A HISTORY OF BRICK MANUFACTURING IN KANSAS

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by

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CHAPTER I

INTRODUCTION

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INTRODUCTION

I first became interested in the brick industry in late 1968 when I began a hobby collecting brick having the imprint of the company and place of manufacture. I soon realized there must be an interesting history connected with these brick. A History of Brick Manufacturing in Kansas seemed to be a natural when I was considering a topic for a master's thesis. This thesis is not intended to be a complete history of brick manufacturing in Kansas, because one could write a long history on many of the hundreds of individual brick manufacturing concerns that have existed in Kansas from pre-territorial days to the present if information on them is not obscured by time.

An immense amount of information can be gleaned from old newspaper files, histories, court records, deeds, and other sources concerning brickmaking in Kansas. I spent seven weeks perusing the newspaper files in the Kansas State Historical Society Library in Topeka and untold hours gathering information from local libraries, courthouses, personal interviews, visiting operating brick plants, and visiting old brick plant sites. I fully realize I have only scratched the surface of the topic. Much remains for enterprising scholars to research and record.

The content of this thesis will of necessity be very general, because the time, energy, and research capabilities of one individual will not permit detailed coverage of such a broad subject.

Inaccuracies undoubtedly will be included in this thesis, but it is my desire that they be inaccuracies in the materials researched rather

than in the processes of research and writing. Much of the information included in this thesis was gained by perusal of weekly and daily newspapers. One must be mindful that the press of deadlines and the instinctive pride of newspapermen in their hometown did not insure accuracy in their reporting of events and situations connected with the brick industry.

I was somewhat hampered by gaps in the information I gathered from newspapers, because they did not report much of the information about the plants that might cast an unfavorable light upon the local community.

I started my research in almost total ignorance of the history of the brickmaking industry and techniques used in making brick. I do not claim to be an expert, but my knowledge has been expanded tremendously. Most of those who read this thesis will need a basic understanding of some terms used in the brickmaking trade. The following section should aid in the understanding of this thesis.

Definitions and Terms

Brick--a construction material that has been hardened into the form of a block by being sun-dried or kiln-burned. The main ingredients are clay or shale. Brick may be made of concrete, a mixture of sand and hydrated lime, or other materials. References made to brick in this thesis will indicate those made of clay or shale unless otherwise specified.

TYPES OF BRICK:

Adobe--brick dried in the sun that usually have grass or straw added for strength. Such brick are often larger than common or face brick.

Antique--brick that usually are grooved and given a special coloration to produce an antique appearance when used as face brick.

Common--brick used mainly for backs of walls and for reinforcement in buildings, generally where they are not in view. These brick are much softer, more water absorbant, and much less expensive than are face brick. In early days common brick often were sun-dried. Common brick have veen mostly replaced by concrete, concrete blocks, steel, and other materials in the construction of interior walls and in reinforcement of buildings.

Face--brick that are especially made to be used on the exterior surface of buildings and homes.

Firebrick--brick made from clays that contain considerable amounts of silica. They are used in kilns, furnaces, and retorts; because they withstand high temperatures. Firebrick are usually yellow or cream in color and somewhat larger than other brick. They are often made in various shapes to conform to the contours of the kilns, furnaces, and retorts for which they are intended. Firebrick manufacturing in Kansas was of limited importance, as most shales located in the State do not make satisfactory firebrick. Most of the firebrick used in brick kilns in Kansas came from Missouri.

Green--brick that have been shaped and cut but not fired.

Modular--brick of ordinary size, approximately 2¼ x 3½ x 7 5/8 inches. The term is usually associated with common or face brick.

Paving--brick made especially for paving streets or sidewalks. Most brick made for such purposes were vitrified and fired at a high temperature to produce a durable brick. Paving brick produced in the late nineteenth and early twentieth centuries were approximately the

same size as face brick produced at the time. Some were slightly larger. Paving blocks were made much thicker, being nearly four inches thick.

Sand-lime--brick made principally of sand, using lime as a binding agent. The brick were pressed brick, being produced under high pressure. Such brick were highly porous and tended to deteriate if exposed to the weather. They were sometimes used for structural strength in interior parts of walls.

Sidewalk--brick made especially for construction of sidewalks. They were vitrified and fired at high temperatures to produce durability. Sidewalk brick produced in the late Nineteenth and early twentieth centuries often were imprinted. They were used to a great extent in constructing deep red brick structures.

Sun-dried--brick not kiln-fired but left out in the sun to dry. These brick are extremely porous, absorbing large quantities of water. They also crumble easily.

Valour--textured brick that are wire cut in such a way to produce a rough surface. They are popular today.

Vitrified--brick that has a glazed surface or a glass-like appearance. Such brick have a hard surface, desirable for paving purposes.

OTHER DEFINITIONS AND TERMS:

Brick plant--This term is used in this paper to indicate brick manufactories from 1894, the beginning of the "heyday" of brick manufacturing in Kansas, to the present day.

Brickyard--brickmaking establishments before 1894. Such yards made brick mainly for local consumption, but a number of them were fairly large and sophisticated in their operations and shipped brick moderate distances.

Beehive kiln--a circular periodic kiln with a domed roof.

Clay--a type of earth that consists of extremely fine particles and is smooth and oily to the touch. It becomes slippery, yet sticky when wet. When dry it is difficult to hold together and is easily turned into powder and dust. Minerals found in clay are mostly hydrous silicates of aluminum. Purest of clay is white and called kaolin, but most clays are colored by other materials. Iron oxide may color it red, and carbonaceous matter may color it different shades of gray.[1] Shale is the hardened form of clay found in layers of earth, often with layers of sandstone and limestone. It has been formed by heat and pressure. "Clay" and "shale" often are used interchangeably in this thesis. Clay was generally used in the early days in the manufacture of brick in Kansas, because it was easier to obtain and process. Shale was generally used in later brickmaking operations, because it was freer of drift and impurities. Clays are used today by the producing brick plants in the western two-thirds of Kansas.

Continuous kiln--a kiln so constructed that brick are moved continuously through the kiln on cars on a track during the burning process.

Downdraft kiln--a beehive kiln in which the burners and flues are so arranged that the heat for burning brick or other clay products is deflected off the inside dome down through the center of the kiln, where the brick are placed for burning, and out through flues located in the floor of the kiln.

Drift--impurities found in clay such as sand, rock, or soil that produce brick with a mottled appearance due to the variations in texture and coloration.

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[1]A. Papst, "Clay," World Book Encyclopedia, 1974, Vol. IV, p. 503.

Dry pan--a large device in which shale is fed for the purpose of grinding the shale into a fine powder in preparation for manufacturing brick or other clay products. The device usually consists of two huge rollers for crushing the shale.

Fire--This term is used to refer to the process of applying great amounts of heat by means of open flames within the kiln to harden brick. The term is synonymous to "burn."

Grading--the process of sorting brick and rejecting those that are deformed or broken and do not measure up to quality standards in regard to shape.

Grog--The term, as used in this manuscript, refers to ground up fired brick rejects that are mixed with clay or shale to give a certain textural and color effect to the brick produced.

Hacking--the process of taking green brick from the conveyor belt after they have been cut and stacking them on a car in preparation for transfering them to the dryer. This process is still done by hand in most plants. "Setting and "off-bearing" are also terms applied to this process.

Header--brick that has its end turned toward the face of the wall when laid by a bricklayer. Brick are often laid in a wall in this manner and alternated in a certain pattern with brick laid in the normal fashion for special architectural effect.

Off-bearing--See "hacking" above.

Periodic kiln--a kiln in which the green brick or other clay products are placed before the burners are lighted and remain there during the firing and cooling stages. The opening to the kiln is walled up to keep the heat in; thus, the kiln is capable of receiving brick only periodically.

Most periodic kilns are beehive in shape.

Pug mill--a large mixer in which the clay or shale is mixed with water and other ingredients to form a column of material later cut into green brick.

Rattler--a cylindrical container in which pieces of iron were placed with paving brick and rotated a certain number of rounds per minute to test the durability of the brick.

Repress--A magazine type device used to produce individual pressed brick, utilizing a dry powdered shale with only enough moisture content to hold a brick together. Normally a repress was used only for making paving bricks. Generally a die was used in the repress for imprinting the bricks.

Setting--Same as "hacking" and "off-bearing."

Shading--the process of sorting burned brick before packaging to insure uniformity of color or variations of color if desired.

Shale--See "clay."

Slurry--a process whereby a solution of water and clay, sand, cement, manganese, or other materials are poured over the column of clay as it comes from the pug mill. The slurry creates a special appearance on the brick when they are fired. A slurry is often used to produce antique brick.

Terra cotta --a hard durable earthenware made from superior clay by that name. Terra cotta is normally used for pottery, garden vases, flower pots, monuments, fountains, and chimneys; but references in this thesis are to ornamental decorations for buildings produced by some brick plants.

Tunnel kiln--a kiln consisting of one or more tunnels ranging from 300 to 700 feet in length in which brick are burned while on cars placed on tracks. Most tunnel kilns are of the continuous type; however, some

like the Hoffman kiln, are of a nature that the brick remain stationary and the heat is increased and decreased at different stages of the burning process.

Updraft kiln--a beehive kiln or other type periodic kiln in which the intense heat is directed upward from the burner placed in the floor of the kiln to a flue at the top of the kiln. This type of kiln is in contrast to a downdraft kiln, which is considered to be superior.

Vitrify--to change into something that is glass-like. Vitrified brick, as used in this thesis, refers to a very hard brick that is produced with a glaze. Vitrified brick are not to be confused with enameled brick or tile that are highly glazed and are used along interior walls of buildings. Vitrified bricks usually were produced for paving streets and sidewalks; however, vitrified bricks were used as face brick on many buildings in the late nineteenth and early twentieth century. Salt usually was thrown into the fires of the kiln to produce vitrified brick. Some shales and clays contained enough sodium cloride to produce a fine vitrified brick without the addition of salt in the kiln.

CHAPTER II

BRICKMAKING AS AN INDUSTRY: ITS HISTORY

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Brick is the oldest manufactured building material and dates back at least to 4000 B.C., when they were produced by the ancient Babylonians and Egyptians. Brickmaking was the chief occupation of the Israelites during their captivity in Egypt, where they made sun-dried brick from clay taken from the banks of the Nile River.

Throughout the ages brick has been an almost universal building material for those living in non-wooded areas of the world. Clay and shale, the raw materials for brick, are the most plentiful of those used for manufacturing of construction materials. Much of the top soil of the world is underlaid with clay and shale of sufficient quality to produce brick durable enough to construct dwellings for much of the world's population.

One advantage that brick has continually maintained as a building material is that the raw materials for making brick usually could be found in close proximity to the construction site, thus avoiding transportation problems and costs. Little trouble has been encountered in finding a strata of clay or shale that could be reached by removing a few inches or feet of overburden. Often the strata of clay or shale was exposed along stream banks where the clay or shale could be obtained with a minimum of digging.

Through the ages there have been many techniques used in manufacturing brick, but they come under three general methods--soft

mud, stiff mud, and dry processes.[1] The soft mud process was the oldest and the most common.

Little equipment was needed to make brick. A sharp implement was needed to dig the clay--a piece of wood or a stone would do. Baskets, buckets, or some type of sling device would suffice to haul the raw material the short distance to where the clay was mixed with water to form the brick. In ancient times slave labor, oxen and other draft animals were used to carry the raw material or finished brick to the construction site.

Water was mixed with the clay to make a soft mud. Often straw or grass was mixed with the mud to give strength to finished brick. Children or slaves frequently worked in the mixing pit, blending the clay, water, and other ingredients with their feet. When the mud was sufficiently mixed, it was poured into molds, usually constructed of wood. Such molds formed two to six brick. The molds had no bottoms, but were placed over planks. After the molds were filled, the mud was leveled at the top and the excess brushed away with a stick. When the mud was sufficiently stable for the resulting brick to retain their shape, the mold was raised. The formed brick were then placed in the sun to be dried.

