784, I. 197–216, passim, II. 4–8.
country, Michaux called at Probes’ Works or Westmoreland Furnace. Writing about his adventures, he stated:

They directed me at the foundry which road I was to take, notwithstanding I frequently missed my way on account of the roads being more or less cut, which lead to the different plantations scattered about the woods.\[77\]

One of the few native Pennsylvanians who liked to travel in her own land was Elizabeth Drinker. Leaving Philadelphia on September 3, 1764, with her husband, she visited Durham Iron Works. In her diary she wrote:

Left home after dinner—second day; B. Booth on Horseback, and his man Robert; H. D. and E. D. in the Chaise. Drank tea at the Red Lion, 13 miles from Phila.; lodged at Alexr. Brown’s, 28 miles from town, good accomodations. Breakfasted there ye 4th, then went to James Morgan’s at Durham Ironworks—48 or 50 miles from home. Roads very bad; stayed there to dinner; walked to the Furnace, where we saw them at work casting iron bars, &c.\[78\]

In 1777, the gossipy Jacob Hiltzheimer, also paid Durham a visit. In his Diary he wrote:

Reached George Taylor’s at Galloway’s Iron Works (Durham) where we had everything we could desire.\[79\]

After the battle of Brandywine in 1777, George Washington stopped at Reading Furnace in Chester county\[80\] while many of his men were sent to Warwick.

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\[77\] F. A. Michaux, *Travels to the West of the Alleghany Mountains*, p. 48.
\[78\] Extracts from the *Journal of Elizabeth Drinker*, p. 20.
\[79\] Jacob Hiltzheimer, *Diary*, p. 36. Joseph Galloway was the owner of the Durham Iron Works at this time and had leased them to George Taylor. Galloway had presented a compromise plan to the first Continental Congress which he believed would safeguard the rights of the colonists and keep them within the British Empire. He remained loyal to Great Britain and therefore lost his iron works and his large estate. They were sold in 1779 by the commissioner of forfeited estates. *Pennsylvania Colonial Records*, XII. 104.
not very far away. At this time these furnaces and many others were busy casting cannon and cannon balls for the Continental army. Washington went into winter quarters at Valley Forge in 1777–1778. The famous forge there was burned a few months before the American army arrived to spend the winter.

Many legends and traditions have grown up around the iron plantations. The Legend of the Hounds, put into verse by George Boker is one of the most dramatic and interesting. The setting of the legend is the Colebrook Furnace in Berks county, although some claim that it originated at several other furnaces. One of the early iron masters was a man of violent temper, a heavy drinker, and exceedingly cruel, who ruled over his community like a despot, feared by all. One day he returned from a fox hunt, enraged and cursing because the hounds had played him false. He drove the entire pack up the furnace road to the open blazing tunnel head. With whip in hand, he forced them one by one into the flames until only his favorite dog remained, quivering with fear at his side. Picking her up he made a motion as though he were about to cast her into the furnace. With terror in her eyes, she licked his hand. But he hurled her too into the furnace with a curse. A low, fearful moan escaped her and it was all over. The inhuman iron master never hunted again after that. Tortured with gout and with senses dulled with strong drink, he sat day after day before his open fire place. He seemed to have no further interest in life. One morning he failed to appear. His servants found him seated upright in bed—dead, his hunting whip in his hand and his eyes set in terror. In the years that followed, many of the country peasants who lived in the neighborhood testified that on stormy autumn and

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winter nights they had heard the dread baying of hounds, and had seen the iron master flee in terrible fright before them.

Whether or not there is any foundation for this legend in the character of the iron master at Colebrook or elsewhere, most of the iron masters were kindly men who took a real interest in the every-day life of their dependents. The English Quaker, Thomas Rutter, the first iron master in the province; Samuel Nutt, the second son of an English nobleman, Robert Grace, a close friend of Benjamin Franklin; Thomas Potts and his sons and descendants who became prominent iron masters, the Birds of Birdsboro; the erratic Henry William Stiegel, the outstanding German iron master, the Colemans, Mayburys, Olds, Grubbs and many others, were all men who had much sympathy for their workmen and treated them well.

