BUSINESS LONGEVITY AND THE FRONTIER IRON INDUSTRY

In January, 1876, the superintendent of Maramec Iron Works, wrote to one of his forge workers visiting Ohio, and emphatically informed him that "Mr. James had decided to stop *all work here,* hence you need not return."[1] After half a century of continuous operation the first large-scale iron works west of the Mississippi had closed down. Usual rationales for the failure of small frontier manufacturing establishments portray them as hapless victims of improved technology. Appealing and simple as this may be, it is a gross oversimplification. Some charcoal furnaces in southeastern Missouri continued in production well into the twentieth century, and aside from the seven years immediately following the panic of 1873, production of charcoal iron increased in both the United States and Missouri from the Civil War until 1900, indictaing that factors other than obsolescence were involved in the failure of the Maramec Iron Works.

Explanations of business failures in the 2oth century emphasize inadequate capital and lack of entrepreneurial ability as primary factors in business turnover. Moreover, it is suggested that failure is a phenomenon occuring almost exclusively in small and relatively new enterprises.[2] Howard W. Bowen in his analysis of 20th century business turnover concludes, "since the rate of turnover is high, it follows that there are at all times in existence a large number of undersized and submarginal businesses which have come on the scene for a brief period only to disappear and be supplanted by similar ventures."[3] Application of this theory to 19th century business failure reveals several shortcomings and suggests the need for a more general theory of business turnover. The long life and demise of the Maramec Iron Works offers a case study of this phenomenon: 19th century business turnover.

The production of iron differed greatly from most industry associated with the frontier. Gristmills, rope walks, distilleries, lumber mills, and even lead smelters required only modest capital, relatively little machinery, and only limited technical skill. These small-scale concerns were usually short-lived and few expanded into large heavy industries. The smelting and refining of iron on the other hand, involved some of the most compli-

cated and advanced 19th century technology. The necessary physical plant and equipment was complex and costly. Moreover, production and marketing iron on a limited scale with any hope of profits or survival was impossible. The large capital requirement meant that even on the frontier the iron industry started as large-scale heavy industry.

Understandably, 19th century entrepreneurs were reluctant to risk such large capital funds in an enterprise so dependent upon an undeveloped frontier market. When Missouri became a state in 1821, the nearest furnaces and forges were in Kentucky, Tennessee, and southern Ohio, with Pittsburgh, Cincinnati, and Wheeling already centers of casting and rolling operations for converting pig iron into marketable products. These mills dominated the iron trade in the Trans-Mississippi West by utilizing the Ohio, Mississippi, and Missouri river systems to supply western merchants through commission agents in St. Louis.

The cost of transporting iron products to the Missouri market increased the retail price at least 75 to 100 per cent. These high transportation charges, combined with a rapidly growing population in Missouri, provided incentive for the establishment of an ironworks closer to the western market. In 1826, Thomas James, a wealthy Chillicothe, Ohio, ironmonger, and his furnace superintendent, Samuel Massey, began the construction of an iron works at Maramec Spring in southeastern Missouri to exploit a location with a rich hematite deposit, abundant timber for charcoal fuel, and the huge spring for power.

Not only did Massey and James build forges and a furnace, they also transported a sizeable community from Ohio to the Missouri frontier, and erected all the dwellings, a store, grist and saw mills, and provided other necessities for a community of more than one hundred men, women, and children. Besides the expensive physical plant, over 10,000 acres of timber were purchased for fuel. In addition, men, animals, and equipment had to be maintained for nearly three years before the first molten iron trickled into the furnace crucible in the spring of 1829. Well over $50,000 was invested before the Maramec Iron Works ever went into production.[4]

The site of the Maramec Iron Works possessed the natural endowments needed for success, but its remoteness presented staggering problems in transportation and marketing. These two closely related and enduring problems provide much of the

explanation for the long life and ultimate failure of the enterprise. No possible route or method which promised quicker, cheaper or more dependable transportation escaped the attention of first Samuel Massey and then William James, and no other factors so affected the Iron Works as shifting freight patterns. Until the 1850's when the rolling mills in St. Louis offered an alternative market, the very existence of the Works depended on selling a heavy product to widely scattered customers. Any hopes for expansion necessarily hinged on reducing transportation costs and thereby expanding the market. Moreover, high freight costs, limiting the extent of the market, necessitated unspecialized, almost custom-order production to satisfy the local demand at a time when the national trend was toward large, efficient firms specializing in the production of a few items or even one product. Little wonder that the management of the Works devoted so much time and effort to improvements in land, water, and rail transportation.