Adobe brick or blocks are made in some of the isolated areas of Mexico and many other countries in the same manner today. Such brick have lasted for hundreds of years where they are not exposed to freezing temperatures.

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[1] J. H. Houck, "Brick and Other Clay Products," Moline Review, Jan. 20, 1911, p. 2.

It probably is impossible to pinpoint the exact time in history when man began to kiln-burn brick. Wood was used for fuel in the primitive brick kilns. The kilns were constructed of compacted clay or brick baked to the point where they withstood high temperatures. Such kilns usually were constructed on the building site then torn down when a sufficient number of brick had been burned.

Englishmen brought brickmaking to America at an early date. Within five years after the first permanent English settlement was made at Jamestown brick were being produced. Brickmaking was introduced in Massachusetts as early as 1629.[2]

Probably the most famous colonial brickmaker was Thomas Jefferson, who produced brick for construction of his home and other buildings at Monticello. The Serpentine Wall and buildings he designed on the campus of the University of Virginia are good examples of his innovative use of brick.[3]

Brickmaking moved west with the developing frontier and remained very much a localized industry until the latter part of the nineteenth century, when coal and natural gas began to replace wood as a major source of fuel for firing brick. Brickmakers began to locate plants in close proximity of these fuels, because harder and more durable brick could be produced with fossil fuels. Improved transportation, especially railroads, also became an important factor in concentration of the brick industry into larger manufacturing units. The high weight ratio to the

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[2]Henry Chandlee Forman, Virginia Architecture in the Seventeenth Century (Williamsburg: Virginia 350th Anniversary Celebration Corporation, 1957), p. 33.

[3]Claude G. Bowers, The Young Jefferson, 1743-1789 (Boston: Houghton Mifflin Company, 1945), p. 222.

value of brick prohibited shipping long distances unless cheap transportation was available. Shipping of brick long distances by horse, mule, or oxen drawn wagons was impractical.

Ohio early became a major production area for the consolidated brickmaking industry due to the availability of coal and the early development of natural gas in that State. Ohio today leads the states in the manufacture of clay products.[4]

Brickmaking, despite the beginnings of consolidation in the late 1800's, has remained a fairly localized and family or partnership operated industry. In 1885 there were more than 5,000 brick plants in the United States. The number had shrunk to 1,500 by 1925 and to 525 in the late 1960's.[5]

Brickmaking has remained one of the most stagnant of industries, resisting the automation that has taken place in other industries.[6] The machinery used in many of the brick plants throughout the United States today is basically the same as that used 70 years ago. A few refinements have been introduced to handling brick at the plants, but many still use manual labor for setting green brick as they are conveyed from the cutting table. Manual labor is also used to a great extent in shading, grading, and packaging brick. One of the main reasons that further automation has not taken place is the desire of the brick companies to produce a wide variety of brick, requiring special tooling and handling.[7]

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[4]Ralph W. Frank, Ben Hayes, James H. Rodabaugh, "Ohio: The Buckeye State," World Book Encyclopedia, 1974, Vol. XIV, p. 532a.

[5]"Brick Kiln Builds Up Its Speed," Business Week, No. 1976 (July 15, 1967), p. 72.

[6]Ibid., p. 72.

[7]Richard Cooke, private interview held during a visit to Cloud

CHAPTER III

PLYING A TRADE AND BUILDING A STATE

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Brickmaking became an important activity in the early settlement of Kansas, especially in the non-wooded areas where a substitute had to be found for the timber that had been readily available in Eastern States. Some of the earliest settlers in the non-wooded areas resorted to making sod houses. However, the majority of the early homes in Kansas were not constructed of sod but were of logs where timber was found, of stone where the outcroppings made it practical to quarry stone, or of locally manufactured brick. Although few of the first homes were constructed of brick, brick was often used in the construction of chimneys.

Wealthy builders had brick shipped from the East for chimneys or for the entire house, but most early settlers relied on locally manufactured brick made in much the same way as brick had been made in Biblical times.

The major raw material for early brickmaking, was readily available in pioneer Kansas. The topsoil of much of the State is underlaid with a rather deep layer of clay, which is exposed along the banks of numerous streams. Thus most of the early clay pits for acquiring raw material for brickmaking were located on the banks of small streams. For example, it was reported that Salt Creek Valley three miles west of Leavenworth contained more than ten square miles of excellent clay ten

to fifteen feet in thickness three feet below the surface.[1] From this vast source of raw material bricks were made for chimneys or the few brick houses being constructed.

Early Kansas brickmakers mixed clay with water, much as ancient brickmakers had done, to form what was called a soft mud. The mud was placed in the forms to mold individual brick. The molds usually were constructed of boards to form four compartments the proper size, with a removable plank forming the bottom so the brick could be easily removed. When sufficiently dry to remain rigid, the brick were placed in the sun to dry or in a kiln of home-manufacture to be fired. The first brick made at Marysville, Kansas, were of the sun-dried variety.[2]

Probably the first brick kiln to be located in Kansas was constructed at Shawnee Mission in 1839. Many of the brick used in constructing the Mission were shipped from St. Louis, a leading brick manufacturing center at that time. However, a kiln was set up during the first season of activity at the Mission for burning brick. Wood was used as fuel, as was the case in most of the very early brick kilns. A brickyard, a sawmill, and other industries to employ the labor of the Indians were added later.[3]

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[1] Leavenworth, Kansas, The Manufacturing Centre of The West--Advantages and Resources (Leavenworth: Ketcheson & Reaves, Printers and Engravers, 1888), p. 13.

[2] Everett Dick, The Sod-House Frontier: 1854-1890 (New York: D. Appleton-Century Company, Incorporated, 1937), p. 493.

[3] J. J. Lutz, "The Methodist Mission Among the Indian Tribes in Kansas", Transactions of the Kansas State Historical Society, Vol. IX (1905-06), p. 174.

Brickmaking early became an important activity in building the avalry post at Fort Riley. While the Fort had been established in 852, the real efforts to make the Fort an outstanding cavalry outpost n the plains did not come until 1855. In that year kilns for burning rick and lime were constructed.[4]

Brickmaking became a rather widespread industry in Kansas in he 1850's. Most of the settled Missouri River towns had one or more rickyards making brick for local use. Fig. 1 shows the location of ome of the known brickyards during the 1850's. Atchison had two rickyards as early as 1856.[5] In Lawrence in 1857 a firm was engaged n burning 168,000 bricks for the Free State Hotel. The building ctivity was so pronounced in Lawrence that a newspaper editor was rompted to write that three or four brickyards were needed in Lawrence o keep pace.[6]

The same newspaper editor indicated the costs of brickmaking to be $50 a month for common yard hands, $4 a cord for wood, and clay--which was abundant and free. Brick were selling for $8.50 a thousand.[7]

The demand for brick soon brought about refinements in brick-making. Brickyards tended to be located where materials were of better quality instead of in every town. Nevertheless, much of the brickmaking

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[4]Percival Lowe, "Recollections of Fort Riley," (Address given by him before the Kansas State Historical Society, Jan. 15, 1901), Transactions of the Kansas State Historical Society, Vol. VII, p. 102.

[5]A. T. Andreas, ed., History of the State of Kansas (Chicago: R. R. Donnelley & Sons, The Lakeside Press, 1883), p. 373.

[6]Dick, The Sod-House Frontier, p. 493.

[7]Ibid.

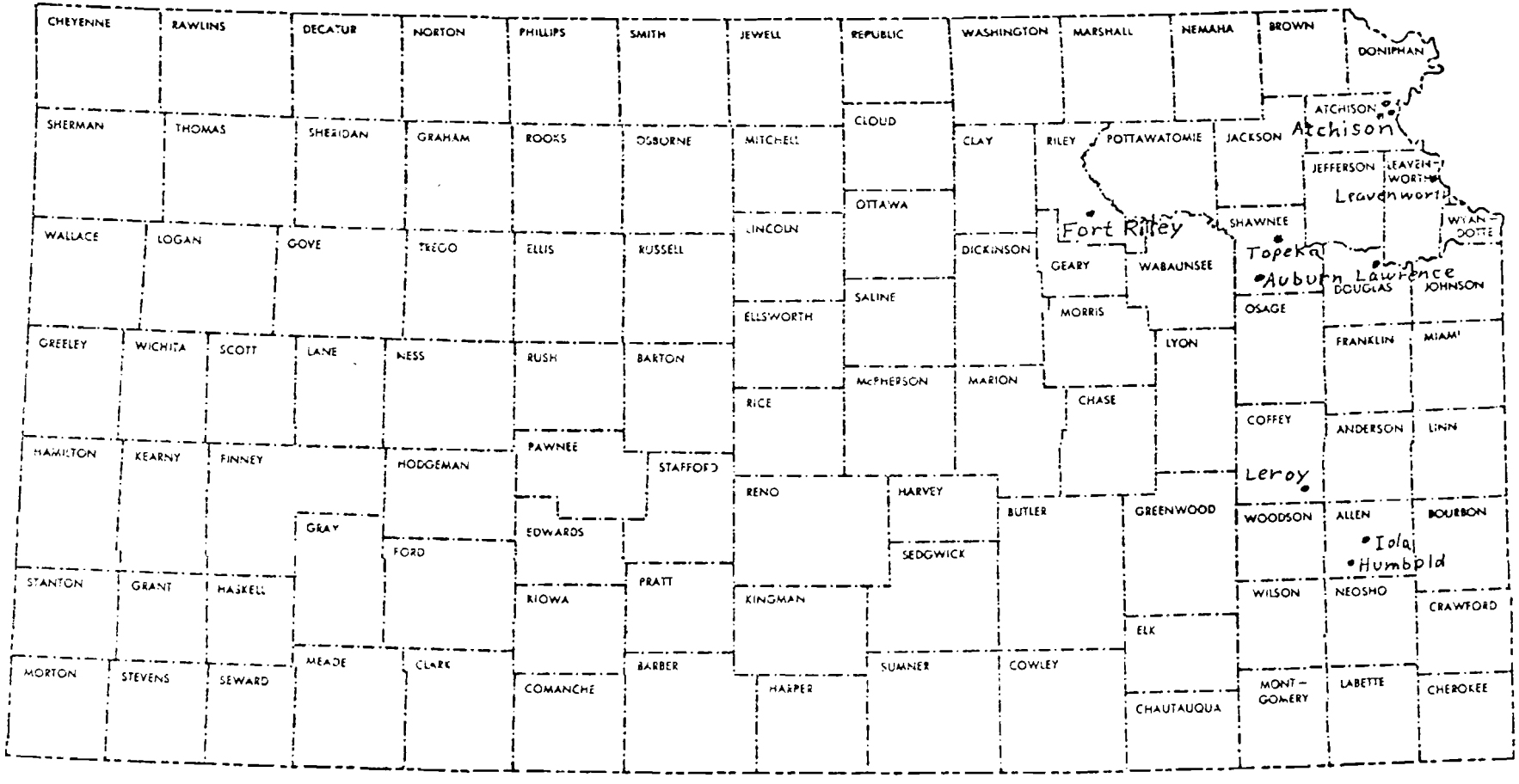

Fig. 1--Location of known brickmaking establishments in Kansas in the 1850's. Each dot represents one. Compiled from various sources.

in Kansas remained localized on up to the 1890's. For additional information on the location of known early brickyards refer to Fig. 2 and Appendix B.