A legend, similar to the one told above, centers around Jacob’s Creek Furnace in the western part of the state. Peter Marmie, a Frenchman and former private secretary to Lafayette, was one of the owners of this furnace. After a few years of prosperity, he met with business reverses. After his failure, he called his hounds to him, assembled them on the bridge which led to the mouth of the furnace, and with whip in hand forced them into the blazing fire below. When the last one had disappeared, Marmie himself rushed headlong into the inferno. According to the story, the fires died out and were never rekindled. The stack went to ruins, the once prosperous community disappeared, and desolation marked the place where activity had abounded.\(^{84}\)

It is true that many of the iron masters kept packs

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\(^{84}\) R. P. Nevin, *Le Trois Rois*, pp. 57–58. There seems to be some grounds for the origin of this tragic legend. Marmie, who was impulsive and temperamental, lost all his wealth because of his connections with the changing French governments during the years following the French Revolution. No evidence, however, has been found to show that he took his own life.
of hounds and loved to hunt the fox. The hills around the plantations often echoed the hunter's horn and responded to the baying of his hounds. Many iron masters imitated the life of English gentry. In the New World, there was more isolation, perhaps, than in England, but the Americans enjoyed the advantages of hunting, fishing and building fortunes that only a virgin country can give.

Life on the iron plantations, however, was cheerless at its best for those who had to toil hard and long. While the iron master could secure many luxuries, could afford to travel, even to Europe occasionally, and was able to provide teachers for his children, the lot of the workers was relatively hard. There were few material comforts of life. It was a time when houses were lighted with tallow candles, when water had to be carried from springs or drawn from wells, when only a few had the opportunity of even an elementary education, when medicine as commonly practiced was a formulated superstition, rather than a science, and doctors purged and bled their patients. The few who traveled did so on horseback or in jolting stage coach or springless stage wagon, over rough limestone or poor clay roads. On the other hand, stark poverty was unknown on the iron plantations in spite of periods of occasional depression. The wages of the skilled workers were high when compared with wages paid in European countries of the same time. Initiative, industry and aggressiveness reaped rewards, for many of the iron workers by hard work and constant application became iron masters themselves.

While the early furnaces and forges were organized on plantations, most of the other types of iron works were not. Slitting mills which produced slit-iron for making nails; plating mills where bar iron was hammered into sheet iron or tin-plate iron; steel furnaces

85 It has been pointed out that wages in this country were paid to the iron workers largely "in kind."
where small amounts of blister steel were produced for making tools; and air furnaces, the progenitors of modern cupolas, were usually built in towns or boroughs. A few of these, however, could be found on plantations, as the slitting mill on the Brandywine, and the steel furnace at Coventry. But pig iron and bar iron were made on the iron plantations. These plantations originated during the colonial period. Beginning in southeastern Pennsylvania and spreading westward to the Monongahela country, they played an important part in the history and development of the state of Pennsylvania long before Pittsburgh became a great iron and steel center.

The close connection between iron making and agriculture during the eighteenth and part of the nineteenth centuries contrasts strangely with the industrial organization of the present day. Many changes have taken place in the iron works. The small stone furnaces have given way to the modern blast furnaces with their towering height of 100 feet or more, their four huge heating stoves, their blowing engines which deliver thousands of cubic feet of blast each minute, the array of dust arresters, gas washers, and automatic ore and coke handling machinery which are essentials of the giants of modern metallurgical devices. The forges at which iron was hammered out have been surpassed by rolling mills of various kinds. Water power has been superseded by steam and electric power, while coke as a fuel has taken the place of charcoal. The iron plantations have disappeared and have become memories. The pioneer iron masters and iron workers of Pennsylvania, however, played their part in establishing the foundations of a great industry which today makes the Pittsburgh district one of the greatest iron and steel centers in the world.

*Pennsylvania Archives, First Series, II. 57; Pennsylvania Colonial Records, XI. 635.*

*Pennsylvania Archives, Third Series, XI. 634, 752.*