In spite of high freight costs, during the first twenty years of operations an almost endless variety of hollow-ware, bar and cast iron products left Maramec on wagons for the retail trade or for the commission stores strategically located to serve both wholesale and retail trade in Missouri. Since Tennessee and Ohio iron had to absorb higher transportation costs, Maramec iron enjoyed a sizeable margin of profit. Because of its locational advantage, the Iron Works monopolized the market in southwestern Missouri. While rates varied according to the season and road, ton-mile-rates usually hovered around 20 cents, providing a transportation differential of more than one cent a pound in markets west of Maramec.[5]

Overland transportation costs were much too expensive for blooms or pig iron for industrial consumers. In desperate efforts to lower costs Massey and later William James attempted to utilize small streams to float blooms to the Mississippi and Missouri Rivers. Massey hoped to render the small Maramec River suitable for flatboats to the Mississippi, where steamboat charges for the remainder of the trip were reasonable. In 1834 the steamboat "Polander" charged only $6.60 per ton for hauling 28 tons of blooms from the mouth of the Meramec to Portsmouth, Ohio, while it cost Massey three times this amount to move them the 75 miles from the Iron Works to the river.[6] The same year after an expensive attempt to clear the stream of obstructions demonstrated that the Meramec was unsuitable

even for flatboat navigation, Massey and James sought state aid to remove obstructions and construct wing dams on the Gasconade to the Missouri River near Hermann.[7] Despite the refusal by the legislature to support improvements, the Iron Works continually utilized the Gasconade until the advent of railroad transportation.

These futile attempts to render a small stream like the Gasconade navigable indicate the seriousness of the transportation problem. In his petitions for aid in 1836 Samuel Massey warned the General Assembly that unless some means to market the blooms were found the Iron Works would surely fail. Apparently he was not exaggerating, for at that time he had over $26,000 in blooms stranded on the Gasconade waiting for high water.[8] In August, the same year, to an urgent request from his St. Louis agents that he rush iron to market and take advantage of high prices, Massey replied, "We could not agree to deliver our blooms at any price to your place."[9] When William James and his partners leased the Iron Works from Thomas James in 1848, the problem of moving the blooms to distant markets remained unsolved.

Perhaps encouraged by the successful attempts of small steamboats to navigate the Osage and other streams in the vicinity, William James concentrated his efforts on the Gasconade-Missouri rivers. In early 1849, after experimenting with a flatboat, James authorized his St. Louis agents to purchase a sixty-foot keelboat. Unfortunately, the agents informed James that boats of such size cost at least twice the allotted amount. Gaty, McCure, and Glasby, the St. Louis agents, suggested James experiment with a small locally built keelboat which drew less than two feet of water when loaded. If the experiments proved successful, the Iron Works could purchase a small stern-wheel steamboat also especially designed for shallow streams.[10]

During the summer of 1849, two different attempts were made by small steamboats to ascend the Gasconade with freight and descend with a load of blooms; in both instances low water and obstructions in the narrow channel prevented the craft from coming within twenty-five miles of the Iron Work's landing. Even the steamer "Lightfoot," which advertised to "run where the ground is a little moist," failed to complete the trip.[11] When his attempts to secure steamboat transportation failed James resorted to smaller crafts in an effort to utilize the stream.

Between 1850 and 1852, the Iron Works' keelboat and

lighter moved all the remaining $26,000 worth of blooms stored on the Gasconade, in addition to others produced later, downriver to the Missouri. Freight charges from Maramec to the landing on the Gasconade, some twenty miles away, averaged $4 a ton; the crew of the keelboat received $2 per ton for loading the blooms, taking the boat downriver to Hermann, and unloading the iron into the warehouse. Overland drayage from Maramec to Hermann averaged between $2 and $4 per ton higher.[12] While water transportation was undoubtedly much cheaper than other modes, it was also notoriously undependable.