Who were the men who as brickmakers plied a trade and built a state? They came from practically all walks of life and all types of backgrounds. They seemed to have one thing in common; like most early Kansas pioneers, they were restless. Many of them were foreign born or had been born in the eastern part of the United States. Most of them had stopped and settled for a time at some intermediate point between the East and Kansas. Some of them had considerable experience in brickmaking before they settled in Kansas, others had none.

A number of those who took up brickmaking in Kansas were those associated with the building trades as carpenters, bricklayers, and stonemasons. Others had pursued non-related occupations in the East: but, being opportunists like many of the settlers, they saw the opportunities in brickmaking in a state that was building rapidly. If they did not become brickmakers directly, they often became silent partners or stockholders in concerns manufacturing brick.

Contractors often turned to manufacturing brick as a necessary adjunct to the building trade to furnish the materials they needed. As they moved into new communities, they found it extremely difficult to acquire brick at a price that made their use economically feasible.

William Lassman, one of the founders and builders of Humboldt, apparently had not been a brickmaker in his native Germany, where he had learned the trade of stonemason and plasterer. He immigrated to the United States in 1853 and was employed in cotton mills near Paterson, New Jersey, and Hartford, Connecticut, before he came to settle in Kansas

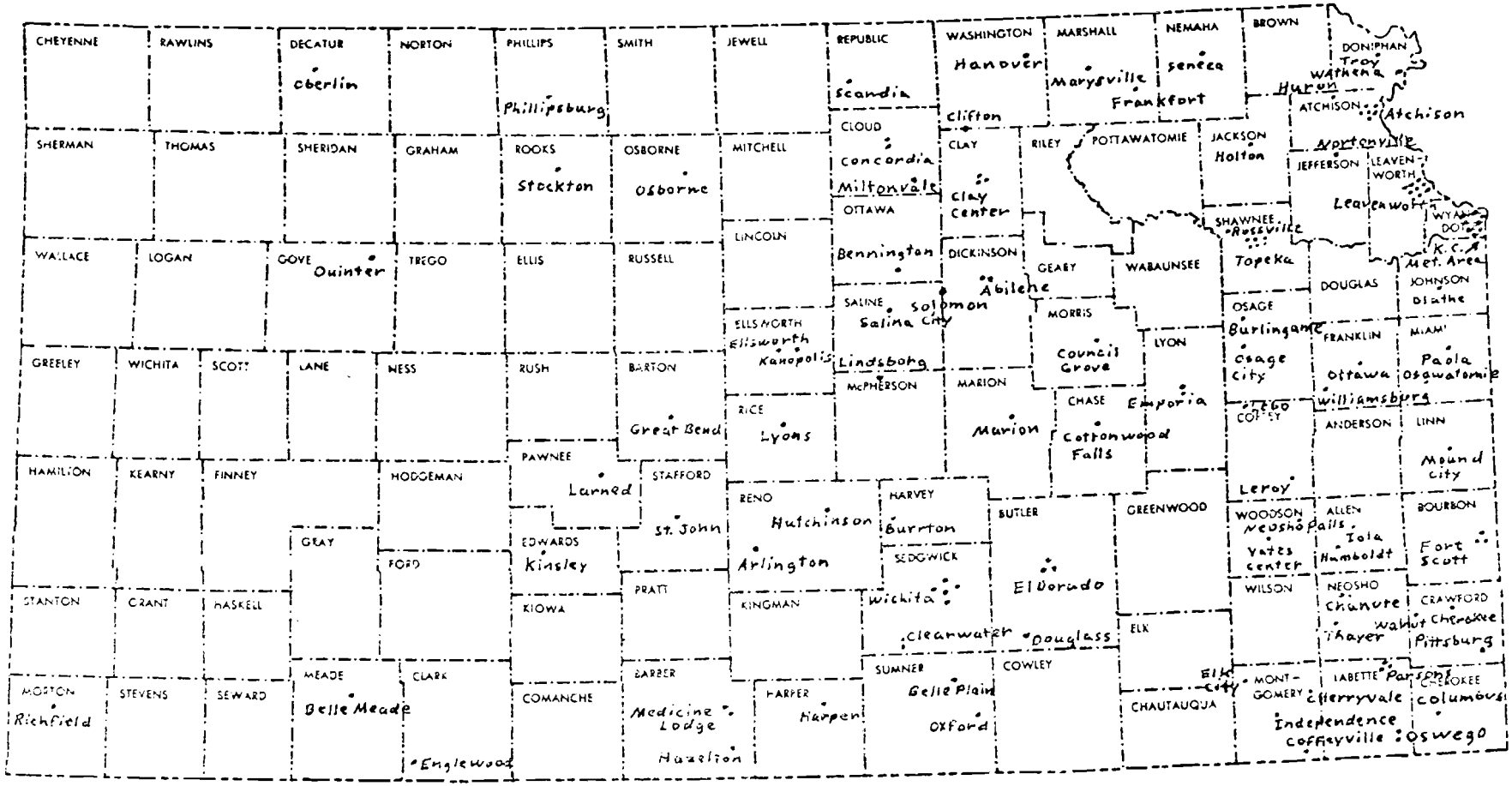

Fig. 2.--Location of known brickmaking establishments in Kansas in the 1880's. Each dot represents one establishment. Compiled from various sources.

made approximately 3 million bricks, all for local use. He then went to Davis County (now Geary County) and made 500,000 bricks. He then went to Phillips County and made 800,000 bricks. In the years since coming to Kansas he had also constructed a number of buildings in Kansas City and Kirwin.

Mowers settled in Rossville, because he had contracted to build the Presbyterian Church there. He burned his first kiln of 110,000 bricks in 1882, and he soon was employing five men and producing 400,000 bricks per year.[12]

David Davies, a bricklayer who settled in Coffeyville in 1870, presents an interesting case study. He was born in Wales in 1830 and came to America to settle in Wisconsin. He learned and worked at the bricklaying trade in Oshkosh for ten years. He then went to Pikes Peak in Colorado and to Pioneer City, Idaho, where he was connected with mining enterprises. He then settled in San Francisco before coming to Kansas. He established a brickyard at Coffeyville in 1880 to turn out about 300,000 bricks per year.[13]

Brickmen tended to move in and out of the business as they moved from one locality to another. A good example of an itinerant brickmaker jumping in and out of the business but moving up the ladder of success was J. W. Kirkman, an Englishman who settled in Texas with his parents. He was engaged in brickmaking and then in the salt business in Texas until 1862. He escaped to Kansas, because he was afraid he would have

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[12] Ibid., p. 592.

[13] Ibid., p. 1575.

in 1857. He started to manufacture sun-dried brick in 1859 at Humboldt.[8]

In 1870 J. S. Johnson moved from Leavenworth to Fort Scott to build the Catholic Church and soon started a brickyard to furnish brick for the building project. He continued his operation after the church was built, and by 1883 his yard was producing 15,000 bricks daily.[9]

Cyrus Leland, Jr. got into the brickmaking business by an unusual route. In 1872 he had a packing house built at Troy. The bricks for the building were fired on the spot. They proved of such good quality to induce him to burn all the bricks needed about the town, generally a kiln a year.[10]

J. V. Gordy, a brickmaker at El Dorado, in striking contrast to Leland, came from a family of brickmakers. A native of Indiana, he moved with his family to Des Moines, Iowa, when he was two years old. His father was a brickmaker and made brick for the construction of Fort Des Moines.[11]

One of the most interesting and most experienced early brickmakers in Kansas was Charles Mowers. He was born in West Union, Ohio, in 1837. He started in the brickmaking business when he was ten years old and went into business for himself at eighteen. He spent a year in Milwaukee learning more about his trade. Mowers first settled in Johnson County, Kansas, near Shawneetown in 1865. In his first three years he

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[8]Andreas, History of the State of Kansas, p. 674.

[9]Ibid., p. 1082.

[10]Ibid., p. 480.

[11]Ibid., p. 1436.

to serve in the Confederate Army if he stayed in Texas. He reached Leavenworth with $1.50 and soon opened a photography gallery. He became superintendent of the Leavenworth Bridge Company. He then went to Atchison in 1882, and with John F. Price, began manufacturing machine-pressed brick on an extensive scale.[14]

A railroad man with vision, J. M. Jamerson, had seen the possibilities in brickmaking before coming to Kansas. He had established a brickyard at Porter, Indiana, to capitalize on the Chicago market, operating it ten years before coming to Kansas to buy into a partnership at Wyandotte in 1880.[15]

Many of the early brickyards in Kansas were privately owned or were partnerships. However, in the 1870's, 1880's, and early 1890's a number of corporations were being chartered to provide the capital necessary to meet the needs of the expanding industry. More sophisticated machinery was being required to mass produce the brick necessary to meet the demands and at the same time to remain competitive in the field.

Only four brick companies were chartered during the 1870's ranging in capitalization from $2,000 to $50,000. Twenty-nine brick companies were incorporated in the next decade, with capital stock ranging from $2,000 to $100,000 and a median of $25,000. Sixteen brick companies were chartered in the following decade up to 1894, when the Coffeyville Vitrified Brick and Tile Company was incorporated to usher in the "heyday" of

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[14] Ibid., p. 393.

[15] Ibid., p. 1237.

brick manufacturing in Kansas. Fig. 3 shows the location of the brick companies incorporated from 1870 to 1894.

Capital stock in the brick companies in the 1890's prior to the incorporation of Coffeyville Vitrified Brick Company, ranged from $10,000 to $200,000, with a median of $50,000.[16] Brickmaking in Kansas was clearly being consolidates into larger firms, due to the demand for more operating capital. The number of individually owned brickyards was on the decline.

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[16] Kansas Corporation Charter Files, Topeka: Kansas State Historical Society Library.

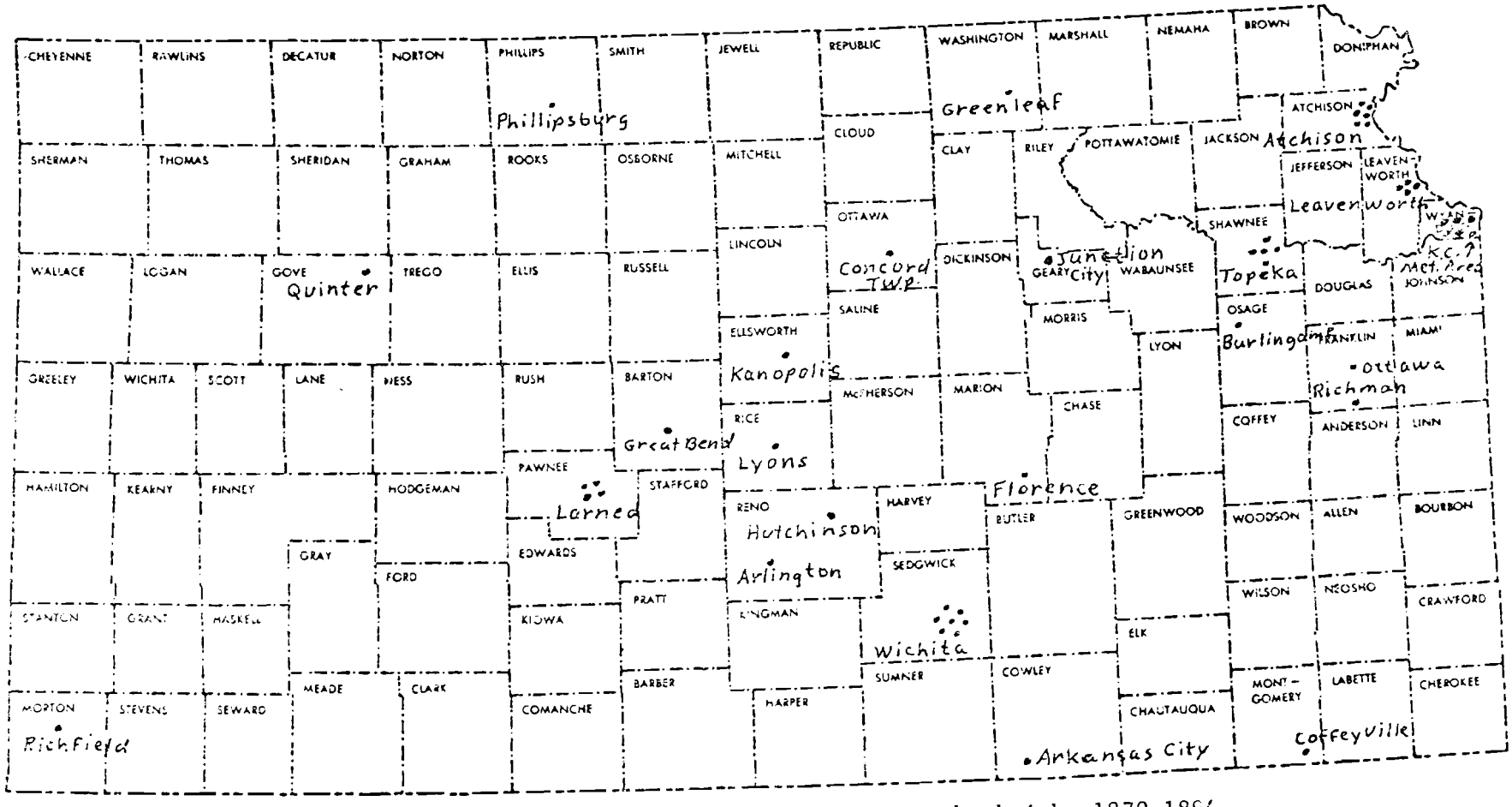

Fig. 3.--Location of Kansas companies chartered to make brick, 1870-1894. Each dot represents one company. Source: Kansas Corporation Charter Files.

CHAPTER IV

THE HEYDAY OF BRICKMAKING IN KANSAS

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THE HEYDAY OF BRICKMAKING IN KANSAS

The beginning of the "heyday" of brick manufacturing in Kansas was marked by the chartering of the Coffeyville Vitrified Brick Company on May 8, 1894. From its humble beginnings as a corporation with a capital stock of $20,000 raised by local men, the company was to climb to the pinnacle of success and become the second, if not the largest, brick producing company in the United States in the first years of the twentieth century.[1]

Much of the success of the Coffeyville Vitrified Brick Company can be attributed to the fact that it was the first company in Kansas to effectively utilize natural gas to fire brick. Charley Francis, who in May of 1894 displayed three brick from the first kiln of Coffeyville Vitrified Brick Company, correctly assessed the future by predicting that brickmaking would become a leading industry of that section of the State.[2]

What happened in Southeastern Kansas in the next sixteen years could be said to border on "brickmaking madness." Numerous other local entrepreneurs in a score or more towns believed they could emulate the success of the Coffeyville Vitrified Brick Company. Some were moderately successful; many others were doomed to failure and disappointment. The

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[1]The Purington Brick Co. of Galesburg, Illinois, was reputed to be the largest producing company in the United States.

[2]"It's a Success," Coffeyville Journal, May 18, 1894, p. 5.

events and situations that existed in the next sixteen years present an interesting story.

The "heyday" of brickmaking in Kansas occurred primarily because it was during that time, approximately 1894-1910, that natural gas was being developed in the Gas Belt of Kansas and used as a cheap source of fuel for industries such as brickmaking. This exciting period of "brickmaking mania" undoubtedly would have lasted a number of years longer if what was once considered an inexhaustible supply of natural gas had not begun to play out, especially after the year 1907.[3]

Kansas Gas Belt

"Gas Belt" was a term applied to the area of Southeastern Kansas that in the last decade of the nineteenth century and the first decade of the twentieth century produced larger supplies of natural gas than any region west of the Mississippi River. The area of the Gas Belt was not contiguous, but generally it was an area that encompassed eight counties--Allen, Bourbon, Chautauqua, Elk, Linn, Montgomery, Neosho, and Wilson.[4] The heart of the Gas Belt was about twenty miles on either side of a line running slightly diagonally from a point a few miles north of Iola to the Oklahoma line near Coffeyville.[5]

Production of natural gas in the Gas Belt began near Iola in 1874, when a well was drilled that produced both gas and mineral water.

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[3]There were other causes of the decline in brickmaking in Kansas that were important, but they will be dealt with in subsequent sections.

[4]State of Kansas Sixteenth Annual Report of the Bureau of Labor for 1900, (Topeka: State Printing Office, 1901) p. 228.

[5]Fig. 4, page 30, shows the location of the Gas Belt.

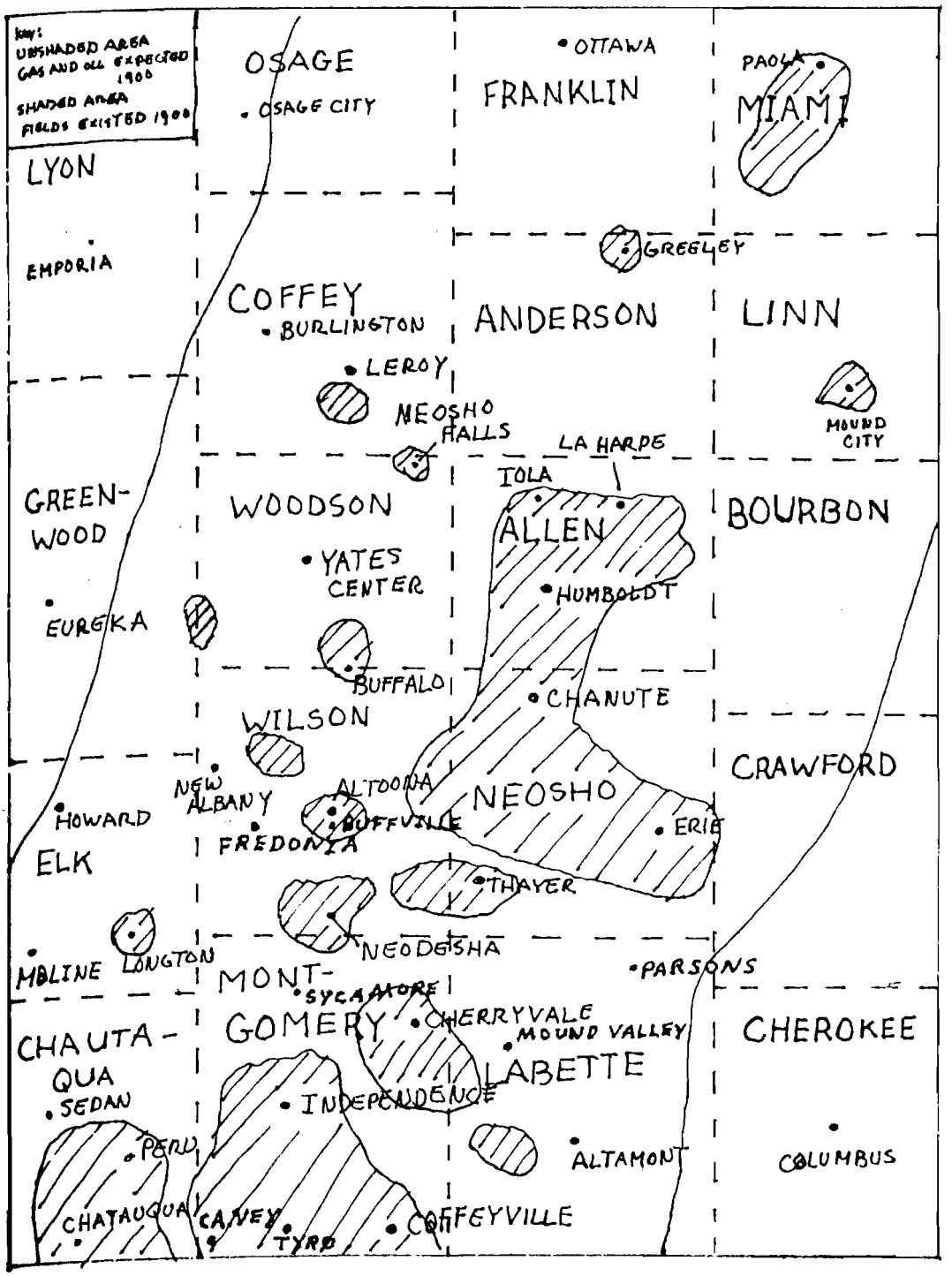

Fig. 4.--The Gas Belt of Kansas. The wide area between the two diagonal lines was the area in which gas and oil could be expected in 1900. Gas was being found within the shaded areas. Taken from: Erasmus Haworth, Annual Bulletin of the Mineral Resources of Kansas (Lawrence: The University Geological Survey of Kansas, 1903), Plate I.

The proprietor considered the mineral water more valuable and had a sanitorium built and water piped to the baths. The gas that could be saved was used for lighting the sanitorium.[6]

Production of gas was pretty well ignored for the next several years, and it was not until the 1890's that the gas fields started to develop around Iola and attract industries that used large quantities of fuel.

Natural gas was found in Eastern Kansas at the base of the "coal measures" in what is called the Cherokee shales. A great deal of sandstone quite irregularly distributed is found in the Cherokee shales. These shales are exceedingly organic in content and held much of the coal that was mined in Southeastern Kansas. The Cherokee shale formation inclines to the west, while the general slope of the surface of Eastern Kansas is to the east and southeast. Thus the formation is at the surface in the extreme southeastern part of Kansas, while it is several hundred feel below the surface in the Gas Belt area. The Cherokee shale formation is deep enough to permit the entrapment and holding of natural gas.

The sandstone in the Cherokee shales is variable in quality and location, but moderately coarse--furnishing good reservoirs for oil, gas, and water. The sandstone bed is not continuous over a wide area, but can change entirely into shale in any direction within a few miles. This made prospecting more uncertain, but it did tend to make it less likely

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[6]Erasmus Haworth, Special Report on Oil and Gas, (Lawrence: The University Geological Survey of Kansas, 1908), p. 29.

for one well or a set of wells to entirely exhaust gas supplies in a given area.[7]

In order to hold natural gas in an underground reservoir at 350 pounds per square inch pressure, it must be overlaid by a sufficient rock strata to prevent escape. A too porous rock structure allows gas to escape, and a too rigid overlying strata can be rendered porous by fractures. Fine-grained clay shale is the best material to hold gas down, because the closeness of grain causes all fissures to be closed by fine-grain clay particles.[8]

Nature acted in curious ways in the Gas Belt of Kansas. Shales, similar to the Pennsylvanian shales at or near the surface and the raw materials for brickmaking, were entrapping the gas so essential for economically firing brick.

By 1900 the oil and gas fields were estimated to include 859 square miles of land on which more than 100 wells had been drilled for securing oil or gas at an average depth of 900 feet. The depth at which gas was found varied from 400 to 950 feet and at pressures of 300 to 350 pounds per square inch. It was estimated that 100 million cubic feet of natural gas was on tap for commercial comsumption every twenty-four hours. Gas was considered to have heat units on the ratio of 20,000 cubic feet to one ton of bituminous coal. Therefore the Gas Belt was producing each day gas with a heat unit equivalent of 5,000 tons of coal.[9]

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[7]Erasmus Haworth, The University Geological Survey of Kansas Bulletin on Mineral Resources of Kansas, 1899, (Lawrence: The University Geological Survey, 1900), pp. 44-45.

[8]Ibid., pp. 46-47.

[9]Sixteenth Annual Report of the Bureau of Labor, p. 228.

Production of gas in the next few years would increase many times over this amount. A further advantage was that gas produced in the Gas Belt was considered to be superior in quality to Eastern gas, because it was almost free of sulphur.