In April, 1852, the agent at the Gasconade landing informed William James that all iron had been shipped but one small load. Encouraged by this success and anxious to take advantage of current high prices, James decided to market every available pound of iron.[13] Every wagon at the Iron Works or for hire in the vicinity was pressed into service hauling iron to the Gasconade. Unfortunately, the water, which had been high all spring, fell suddenly and the stream became unnavigable. On July 28, the agent informed James that he had the boat loaded and tied to the pier waiting for rain. James was frantic, for with prices high, demand strong, and with a lot of iron on hand, he could not market his product because of low water.[14] Determined to sell iron while the good market lasted, James hauled the blooms overland to the Missouri, despite the extra cost involved. The following spring, disgusted with the previous years experience, James told his agent in Hermann to sell the keelboat.[15]

William James long maintained that poor and undependable transportation constituted the most serious problem facing the Missouri iron industry. Speaking of his own establishment, James complained to his Springfield, Missouri, agent, R. J. McElhany, that low water prevented proper marketing to take advantage of seasonal high prices.[16] To Eastern wholesale houses James apologized for his inability to pay his notes when promised because of "unusual delays in transporting our iron through a country where the means are insufficient to insure promptness."[17]

Railroads, James believed, offered the only feasible solution to the severe transportation problems in southeast Missouri. Realizing that wider markets made possible by effective transportation would permit greater specialization and larger-scale operations, James visualized the Maramec Iron Works as a

rival of the great Pennsylvania enterprises. What he, like almost every other frontier entrepreneur, failed to consider was the other aspect of being integrated into the national economy. Just as Maramec would be able to specialize and enjoy economies of scale so would other firms. Even more important, integration into the national economy would end his locational advantage and open up his heretofore protected market to outside competition.

In 1852, James' strong support helped push through the Missouri General Assembly the enabling act, land grant, and state aid for the Southwest Branch of the Pacific Railroad.[18] Later, James' influence proved instrumental in changing the aid from guaranteed bonds to direct financial assistance.

On July 4, 1860, amid wild celebrations, the first train pulled into Jamestown, present-day St. James, only six miles from the Maramec Works Nevertheless, transportation costs continued to influence production and marketing policies at Maramec In 1860, James sold Gaylord, Son and Company six tons and 460 pounds of pig metal at $29 per ton delivered in Portsmouth, Ohio. Freight from St. James to St. Louis, less than one hundred miles, amounted to $34.70, whereas steamboats charged only $26 for the long haul to Portsmouth with total freight charges taking one-third of total revenue.[19] Despite the high rates, William James considered railroads the answer to the most serious problems confronting the economic development of the region and expansion of his Iron Works.

In 1833, Samuel Massey managed to sell only twenty-five tons of blooms by hauling them overland to the Mississippi and then shipping them to market in Portsmouth, Ohio by steamboat.[20] As late as 1848, only approximately 60 tons of blooms were shipped to eastern markets by the Gasconade-Missouri River route.[21] The growth of the rolling mill and foundry industry in St. Louis during the 1850's created a demand for cold-blast charcoal blooms and pig iron, but transporting the metal prevented James from taking full advantage of this potential market. In 1854, for example, only about 700 tons of iron, not more than half the furnace output was sold in St Louis.[22]

William James long maintained that adequate transportation would permit specialization, economies of scale and larger profits. The advent of railway transportation ushered in a new era for the Maramec Iron Works. By 1870 the Works had

shifted from a pioneer enterprise producing a wide variety of items for the local market to a firm manufacturing iron almost exclusively for industrial consumption. That year the Maramec Works made 4,700 tons of pig iron, 1,500 tons of blooms, only fifty tons of hollowware and no bar-iron.[23] This transformation in the function of the enterprise provided certain economies of scale, but it also rendered James extremely vulnerable to market fluctuations.

Cheaper, dependable transportation promoted a national market, and the increased productivity of new machinery gave great advantage to the larger firms so equipped; but it would be a mistake to assume that the transformation of the market structure or the integration of local enterprises into the national economy occurred immediately or completely. Small businesses and locally oriented markets continued to dominate the midwestern economic scene into the twentieth century.