Gas prices for industries varied somewhat in the Gas Belt, ranging from a low of two cents per thousand cubic feet by which Tyro attracted its industries to a high of ten cents per thousand cubic feet when the supply began to dwindle.

In 1905 the maximum commercial value of gas at Cherryvale, the heart of the brickmaking industry, was three cents per thousand cubic feet. Even gas piped to Kansas City was being refused by the packing houses at ten cents a thousand.[10]

Natural gas production in the Gas Belt developed first in what was known as the Iola Field. Gas production in the Iola Field went through a cycle of development, peaking, and decline. This cycle was followed later in other areas of the Gas Belt. Production in Montgomery County continued to climb during the early years of the twentieth century, and by 1907 it had surpassed many times the total gas production of Kansas in 1900.

Montgomery County was producing 1.5 billion cubic feet of natural gas per day in 1907, equivalent to 75,000 tons of coal. An average of 3,328,000 cubic feet of gas was being produced daily by each of the 446 wells in the county. More wells were capped and not being used than there

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[10]"Gas for Factories," Weekly Republican (Cherryvale), Aug. 25, 1905, p. 4.

were from which gas was being drawn.[11] It is not surprising that with such output of natural gas the brick companies and other manufacturing concerns were not worried about possible shrinking supplies.

The supplies of natural gas in the Gas Belt were not at this time consolidated like they were later by Kansas Natural Gas and other large gas companies. Most industries in the area either contracted with small producers or held their own leases for natural gas supplies. This was as true with the brick industry as it was with other industries. When supplies from individual leases began to decline, the brick plants were in trouble. They had not planned for alternate sources of fuel.

F. G. Lotterer probably was the first brickman to recognize that the supply of natural gas was not unlimited and was dwindling. Lotterer had formerly operated a brick plant at Fort Scott which used coal as fuel. In 1897, he moved his plant to Cherryvale, primarily to take advantage of cheap natural gas for firing his brick. He located just south of the city near what later became Corbin City and struck one of the finest wells in that part of the State. Gas was struck at 520 feet, and the flow was so strong that it threw water and mud 100 feet into the air. Other factories followed him there and it was not long before the pressure of gas began to gradually subside until none had enough to operate their plants from their original wells.[12]

By November of 1900 Lotterer was warning that the supply of natural gas was playing out. He contended that Kansas gas was fast

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[11]"The Greatest Gas Field on Earth," Cherryvale Weekly Journal, Nov. 21, 1907, p. 1.

[12]"Cherryvale is Booming," Cherryvale Republican, Oct. 15, 1897, p. 2.

being consumed and the supply exhausted. Conditions were the same all over the Kansas field, but people refused to admit it.[13]

Lotterer and other manufacturers, who at first had strong flows of gas, were now buying gas for fuel. Fuel costs ran 60 to 75 cents for every thousand brick he burned; and the capacity for his factory was 40,000 per day, making his fuel bills enormous in an industry where the margin of profit at best was small.[14] Lotterer was quoted in his assessment of the situation:

> It's just like draining water from a barrel. A little stream will be a long time draining it, but several streams will drain it that much sooner. We are now piping gas about two miles. Of course, we realize that it's only a matter of time until the gas will give out. I have it from the Iola field that the supply there is becoming weak. We have a wider field than Iola. It is possible that I might go 2,000 feet from my well and strike another flow, but it's just like digging for gold--I may get it and I may not. When business picks up I shall try it. Gas lies in pockets or reservoirs and when you pull them a certain length of time it becomes exhausted. It is necessary to keep striking new wells all the time.[15]

Lotterer was accused of sour grapes. Because he had not been able to make things go at Cherryvale, it was contended, he was disappointed and sore at the town, country and the whole gas field.

Lotterer's warning was to go pretty much unheeded until his prediction became a reality for most of the brick plants and other factories in the Gas Belt. The comments of a writer in the Coffeyville Weekly Journal probably were rather typical:

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[13]"Lotterer Is Sore," Coffeyville [Weekly] Journal, Nov. 30, 1900, p. 1.

[14]Ibid.

[15]Ibid.

> As a matter of fact the Southern Kansas gas field does not show signs of weakness. The biggest wells ever struck here at all have been found in the last year. Dry holes have been common ever since the first well was drilled and always will be. Our natural gas is the cheapest fuel on earth, quality considered. The fact that big brick plants do not object to the price of gas while little one-horse affairs running half time do, shows beyond doubt that the gas prices are not exorbitant.[16]

Lotterer had fought to keep other companies from draining off his gas. In 1898 he sought to have a permanent injunction granted restraining the Coffeyville Vitrified Brick and Tile Company from locating their plant at Cherryvale. The Coffeyville company had bought the mound of shale just east of Lotterer's plant. In his petition he said they had no right to drill into the gas field, a continuation of which underlay his plant, because it would eventually cut off his supply of gas. Lotterer had a gas lease on the ground bought by the Coffeyville company, with a provision that in case the land was sold, no well should be drilled within 1,000 feet of his wells. Coffeyville Vitrified Brick and Tile Co.'s wells were at least 1,200 feet away. Lotterer lost the case, and the Coffeyville company operated a highly successful plant at Cherryvale.[17]

An interesting cost comparison of gas and coal as energy sources can be made. The price of coal at Cherryvale in 1903 was $2.25 per ton. Assuming that natural gas has a heat-equivalent to coal at a ratio of 20,000 cubic feet to one ton of coal, it becomes apparent that gas was much cheaper to use than was coal. At three cents per thousand cubic

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[16] Ibid.

[17] "Brick Company Enjoined," Coffeyville [Weekly] Journal, Dec. 16, 1898, p. 3.

feet the cost comparison between gas and coal was 60 cents to $2.25. It was not until the price of gas neared eleven cents per thousand cubic feet that its cost approached that of coal.

It was claimed that six cents worth of natural gas would operate a brick plant for the production of 1,000 bricks in 1903 if an efficient plant worked up to capacity. Some brick plants were charged for gas at the rate of six cents per thousand bricks produced.[18]

It was no wonder that brick plants that were in operation within the Gas Belt converted to gas almost without exception and a large number of additional brick companies were formed to take advantage of cheap fuel.

Brick Plant Promotions

The major reason for establishing brick plants in Eastern Kansas during the "heyday" of brickmaking was to utilize cheap natural gas to produce a product for which there was a good market. Coupled with promotions for brick plants were promotions for glass plants and smelters. Communities which were fortunate enough to have nearby sources of natural gas were anxious to obtain plants of one or all three types. A number of the corporations that established brick plants had previously existed as gas companies or in chartering had indicated various interests beyond brickmaking, especially those related to the drilling for, distribution of, and sale of natural gas.

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[18]"Another Brick Plant," Weekly Republican (Cherryvale), Nov. 27, 1903, p. 8.

A rather typical case was the Cherryvale Gas Company, which was organized in 1891 to furnish the city with natural gas. The Company found itself with a large supply of gas on hand and an insufficient demand, so it formed the Cherryvale Brick Company in 1901. The Brick Company was a part of the parent company, but it ran as a separate and distinct unit.[19]

Communities vied with each other to attract brick companies much as they had vied to attract railroads and courthouses to their communities a generation or more before.

F. G. Lotterer was induced to move from Fort Scott to Cherryvale by the city's promise to drill gas wells for his plant and payment of a bonus of $1500, which was to be repaid in brick.[20] Coffeyville, among other towns, had sought the plant.

The small village of Tyro induced two brick plants, a glass plant, and a flour mill to locate there by offering them gas at the unheard of price of two cents per thousand cubic feet.[21]

Some honest, enterprising brick plant promoters went from town to town contacting city officials and private capitalists to determine which community would offer the most attractive inducements. Some enterprising, but dishonest, promoters did the same thing--their intentions being to bilk the unsuspecting stockholders. It is difficult to sift through the motives of many brick plant promoters, because they sometimes had good motives, but their plans went sour.

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[19] Supplement to the Cherryvale Weekly Journal, Aug 11, 1905, p. 6.

[20] Cherryvale Republican, Oct.15, 1897, p. 2.

[21] "Tyro Lands Brick Plant," Tyro Life, Sept. 27, 1905, p. 1.

A scheme of gigantic proportions was promoted and perpetuated for three years by a R. L. Dennison and others in several communities of the Gas Belt. Dennison was one of the major promoters of the Monarch Brick Company, which announced late in 1904 it would build a plant northwest of Caney that would produce 150,000 bricks and 180 tons of tile, hollow blocks, and fire roofing in a ten-hour day. The plant would cost $100,000 and would be the biggest and best equipped concern in the West. It would own its shops, switches, and switch engines. H. B. Wiley, who was in Caney in May of 1905, stated that the Company would start construction in 30 days.[22]

Within a month R. L. Dennison, the master promoter, was in Caney expanding upon the plans of the Monarch Company in his own masterful way. The Company not only would make brick and tile, but it would make vitrified fence posts.[23]

Dennison was the patentee of a hollow vitrified fence post that was six feet long, six inches in diameter at the base, three inches in diameter at the top and perforated for either wire or boards. The post would have a resisting strength of 400 pounds to the square inch when placed in the ground two feet. A team of horses could pull with all their might and the post would tear out of the ground before it would break. Dennison claimed that once the post was in the ground it would be there for all time--there would be no rotting or decaying.[24]

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[22]"Big Factory Comes," Caney Chronicle, Nov. 11, 1904, p. 1.

[23]"The Fence Post Factory," Caney Chronicle, June 30, 1905, p. 2.

[24]Ibid.

Dennison was in Caney for weeks to test the shale for its suitability for making fence posts. A dozen or more fence posts were made and burned in the Caney Brick Co. kiln. They were reported to be everything that one could expect.[25]

Dennison promised that the company would start building the brick, tile and post factory within 30 days after the test of the posts was completed. By the end of June he had inflated the projected capacity of the plant to 300,000 bricks, 120,000 tile and 20,000 posts a day. Also there would be a fully equipped machine shop that would do work for the public, as well as for the plant. It would include lathes, planers, die cutting machinery to cut gears, bevels, threads and pipe casing up to ten inches. The shop would be a boon to the oil and gas fields.[26]

Dennison apparently moved his promotions to Niotaze in the spring of 1906, as a brick and fence post factory was reported to be going in. However, W. S. Cochrane and H. B. Wiley of Chanute, representatives of Monarch, were in Caney in September promising a brick plant would be built there minus much of the windy promotion that Dennison had been making.[27]

The Coffeyville [Weekly] Journal reported that E. O. Holtz, treasurer of the National Vitrified Post Company with offices in Kansas City and a factory in Niotaze, was in Mound Valley early in December,

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[25]"Posts Completed," Caney Chronicle, July 28, 1905, p. 1.

[26]"The Monarch Brick and Tile Co. and National Vitrified Post Co.," Caney Chronicle, June 30, 1905, p. 2.

[27]Caney News, April 27, 1906, p. 1. "New Brick Plant a Reality," Caney News, Sept. 7, 1906, p. 1.

906 promoting a vitrified post factory for that city.[28]

By May and June of 1907, Dennison was in Coffeyville promoting nd promising that the Premier Vitrified Brick and Tile Company, of hich he was one of the organizers, would soon build a 340,000 brick r brick equivalent factory that would manufacture various kinds of rick, conduit, holloware and fence posts.[29]

There is no evidence to indicate that Dennison or the Monarch rick Company ever built a brick or fence post factory.