True, the significant changes in the American economy between 1850 and 1890 involved the growth of large corporate enterprise, but these huge agglomerations were not typical American businesses. The American businessman in every major field except public utilities and railroads usually operated a small shop with no more than a handful of employees.

On the national scene, three distinct trends in the iron industry manifested themselves in the period. The first was an increased degree of specialization by individual firms, made possible by the greatly expanded markets through improved transportation. The second, and to the nation's ironmongers, the most alarming trend was the long-term decline in iron prices.[24] The third tendency was the growing size but decreasing number of blast furnaces in the United States. In 1850 the census listed 377 furnaces with an average annual output of 759 tons per year. Ten years later there were only 286 furnaces, but the average yield had increased to over 3,400 tons per year.[25] Many of these larger concerns were corporate enterprises, suggesting that in the iron industry the day of the small independent entrepreneur, operating on his own capital, was rapidly passing.

Actually in 1860 the Maramec Iron Works exceeded most businesses in size. The average furnace produced 3,453 tons of pig iron, employed fifty-three men, and represented a capital investment of $86,268.[26] That same year, however, the Maramec furnace employed nearly 100 men and double the average investment to produce only a little over 5,000 tons of pig

iron.[27] According to the census the ninety-seven bloomeries in the United States average annual production was 527 tons, worth $27,043, with an average capital investment of $23,047. The bloomery at Maramec cost nearly $80,000 and in 1860 produced 1,000 tons of blooms valued at $50,000 — almost twice that of the average enterprise.[28] Actually averages were somewhat deceiving since many of the firms in the industry were much smaller than Maramec. But on the other hand a few eastern establishments were much larger and more efficient. Already these larger firms who earlier had expanded with the growing market, enjoyed significant economies of scale.

In 1864, when William James signed a new five year lease for the Maramec Iron Works, his brother-in-law, R. G. Dun, later of Dun and Bradstreet, predicted that in the next five years James would make a "pile."[29] Dun's prediction proved absolutely correct. The Civil War multiplied the demand for iron. By 1864, Maramec blooms, which only two years before James could not dispose of at prices high enough to pay production and transportation costs, now brought $100 a ton. At the prevailing prices for metal a furnace like Maramec could easily gross over $200,000 annually from the sale of iron. After deducting production expenses, transportation costs, and rental for the Iron Works, William James enjoyed a yearly income in excess of $40,000.[30] Moreover, the end of the war did not lessen the demand for iron. Indeed, the tremendous postwar boom in railroad construction and rapid industrial expansion more than compensated for the loss of the military market. Westward expansion, invention of new farm machinery, and the introduction of wire fencing supplemented the already high demand for iron, and rather than declining the price of pig metal rose even higher. Seemingly, the only limitation on the sales of Maramec blooms and pig iron was the capacity of the Iron Works.

In order to increase the output and keep up with the national trend toward larger and more efficient blast furnaces, William James instituted a number of improvements at Maramec. A new compressor, installed at the cost of $3,000, greatly improved the efficiency of the furnace. In 1869, when he signed a new fifteen year lease, James promised the owners that he would install a steam engine to insure production even when the volume of water from the spring was insufficient to provide power for both the forges and furnace. That year, James sent his brother,

Anvil, on a tour through several eastern iron works to inspect steam-driven ore crushers and hotblast apparatuses. James never installed any of the more modern equipment that might have reduced his operational costs, primarily because he had already expended far too much of his limited capital in speculation or wasteful living. Besides, he probably also realized that no amount of improvements could increase the capacity of the Maramec Works sufficiently to keep up with the growing market, or reduce his high production and operating costs to a competitive position with the larger and more efficient eastern furnaces.[31] Rather, James decided to follow the advice of his brother-in-law, R. G. Dun, and build a new iron works.

The Ozark Iron Works Company, which William James formed in 1872, consisted mostly of heirs of Thomas James, who had been induced to invest in the new furnace by the large profits enjoyed at Maramec during the previous ten years.[32] In all, the subscription of stock raised $97,000 toward the costs of putting the new furnace in operation, but substantial as the sum was, James seriously underestimated the expenses involved and the enterprise quickly ran into financial trouble.[33]

Construction began in the summer of 1873 and the new stack went into production the following summer. James could hardly have picked a less propitious time to launch a new enterprise. Only two weeks before the furnace started production the president of the American Iron and Steel Association stated, "The iron trade has not been so bad in fifteen years, and there is little prospect for improvement...."[34] James had already felt the pinch when the price of pig metal dropped to $25 per ton delivered in St. Louis during the fall of 1873.[35]

The panic of 1873 demoralized and for a time completely paralyzed the iron business throughout the country. In November of that year, James visited St. Louis, Cincinnati, and Pittsburgh, seeking buyers for his pig iron, but for the most part the trip was fruitless. Although he offered as high as 1 1/2 per cent monthly interest for funds, with the metal already assigned to dealers as collateral, he found it impossible to borrow money from commercial banks. Through personal loans from R. G. Dun and a number of short-term credit extensions from several large metal dealers James managed to survive until the following spring, when conditions improved enough for him to collect a few bills and market some metal. Although he weathered the initial crisis, James remained deeply in debt with little prospect of relieving his financial burden.[36]

As if trouble bred trouble, in August, 1874, the circuit court in Phelps County, Missouri, levied a $10,000 fine against James for failing to comply with the federal banking laws which imposed a 10 per cent annual tax on all notes issued and intended to be circulated as a substitute for currency. The threat of additional tax fines under the banking laws caused James to cease issuing scrip, and although he continued to pay his employees when possible by giving credit on the Company books, the large fine and the redemption of the outstanding scrip further exhausted his limited supply of capital.[37] Even the Ozark Iron Works, which James felt should produce thirty tons of pig iron daily at costs comparable to the larger eastern establishments, experienced prolonged technical difficulties. Moreover, a disastrous fire removed the furnace from production for nearly six months, at a time when James could least afford the loss.[38]

The state of the national iron industry offered little encouragement. Instead of improving, as James claimed they must, prices continued to fall. By October, 1875, almost half of the blast furnaces in the United States had ceased production, but stocks of iron still accumulated in the hands of dealers. In January, 1875, a commercial journal, *Mines, Metals and Arts,* reported, "the condition of the iron trade is lower than ever known in the history of iron making in the United States."[39] Although the Maramec furnace produced over 4,500 tons that year, James was unable to make any sales because the price of cold-blast charcoal iron would not even cover his variable costs of production. At Maramec the forges shut down in August, 1875, simply because no market existed for the blooms.[40] Early the following year, James suspended all operations. With Missouri cold-blast pig iron selling for $33 per ton and blooms at $63, James knew that Maramec could no longer produce and market iron at a profit.[41]

The loss of revenue from the Maramec Works made William James entirely dependent upon the Ozark Works. Unable to keep the new furnace at Ozark in production, and plagued by one financial set back after another, James decided in late 1877 that the only course open to him was to resort to bankruptcy. In early 1878, the court appointed an assignee of assets and all of James' business holdings, land and buildings — even the family home, "Dunmoor" — were seized and sold to cover his debts.[42]

Leland Jenks, in analyzing the role of railroads in American economic development, suggested, "historically, the very existence of most American communities and regions, of particular farms and industrial firms and aggregates, was made possible by the railroad."[43] However, if the experience of the Maramec Iron Works was at all representative, the advent of railway transportation, which produced a nationally integrated market, rendered the continued existence of many previously successful small firms impossible.

Like most frontier entrepreneurs, William James eagerly promoted the cheaper and more dependable railroad transportation for his enterprise without considering possible adverse effects of expansion of the market and incorporation into the national economy. Prior to the Civil War, the absence of cheap transportation and the resultant localism insulated western manufacturers from the full effects of the periodic down swings in the economy. The fact that the 1857 panic and subsequent hard times had a much greater impact on the Maramec Iron Works than the 1837 panic, should have impressed James with perils inherent in this transition from a localistic to a national integrated economy.