Numerous other brick companies were incorporated, of which there s no indication that they produced brick. One explanation for this may e that companies included the word "brick" in the title or in their urpose for incorporation in the eventuality they wished to later anufacture brick. Most incorporation charters were general in nature, sually listing a number of purposes for incorporation. The purpose of he Chanute Brick and Tile Company was typical:

> To buy, sell, own lease and operate brick clay product plants; to make and sell tile and brick and all other products of clay shale, to buy sell, own, lease and operate gas and oil lands for the purpose of utilizing the same in operating said brick and tile plants; and to own, hold and occupy, lease, and sell real estate for the purpose of said corporation; . . .[30]

Another interesting brick plant promotion was that called the ow-Kim Brick Plant located approximately four and one-half miles orthwest of Mound Valley in Labette County. The intent of the promoters

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[28]"Another Plant Loose," Coffeyville [Weekly] Journal, Dec. 7, 906, p. 2.

[29]"Another Brick Plant," Coffeyville Journal, May 3, 1907, p. 8. ork to Begin July 8," Coffeyville [Weekly] Journal, June 28, 1907, p. 1.

[30]Kansas Corporation Charter File, 71:35.

ll of the events surrounding the plant are rather obscure.[31]

It seems that in 1908 two women from St. Joseph, Missouri, a loward and a Miss Kimber decided to establish a 50,000 bricks ay plant on a farm with a valuable gas lease located near the village celsior and near the Frisco Railroad. Foundations for machinery constructed according to blueprints prepared by the American Clay nery Manufacturing Company, which was to supply the machinery to ed in manufacturing brick. Tunnels and walls for the latest im- d brick drying system were constructed. Everything was practically adiness to receive the brickmaking machinery, when Misses Howard and r abandoned the project.[32]

Two years later the plant was sold at a sheriff's sale to es L. Snyder to satisfy a labor claim of $940. There was specula- for a time that he or the two Ellison brothers, on whose farm the was located, would develop the plant or sell it to some interested .[33] However, nobody seemed interested enough to buy the partially eted plant. It is believed that the plant was never completed and produced a brick. The remains of the tunnel kilns and foundations achinery with bolts in place can be seen today.[34]

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[31] "How-Kim Brick Plant Sold," Mound Valley Herald, June 10, 1910, "A Fine Lay-Out," Mound Valley Herald, Oct. 28, 1919, p. 3.

[32] Ibid.

[33] Ibid.

[34] Personal visit to plant site, June 4, 1976. The numerous brick ered around the site seem to be of the same composition as those used structing foundations and kilns rather than any that might have been ctured on the site. Elwyn Ellison, personal letter, June 9, 1976. llison states that the brick plant never operated. The land on which constructed has been in the Ellison family 105 years.

Persons who had a direct financial interest in brick plants were not the only ones who were active promoters. The American Clay Machinery Manufacturing Co. of Bucyrus, Ohio, which sold much of the machinery used in the manufacture of most of the Kansas brick during the "heyday" of brickmaking, was quite zealous in promoting brickmaking. Samples of shale from the localities where brick plants were comtemplated often were sent to Bucyrus for analyses to determine their brickmaking qualities. The report invariably came back favorable, and quite often it stated that the shale was the finest to be found anywhere and would produce brick comparable to the famous Milwaukee cream or buff or other well-known brick. This inclination of the Bucyrus company did not escape the notice of the Wilson County Citizen:

> We have noticed that whenever samples of shale are sent to Bucyrus, Ohio, to be tested as to its adaptability for brick, the reports from the experts are favorable; in fact the shale is often declared by them to be of extra excellence for the purpose indicated. Bucyrus sells brick-making machinery.[35]

Of course every community that had shale tested at Bucyrus could not have the best shale found anywhere, but most plants established as the result of the glowing reports found the shale suitable for quality brickmaking. The absence of good shale usually was not one of the problems experienced by the brick plants of Kansas.

One rare exception was the Verdigris Valley Vitrified Brick Company, which was constructed at the north edge of Neodesha in 1900. The shale at the site was claimed to be of excellent quality and to compare to the shale at Galesburg, Illinois, the home of the largest brick

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[35]Wilson County Citizen, July 7, 1905, p. 3.

manufacturing plant in the United States.[36]

Early in 1901, soon after the plant was put into operation, it was found that the best shale was playing out and the remaining shale contained too much cotton rock or fine grained limestone and was not suitable for making brick, despite the fact that American Clay Machinery Co. claimed it was suitable for making brick.[37]

Verdigris Valley Vitrified embarked upon a search for a suitable supply of good shale that would permit the Company to leave the plant at the original location. This sparked speculation that the whole problem was a ruse to either get some of the stockholders out of the Company or to justify moving the plant elsewhere. Tests were conducted of brick made from shale at the original site; Little Bear Mound, about a half mile east; and from the Sycamore area, three miles south of Neodesha. The Neodesha shale was determined to produce the best brick and to be comparable to the famous Milwaukee cream brick. However, the Company bought 80 acres of land two miles north of Sycamore and negotiated with the Missouri Pacific Railroad for transporting the shale to the original plant site. The decision was made in 1902 to move the plant to the new site, where it was put into production in August.[38]

Verdigris Valley Vitrified, after months of wrangling and indecision, found an adequate supply of quality shale to last until the

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[36]"New Brick Plant," Neodesha Register, Jan. 12, 1900, p. 3.

[37]"Brick Plant All Right," Neodesha Register, Jan. 25, 1901, p. 1.

[38]"Gas and Shale All Right," Neodesha Register, Jan. 18, 1901, p. 1. "Shale Is All Right," Neodesha Register, April 19, 1901, p. 1. "Brick Plant Lays Off," Neodesha Register, May 3, 1901, p. 1. "Brick Plant is Working," Neodesha Register, Aug. 8, 1902, p. 1.

plant was closed in 1953. Interestingly, one of the main reasons for closing the plant at that time was that it was not economical to remove the 55 feet of overburden to reach the shale.[39]

Another group that was guilty of "boomerism" in regard to brick plant promotions were the newspapermen. The competitive spirit of cities in attracting new industry usually was vented in its greatest form in the daily and weekly newspapers of the Gas Belt. The newspapers were eager to pounce upon a glimmer of hope that their town was being considered as the location for a new brick plant. Newspapermen often were unwitting accomplices of brick plant promoters who "windjammered" their proposed brick plants. Newspapermen were prone to gloat over the fact that their town was being considered in preference to other towns. They often did not disguise their satisfaction that other towns had met with misfortune in their promotional efforts or attempts to hold on to an existing industry.

Once the brick plant or other industries were assured for the hometown, the newspaper usually waxed eloquent and predicted the town was on the verge of Utopia.

The Tyro Daily Life predicted a glorious future for Tyro after the inducement of 2 cents per 1,000 cubic feet of gas had attracted the Tyro Shale Brick plant, a glass factory, and a flour mill. It predicted the unlimited quantities of natural gas offered at such low prices would cause the city to grow from 500 to 5,000 inhabitants within three years.[40]

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[39]C. V. Coleman, private interview, June, 1975. Mr. Coleman was manager of the Verdigris Valley Vitrified plant when it closed.

[40]"Tyro Lands Brick Plant," Tyro Daily Life, Sept. 27, 1905, p. 1.

The announcement of the formation of the Verdigris Valley Vitrified Brick Company in Neodesha was the occasion for the prediction of an exceedingly bright future for that city.

> We have maintained all the time that Neodesha has the most and best natural advantages of any city in Kansas and this is another link in the chain of evidence that it is true.
>
> Two or three years from now we will be riding on street cars to the suburbs of a city of 10 to 15 thousand people, and factories of all kinds will be in operation furnishing employment to thousands of working men. The bucket brigade will be a long one, and Neodesha, the natural gas city of Kansas, will be a truly metropolitan city.[41]

Most of the towns of the Gas Belt did experience some heady years of development, but most did not live up to the expectation of the hometown newspapermen. Since most of the brick plants were constructe about the same time other industries were built in the towns, it is impos- sible to gain a true picture of the economic impact of the brick plants. It is safe to assume the plants did not have the economic impact that had been predicted by the "boomers" due to the relative short time most of them were in operation and the irregularity of their operation.

Factors Influencing Location of Brick Plants

A number of factors usually were involved in determining where brick plants were located. As previously indicated, the most important factor was the availability of natural gas. Since very little of the natural gas of Eastern Kansas or any other section of Kansas was consolidated and piped long distances during the early stages of the "heyday" of brick production, the supply had to be local in origin.

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[41]"New Brick Plant," Neodesha Register, Jan. 12, 1900, p. 3.

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Not enough care was exercised by most brick companies to insure they had a dependable supply of gas for a number of years of successful operation. Numerous plants experienced temporary interruptions of their operations within a few months after going into operation. Many plants were plagued by this problem during most of their short lives until their "gas-short" demise.

Another important factor in determining the location of brick plants was the demand for brick. In the first part of the period the market for brick was overwhelmingly local in nature. Several things caused this. (1) Lack of favorable transportation rates limited the market area. (2) A reputation for quality Kansas brick had not yet been established. (3) A number of the original frame business structures in the local communities were being replaced by more fire-resistant brick buildings. (4) Brick sidewalks were being laid to replace wooden walks or to get the pedestrians out of the mud by constructing their first walks. (5) Brick was becoming a popular material for paving streets in the developing towns to provide the first hard surfaces for vehicular traffic. A large supply of bricks was essential in many localities to meet the local demands.

Later the local demand for brick became of lesser importance in locating brick plants. The reputation of Kansas brick had been established, and the companies began to expand their marketing territory. As long as the market was primarily local, good rail transportation was not imperative. Some plants actually did not have rail connections in their early days, but relied upon teams and wagons for hauling brick for local delivery or to the railroad. As the market expanded, it became imperative that a brick plant have a good rail connection to deliver its products to

market. However, transportation was not the greatest consideration in selecting a site for a brick plant. While communities that had good rail connections had a small advantage in attracting brick plants, most small communities were served adequately by one or more railroads and could attract a brick plant if other conditions were right.

Capitalization of Brick Plants

Capital was an important factor in determining the location of brick plants. Outside of a dependable fuel supply, it probably was the most important consideration. The amount of capital necessary to establish a brick plant depended somewhat upon the desired production capacity of the plant, the time the plant was constructed, and the financial soundness of the undertaking. Most plants of any consequence established during the "heyday" of brickmaking were incorporated, but a few were partnerships or family-owned enterprises.

Table I on page 49 gives a little insight concerning the initial capitalization of brick corporations: (1) The amount of initial capitalization varied greatly during each of the time periods; (2) the later the brick company was established and the more sophisticated manufacturing became, the more initial capital was required. One exception is in the 1900-1910 time period when a number of individuals and corporations were getting into the business.

There is no significant correlation between the amount of initial capitalization and the success of the brick company. In fact, there seems to have been an inverse correlation between the success of the company and the amount of initial capitalization. Some of the companies that had the lowest initial capitalization were the most successful.

TABLE I

INITIAL CAPITALIZATION OF BRICK COMPANIES
(Compiled from Kansas Corporation Charter Files)

Decade	1870-80	1880-90	1890-1900	1900-10	1910-20	1920--
Lowest Capital	$2,000	$2,000	$6,000	$7,000	$6,000	$25,000
Highest Capital	$50,000	$50,000	$200,000	$500,000	$1,250-000	$300,000
Median Capital	a	$25,000	$50,000	$30,000	$50,000	$100,000
No. Brick Plants Inc.	4	29	23	81	23	8[b]

a. Other two were capitalized at $3,000 and $25,000
b. The last one considered was chartered in 1937.

The Excelsior Brick Company of Fredonia was incorporated in 1904 with a capital stock of $30,000, the median for that decade, and it is still in operation. The Humboldt Brick Manufacturing Company was incorporated in 1898 with a capital stock of $15,000, $25,000 below the median for that decade. It also is still operating. Coffeyville Vitrified Brick & Tile Company was incorporated in 1894 as the Coffeyville Vitrified Brick Co. with capital stock of $20,000, half of the median initial capitalization for that decade. This company underwent additional corporation changes with increases in capitalization, reached the pinnacle of success during the "heyday" of brickmaking, and continued to operate for a number of years afterward.[42]

[42] Kansas Corporation Charter Files, 66:265; 56:126; 50:250.