During the panic of 1873, James was unable to enjoy his heretofore protected market as he had previously during periods of hard times, nor could he reduce or suspend operations until the market improved. High fixed costs, especially interest on his heavy indebtedness, forced him to continue production in a desperate attempt to secure some cash even after the price of pig metal no longer covered all the variable costs of production. The same boom which followed the Civil War and encouraged James to expand, had also promoted growth, efficiency and low cost production in the larger eastern ironworks. The subsequent hard times eliminated those firms like the Maramec Works with high marginal costs of production.

Bowen's suggestions that 20th century business turnovers resulted from poor entrepreneurship and inadequate capital in relatively new firms, might, on the surface appear applicable to the Maramec Iron Works.[44] James, however, deserved credit for over thirty years successful leadership under extremely trying conditions. The western businessman had daily decisions to make in the face of chronic labor and capital shortages, inadequate transportation facilities, and almost complete lack of up-to-date knowledge about market conditions. Optimism, in such

an environment, while it betrayed James in the end, proved an indispensable quality for frontier entrepreneurs. The Maramec Iron Works could not be considered a young firm; surprisingly few large-scale enterprises like the Works with a capital investment of over a half-million dollars were erected on the frontier and survived fifty years continuous operation. Most importantly, given the high fixed costs of production at Maramec, the competition from the larger, more efficient eastern furnaces, and the secular decline in iron prices, over the long-run William James had few alternatives to withdrawal from the industry. The demise of the Maramec Iron Works suggests that 19th century business turnover involved not only relatively new ventures, but also reflected innovations and developments in the American economy, in this case primarily railway transportation, which rendered previously successful firms too small and inefficient for continued existence.

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FOOTNOTES

[1] *David Carson to Casper Barth, January 1, 1876, in Letter Book (Volume 216 in the James Collection, Western Historical Manuscripts, University of Missouri, Columbia, Missouri), hereafter cited as James Collection, Western Historical Manuscripts.*

[2] *Howard W. Bowen, "Turnover of Business Enterprises," Journal of Business of the University of Chicago, XVIII, 73-74 (1945) and Gunnar Lindgren, "How Long Does a Company Live?", Oxford Economic Papers (new series), V, 235-47 (October, 1953).*

[3] *Howard W. Bowen, "Turnover of Business Enterprises," Journal of Business of the University of Chicago, XVIII, 76 (1945).*

[4] *Entries for April 30, 1833, in Journal B (Volume 16 in the James Collection) and Cash Book (Volume 5 in the James Collection, Western Historical Manuscripts.)*

[5] *Entries for February 9, 1849, February 10, 1849 and July 2, 1851, in Record Book (Volume 49 in James Collection, Western Historical Manuscripts.)*

[6] *Bill of lading from the steamboat Polander to Massey and James, April 24, 1834 and entry for May 9, 1834, in Journal (Volume 23 in the James Collection, Western Historical Manuscripts.)*

[7] *Argus (St. Louis, Missouri), December 9, 1836.*

[8] *Copy of petition was published in the St. Louis Argus, December 9, 1836 and "A Bill to Improve the Navigation of the Gasconade River," Journal of the Senate of the State of Missouri (1st session, 9th General Assembly, 1836-1837), 184.*

[9] *Marburton and King to Massey and James, August 12, 1836 and Massey and James to Marburton and King (copy), August 26, 1836, in the James Collection, Western Historical Manuscripts.*

[10] *Gaty, McCure and Glasby to James and Chapman, March 9, 1849, Ibid.*

11 *Charles P. Warner, Captain of the steamboat "Mustang," to James and Chapman, June 21, 1849, Ibid. and Ellis Evans Diary, June 20 and July 28, 1849, Microfilm copy in Western Historical Manuscripts.*

12 *James and Chapman to C. D. Eitzen, March 16, 1852, in Letter Book (Volume 55 in the James Collection, Western Historical Manuscripts).*

13 *James D. Norris, Frontier Iron: The Maramec Iron Works, 1826-1876 (Stevens Point, Wisconsin, 1964), 100-103.*

14 *Ibid., 102-103.*

15 *William James and Company to G. H. Coppedge, April 29, 1854, in Letter Book (Volume 55 in the James Collection, Western Historical Manuscripts).*

16 *James and Chapman to R. J. McElhany, August 12, 1850, in Letter Book (Volume 55 in the James Collection, Western Historical Manuscripts).*