Some of the most highly capitalized brick companies were the least successful. The Yoke Vitrified Brick Company of Coffeyville was incorporated in 1906 with a capital stock of $125,000 and was highly promoted to be one of the most promising brick plants in Kansas with the world's greatest production capacity.[43] Within a few months the company was in deep financial trouble. By August 1909 the Company had filed for bankruptcy, with debts listed at over $95,000. The Company was reputed to have invested a total of $250,000 in the plant.[44] After seven bankruptcy sales, the plant was finally sold for $20,776. This was only enough to pay $21.82 on each $100 of debts.[45]

Lumbermen's Cement and Brick Co. at Carlyle, one of the most highly capitalized concerns at $1,250,000, met with about the most dismal failure.[46] The Company was financed mainly by selling one $125 bond each to many lumbermen and contractors throughout Kansas, surrounding states, and as far away as Florida and California. In 1910 the Company began to construct a cement plant, and it finished a brick plant with a production capacity of 50,000 bricks per day.[47] Within a few months after the Company was organized it went into receivership. A petition for involuntary bankruptcy was filed in 1913, and the Company was judged to be bankrupt in 1914.

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[43] Kansas Corporation Charter File, 70:3.

[44] "Yoke Affairs Are Closed," Coffeyville Journal, June 30, 1911, p. 2.

[45] Bankruptcy Files, Yoke Vitrified Brick Co., Case 494, Federal District Court, Fort Scott, Kansas. (All such files are now located at the Federal Archives and Records Center, Kansas City, Mo.)

[46] Kansas Corporation Charter File, 75B:352.

[47] "Cement Company Defunct," Coffeyville Journal, Aug. 26, 1910, p. 3.

The Lumbermen's Company had incurred debts of approximately $486,000. Although the receiver attempted to extract the Company from its financial woes, it was declared insolvent in June, 1914. The plants were sold for $55,000, and the Company was liquidated. Bondholders received only $15.73 for each $125 investment.[49]

One of the stated causes of the failure of the Lumbermen's Co. was its purchase of machinery from the Wisconsin Engine Co., and the machinery had never operated correctly. Wisconsin Engine was adjudged to be bankrupt in January 1913. Lumbermen's had submitted a claim for nearly $237,000, but had received only a small settlement. The cement and brick company was accused in the bankruptcy petition of transferring property to creditors while insolvent to give preference to certain creditors.[50] Therefore, one might suspect some underhand dealings by the Company.

The Tyro Shale Brick Co. was another example of a company that had relatively high initial capitalization, but which had continuous financial woes. The Company was incorporated in 1905 with a capital stock of $75,000--$45,000 above the median for that decade.[51] Although the Company enjoyed a brief period of prosperity, it was experiencing serious financial problems by mid 1910. It was closed much of the time from then until September 1912, when the plant was taken over by

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[49]Bankruptcy File, Lumbermen's Cement & Brick Co., Case 684, Federal District Court, Fort Scott, Kansas.

[50]Ibid.

[51]Kansas Corporation Charter File, 68:258.

Montgomery County for $223 in delinquent taxes. There was no bid at the sheriff's sale.[52] The County did not operate the brick plant.

More important factors determining the success or failure of brick plants than their initial capital stock were: (1) honesty of company officials, (2) managerial ability, (3) their ability to attract additional capital, and (4) their ability to continue to produce brick against all adversities.

The key factors were, first, the honesty of the directors or company officials; and secondly, the managerial ability of the company officials. If these two factors were well handled, the others came naturally.

It is difficult to determine which ones and how many of the brick plants failed due to the dishonesty of the company officials or to the ineptness of the management. Chicanery could be concealed in a number of ways. Even if the companies were not able to conceal dishonesty or fraud from the local community, newspapermen were reluctant to reveal to the outside world that citizens of their community had been duped. Legends still abound in a number of communities of how brick companies were organized solely to bilk unsuspecting stockholders. Such legends are difficult to document. The Kansas Corporation Charter Files indicate there were many more brick companies chartered than ever produced brick. A number of them may have conducted related businesses, however, especially in natural gas.

Financiers, who probably would not have invested in larger industries, were willing and able to invest in brick plants, because they

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[52]"County Goes Into the Brick and Gas Business," Caney Chronicle, Sept. 13, 1912, p. 4.

required relatively small outlays of capital. A number of men and women went into the brick business with no experience or training. This was especially true with investors who also believed they could manage a brick and tile company.

J. H. Houck, in an article in the Moline Review, probably made one of the best assessments of the situation in the brick industry. He told how a number of successful businessmen of that community had thought they could successfully run a brick plant, but they had been out of their element as a fish out of water. The consequences were similar to that of other brick plants to which he made reference:

> They lived and flourished about as long as the fish when he gets out of his element, yet because they made a failure, on account of their ignorance of this line of business, it is not necessarily true that the brick business is a failure and that there is no money to be made at it; on the contrary it is one of the most lucrative lines today and stands second on the list being next to steel and iron.[53]

Houck emphasized that persons who had little knowledge of the clay manufacturing business often tried to emulate the successful managers with little success.

> An individual will go into the plant of a successful clay worker and find everything up to date, machinery running smoothly, plant nice and clean, no confusion, everything systematical, the manufactured product well burned, and being shipped as fast as made and cooled and a general air of prosperity everywhere he naturally thinks it is no trouble to manage a brick plant, all that is required is to purchase machinery, shovel in dirt, any old kind, and it will come out brick, then pile them up, put fire under them, ship them out and rake in the dollars.[54]

A manager must have a thorough knowledge of clays and shales, of the machinery, how to burn the products, handle labor and manage the

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[53]J. H. Houck, "Brick and Other Clay Products," Moline Review, Feb. 3, 1911, p. 2.

[54]Ibid.

t to insure financial success, Houck stressed. The manager must be ing to virtually live at the plant.

Houck stressed that the different facets of the clay manufacturing stry were so technically different that a person who was a success in night not be a success in another.

> A man may be successful as a soft-mud brickman and a total failure with stiff mud or dry process or visa versa, as the three methods vary greatly, or he may be a good tile maker and no good at sewer pipe, roofing tile or clay shingles, the same as a merchant may be a good grocer, but a failure as a dry goods man, an expert cotton buyer but have no knowledge of wool.[55]

Houck claimed a clay worker must understand all parts of the clay stry, or he could not command a good position with progressive com- es. The companies generally tried to secure a location where they clay or shale that made roofing tile, drain tile, sewer pipe, and linings.[56]

Companies that were successful in the realm of management found ifficulty in attracting additional capital. Most of the successful went through several charter changes to increase their capital stock. most famous of the brick companies, the Coffeyville Vitrified Brick Tile Company, underwent the following corporation and capital stock ges.

1894--Incorporated as the Coffeyville Vitrified Brick Company with a capital stock of $20,000
1899--Changed to the Coffeyville Vitrified Brick & Tile Company with a capital stock of $80,000
1901--Capital stock increased to $240,000
1903--Capital stock increased to $600,000[57]

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[55] Ibid.

[56] Ibid.

[57] Kansas Corporation Charter Files, 50:250; 57:286; A 2:500; 89; A 3:153.

Brick companies that found themselves in financial straits due to poor management might go through reorganizations in attempts to improve their financial condition; but almost without exception, their efforts were doomed to failure. Once a brick company was on the financial skids, there was virtually only one way to go, and the end was inevitable. Most brick plants that were sold in an attempt to salvage the initial investment or to put them on a paying basis were not kept operating long after the sale, if they ever resumed operations. They went the way of most other financially troubled brick plants--closure, varying periods of waiting for a financial miracle to be worked, dismantling and shipping of usable machinery to a more promising company or site, and abandonment of the skeletal remains of a once proud brick plant.

Who were the persons investing in the brickmaking industry, an industry with so many financial pitfalls? A majority of them were businessmen in the communities where the brick plants were located; however, a number of them were capitalists from other communities in Kansas or other Midwestern and Eastern areas. Capitalists from areas east of Kansas were quite venturesome and often as willing to invest in Kansas brick plants as had been their predecessors to invest in land, railroads, townsites, and other business enterprises in prior decades. A number of the capitalists who invested in Kansas brick plants were from Indiana, where they had been associated with the natural gas burning industries, such as glass and brick plants. At this time plants, especially glass plants, were moving to Kansas from Indiana and other eastern areas, because the natural gas supplies were running out.

Some of the capitalists, who were willing to invest in Kansas brick plants, had been associated with brick plants at eastern points,

especially in large brickmaking centers such as Milwaukee, St. Louis and Kansas City.

Undoubtedly, many of the Eastern capitalists, as well as the local capitalists, were disappointed at the size or complete lack of investment returns from the Kansas "heyday" of brickmaking. The considerable evidence available from newspaper accounts of financial problems and litigation indicates that few investors became wealthy, many gained little, many lost much of their investment, and some were financially ruined by their forays into the risky brick industry.

Labor and Working Conditions

Except for those operating the machines and supervising the drying and burning processes, brick plants did not require the skilled labor that glass factories, smelters, and a number of other industries required. Most of those employed were unskilled and were acquired through the local labor market. The going wage rate for brick plant employees the first few years of the twentieth century for a ten-hour day was $1.25 for inexperienced laborers and $1.50 for experienced workers. Almost all plants worked a ten-hour day, except for those which put on a second shift when production was at its peak. The Coffeyville Vitrified Brick and Tile Company at Coffeyville and Cherryvale were the only plants that consistently worked two shifts. The Yoke Vitrified Brick Company of Coffeyville was virtually the only plant that worked an eight-hour day.

Employment in brick plants in Kansas was never a significantly high percentage of the total industrial employment, as indicated in Table 2. Except in small towns, brick plants of the Gas Belt did not employ a major portion of the local work force. Employment in the brick plants

TABLE 2

COMPARATIVE BRICK AND TOTAL KANSAS INDUSTRIAL EMPLOYMENT, WAGES AND SALARIES PAID IN SELECTED YEARS

Year	Number Establishments			Number Employed			Wages and Salaries		
	No. Establishments Brick and Tile	No. Establishments All Industries	Per Cent Establishments Brick and Tile	Average Number Employed, Brick And Tile	Average Number Employed All Industries	Per Cent Employed Brick and Tile	Total Paid to Employees, Brick and Tile (In thousands)	Total Paid All Industrial Employees (In Thousands)	Per Cent All Wages and Salaries
1899	57	2,299	2.5	1,021	30,731	3.3	$ 343	$15,925	2.2
1904	65	2,475	2.6	1,974	42,057	4.7	958	22,883	4.2
1907	56	1,769	3.2	2,332	59,187	3.9	1,125	33,854	3.3
1908	54	1,653	3.3	2,189	57,601	3.8	1,082	36,006	3.0
1909	55	3,334	1.6	1,978	54,678	3.6	1,051	33,254	3.2
1911	43	1,907	2.3	1,763	58,107	3.0	977	40,545	2.4
1912	38	1,760	2.2	1,489	58,482	2.5	971	40,842	2.4
1913	30	1,662	1.8	1,323	60,801	2.2	836	41,411	2.0
1914	26	1,938	1.3	1,315	59,733	2.2	826	42,826	1.9

Compiled from State of Kansas Annual Reports of the Bureau of Labor and Industry for 1906-1907, pp. 276-277; 1908, pp. 230-231; 1910, pp. 240-241; 1911, pp. 254-255; 1912, pp. 182-183; 1913, pp. 202-203; 1914, pp. 180-181.

was never as great as that of smelters, glass plants, and other gas fueled industries located in many of the same towns.