17 *James and Chapman to N. C. Rockhill, February 12, 1850 and James and Chapman to James Harrison, August 15, 1850, in Letter Book (Volume 55 in the James Collection, Western Historical Manuscripts).*

18 *John W. Million, State Aid to Railways in Missouri (Chicago, 1896), 80 and W. J. Devol to William James, December, 25, 1852, in the James Collection, Western Historical Manuscripts.*

19 *Gaylord, Son and Company to William James, May 16, 1860, Ibid.*

20 *Samuel Massey to John Reily and Company, April 10, 1839, Ibid.*

21 *Total Wagoners' receipts for 1848, in Record Book (Volume 49 in the James Collection, Western Historical Manuscripts).*

22 *Total receipts for blooms and pigs shipped in 1854 in Wagoners' Receipt Book (Volume 88 in the James Collection, Western Historical Manuscripts).*

23 *Missouri Republican, January 1, 1871.*

24 *N. S. B. Gras and H. M. Larson, Casebook in American Business History (New York, 1939), 707-708.*

[25] James Moore Swank, History of the Manufacture of Iron in All Ages (2nd edition, Philadelphia, 1892), 509-511 and Department of Interior, Manufacturing in the United States, 1860, Compiled from the Original Returns of the Eighth Census (Washington, 1865), CLXXX and 307.

[26] Ibid.

[27] Ibid.

[28] Ibid.

[29] R. G. Dun to William James, March 11, 1865, in the R. G. Dun Letter Books, Archives of Dun and Bradstreet, Inc.

[30] Traber and Aubery to William James, October 14, 1865, in the James Collection, Western Historical Manuscripts and James D. Norris, Frontier Iron, 13-134 and 151-154.

[31] John Dun to William James, May 18, 1867; Anvil James to William James, April 11, 1869, in the James Collection; and Anvil James to Hendershot, February 23, 1872, in Letter Book (Volume 201 in James Collection, Western Historical Manuscripts).

[32] George R. Wilson to Fitch, February 7, 1874, in Letter Book (Volume 185 in the James Collection, Western Historical Manuscripts) and R. G. Dun to William James, December 19, 1872, in the R. G. Dun Letter Books, Archives of Dun and Bradstreet, Inc.

[33] R. G. Dun to William James, December 25, 1875, in the R. G. Dun Letter Books, Archives of Dun and Bradstreet, Inc.

[34] Joseph E. Ware, "The Depression in the Iron Trade," Mines, Metals, and Arts, I:89 (May 28, 1874).

[35] Joseph E. Ware, "The Pig Metal Market," in Mines, Metals, and Arts, I:102 (June 4, 1874).

[36] G. R. Wilson to B. F. Reams, November 13 and November 19, 1873, in Letter Book (Volume 185 in the James Collection, Western Historical Manuscripts).

[37] "Iron Scrip, First Decision under the Acts of Congress of March 6, 1865 — Section 6," in Mines, Metals, and Arts, I:196-197 (August 7, 1874) and The Herald (Rolla, Missouri), August 20, 1874.

38 *"Annual Statement of the Commerce, Trade, Manufacture, Mines, and Furnaces of the State of Missouri," in Mines, Metals, and Arts, II 345-349 (January 7, 1875) and "1875 Annual Statement and Review of Productive Industry of St. Louis," in Mines, Metals, and Arts, IV 189-197 (January 20, 1876).*

39 *"Annual Statement of the Commerce, Trade, Manufacture, Mines, and Furnaces of the State of Missouri," in Mines, Metals, and Arts, II 345.*

40 *David Carson to Casper Barth, January 1, 1876, in Letter Book (Volume 216 in the James Collection, Western Historical Manuscripts).*

41 *"1875 Annual Statement and Review of Productive Industry of St. Louis," in Mines, Metals, and Arts, IV 196.*

42 *The Herald (Rolla, Missouri), January 11, 1876 and February 28, 1878.*

43 *Leland H. Jenks, "Railroads as an Economic Force in American Development," in Journal of Economic History, IV 3 (May, 1944).*

44 *Bowen, "Turnover of Business Enterprises," Journal of Business of the University of Chicago, XVIII 76 (1945).*