Shale pits that did not have steam shovels relied upon men using pick and shovel to dig and break up shale that had been loosened by dynamite blasts. The men also had to load the shale on wheel barrows or carts on tracks. Some plants relied upon manpower to push carts to the plant. Other plants used mules or cables to draw the shale carts in from the pit. Once the shale reached the plant, conveyor belts took over the process of feeding the machines. The machines carried on the brickmaking process and the heavy work until the bricks were formed in the presses if dry pressed or until they were cut if the stiff mud process was used.

The next difficult task was to off-bear the brick from the press or cutting table and place them on a small car to be wheeled into the drying tunnels. If the plant was making paving blocks at a top rate of production, this could mean off-bearing eleven pound brick at the rate of 44 pair per minute. This was being done as late as 1928 at the Buffalo Brick Co. plant for 28½ cents an hour for a nine-hour day.[58]

Another arduous task was loading the brick on box cars. Some brick plants installed conveyor belts for loading box cars, but others depended upon men to load the cars using two-wheel trucks or wheel barrows so durably constructed to sustain the weight of the bricks that they weighed nearly 100 pounds empty. The brick trucks were designed to hold 100 bricks, producing a load of approximately 700 pounds to wheel into a car.

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[58]Harry Daniel Dill, private interview, July, 1972. Mr. Dill worked in the Buffalo plant at that time.

It took a real man to truck bricks into a railroad car on a brick plant siding in this manner.[59]

Most brick plants hired laborers from the general labor pool available in the vicinity, so the work force was general in makeup. A few plants hired farmers, and were sometimes forced to close down while the farmers were harvesting. The pool of workers in the larger towns generally was made up of different racial and ethnic groups; therefore, blacks, Mexican-Americans, Italians, and other groups were hired by brick plants. Smaller towns usually had only whites in their labor pool, so only whites were generally hired for the brick plants.

Tyro citizens objected strenuously to the Tyro Vitrified Brick Company's plan to import blacks to Tyro to work in their plant that opened in 1908. The citizens drew up a petition asking the Company not to hire blacks, claiming there were enough men there to do the work without importing blacks.[60]

The employment of blacks at other brick plants caused labor problems from time to time. One of the most potentially dangerous labor disputes occurred at the Yoke Vitrified Brick Plant at Coffeyville in March of 1909, when the white workers left the plant en masse after demanding the dismissal of all black workers. Racial troubles came to the surface after a black attempted to shoot a white drifter, who had been hired temporarily to give him a stake with which to move on. The drifter had incurred the wrath of the black by his taunting remarks.

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[59]Harry Wise, private interview, July, 1972. Mr. Wise lives on the farm, in rural Neodesha, on which the Verdigris Vitrified Plant was located. He has such a truck in his possession.

[60]"Race War at Tyro," Caney News, Feb. 21, 1908, p. 1.

After the incident, the whites determined they would rather not work with the blacks. They also charged that blacks had been shown favoritism.[61]

Franz Paul Meyenberg, the rather tyrannical general superintendent and former Prussian soldier who could trace his ancestory back to the Iron Chancellor, noted that about one-third of the Coffeyville work force was black, so one-third of the plant work force should be black. In the few months he had been at the plant he had raised the wages 25 cents to $1.50 per day and lowered the working day to eight hours. He expected a day's work for a day's wages. He refused to fire the blacks, and he hired additional blacks when whites were discharged.[62]

Blacks and other minority groups usually were employed in the most difficult jobs such as in the pits or loading boxcars. Undoubtedly, this was one of the manifestations of discrimination of that day.

Most labor disputes not having racial implications were those prompted by demands for higher wages, but strikes and protests usually were not greatly effective in winning labor demands. As most of the brick plant laborers were unskilled, attempts to unionize them were somewhat futile. Workers were generally at the mercy of their employers; because if they went out on strike, scabs usually were hired to replace them. The laws and the courts generally favored management in those days. Those who attempted to organize the workers often were dismissed.

Fred Messner circulated a petition among the workers of the Fredonia Brick Company Plant in 1903 calling for weekly paydays and a fifteen cent a day increase in wages. Messner was discharged, whereupon thirty workmen quit work and marched up town to the city building to discuss

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[61]"Negro Takes Shot at White Man," Coffeyville [Weekly] Journal, March 5, 1904, p. 2.

[62]Ibid.

their demands and to appoint a committee to present their demands to the Company. The demands of the workers were not met, but they returned to work after receiving assurance that some men's wages would be raised later and other increased as their skills entitled them to higher wages. Messner was not reinstated, because this was before the day in which labor organizers were protected from recrimination from their employers.[63]

The Coffeyville Vitrified Brick and Tile Company was sued in 1901 for $10,000 by five men who claimed they had been discharged for membership in the American Federation of Labor.[64] Later the laborers at Coffeyville Vitrified were unionized.

Work in brick plants was relatively hazardous. Dynamite, with all of its attendant perils, was used to blast the shale loose in the shale pits. Boiler and natural gas explosions were always possibilities. Probably some of the most hazardous situations were those associated with piles of brick, the collapse of walls, and collapse of kilns.

One such tragic accident occurred at the Nelson Vitrified Brick Company at Mound Valley in September, 1905. William Musselman died of injuries when a kiln wall fell upon him. His widow sued the Company for damages and was awarded $5,000 in Kansas District Court. The Company appealed the verdict to the Kansas Supreme Court, which upheld the District Court judgment in 1908.[65]

The Kansas Buff Brick and Manufacturing Company of Buffville had a fatal accident in June, 1905, when Arthur Stark, 18, was caught in a

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[63]"A Small Strike," Wilson County Citizen, April 10, 1903, p. 3.

[64]"Suing the Brick Company," Coffeyville [Weekly] Journal, July 5, 1901, p. 2.

[65]"Nelson Brick Plant Loses," Mound Valley Herald, Nov. 20, 1908, p. 3.

belt at the plant and torn to pieces. His father was awarded $3,964 in district court in a judgment against the Company in September, 1906.[66] This was before the availability of workmen's compensation. Therefore, if a brick plant worker or his survivors expected compensation for an injury or death, suit must be brought against the company. Quite often the court was not sympathetic in regard to the worker.

Some brick companies established housing or company towns for their workers. The most famous of these company towns was Corbin City, a company town for the Coffeyville Vitrified Brick and Tile Company workers, approximately a mile south of Cherryvale. The town was named after C. J. Corbin, on whose land the Lotterer and the Coffeyville Vitrified brick plants were built. The settlement began to develop before the Coffeyville Vitrified Plant was established, and it later came under the control of this company.

The site for Corbin City was forty acres adjacent to the Coffeyville Vitrified Plant. It was laid out in 50 by 40 foot lots facing 60-foot streets. After the Coffeyville Vitrified Brick Company gained control of the town, it established a waterworks, gas distribution plant, and built twenty to thirty more dwellings. The Atchison, Topeka & Santa Fe Railroad established a depot there. A street car line was extended out from Cherryvale, and an interurban connection was made when the interurban was built. The U. S. Government officially recognized Corbin City when it established a post office there in February, 1905.[67]

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[66]"Killed," Altoona Tribune, June 15, 1905,p. 1. "Stark Gets $3,964," Altoona Tribune, Sept. 27, 1906, p. 1.

[67]"Corbin & McClelland," Special Illustrated Industrial Edition of Cherryvale Evening Clarion, March 2, 1899, p. 17. "Corbin City Sold," Cherryvale Weekly Clarion, April 18, 1902, p. 1. "Buys a Whole Town," Coffeyville Weekly Journal, April 28, 1902, p. 6. "New Post Office," Altoona Tribune, Feb. 23, 1905, p. 6.

One of the most interesting of company towns was Buffville, established by the Kansas Buff Brick and Manufacturing Company approximately two miles south of Altoona at what was previously known as Verdi Mounds. The site of the brick plant and company town was variously known as Buff City, Buffton, Buffington, and Buffville. The confusion of names was not only of local origin, but it was added to by the U.S. Postal Department. It seems the Postal Department could not settle on the name for the post office established at the site. The post office first established on February 17, 1910, was named Buffton. The office was discontinued on September 2, 1910, and the name changed to Buffington and re-established on September 12, 1910. This name was discontinued one day later, the order rescinded, and the name Buffville established. This name survived until the post office was discontinued on October 31, 1943.[68]

The Kansas Buff Brick Co. had constructed five new dwellings for the brick plant workers before the plant was opened.[69] Later there were nearly 100 dwellings--a number of them set aside from the rest for the families of the black workers. At its height the town contained at least a dozen buildings and a general store, as well as a post office.[70]

Sycamore had a small satellite community called Brickton, where the workers for the Verdigris Valley Vitrified Brick Co. were housed.

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[68]Robert W. Baughman (ed), Kansas Post Offices (Topeka: Kansas State Historical Society, 1961) p. 18.

[69]"Oil and Gas Gossip," Wilson County Citizen, March 11, 1904, p. 3.

[70]While a town of this size can't be verified, there are indications in a number of notes jotted down by individuals closely connected with the area that it was comparable to this size. Remains on the site as late as 1969 would indicate a town of this size.

Fairfax, another brick town, was located northwest of Altoona, near the Altoona Vitrified Brick Co. Plant. It had a fairly large hotel, a dozen or more duplexes, a boarding house, and a store.[71]

Other housing developments for brick workers existed near other plants. The names of such developments usually were associated with brick.

Brickmaking Techniques

Brickmaking processes varied somewhat from brick plant to brick plant during the peak of brickmaking in Kansas. However, similar processes were used throughout the industry. Some plants used more sophisticated machinery than others, bringing about refinements in the manufacturing processes. Generally, the plants with the most sophisticated machinery were those that had higher amounts of capital.

The initial success of the plants greatly influenced the degree of mechanization, because it was essential to accumulate additional capital in most cases to make improvements. Most plants were not highly mechanized at the outset, but became more so if they were successful. Many were so unsuccessful they never became highly mechanized.

The American Clay Machinery Manufacturing Company of Bucyrus, Ohio, provided a major portion of the brickmaking machinery used in the plants in Kansas. Thus, considerable standardization of machinery from plant to plant was assured. Plants usually were laid out according to blueprints drawn up by American Clay.

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[71]C. A. Barnhart, rural Altoona, private interview, July, 1975.

It is appropriate to follow the brickmaking process from the initial steps to the shipping out of the finished product.

The raw material from which brick were made came from the shale pit. The plants were located as close to these pits as possible.

Three general processes were used in making brick--the soft-mud process, stiff-mud process, and the dry-press process. The initial stages of the three processes were the same.

The shale, on entering the plant, was conveyed and dumped into a dry pan, a large vat-like container approximately nine feet in diameter. The dry pan was equipped with two huge revolving rollers weighing 2,000 to 6,000 pounds for crushing the shale. The bottom of the dry pan was equipped with a screen to permit the passage of the powdered shale.

The powdered shale was then elevated to another screen, which permitted the finest powdered shale to enter the wet-pan or pug mill. Coarse particles were returned to the dry pan for further crushing.

The pug mill was a horizontal cylindrical box about eighty feet long, in which a shaft revolved carrying knives that cut and mixed the ground shale with water. The stiff mud was moved to the opposite end of the pug mill, where it was extruded in the form of a retangular column on a table, where a series of parallel wires were used to cut the bricks to proper size. Another type of cutter was slowly revolving reel equipped with wires that would cut twenty-four bricks at a time.[72]

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[72]"Are Making Brick," Coffeyville Weekly Journal, June 19, [illegible], p. 2.

Smaller and less sophisticated plants had smaller pug mills that ere upright rectangular boxes.[73]

Sometimes the rotary screw motion of the pug mill caused imperfect rfaces on the extruded stiff mud. In order to avoid this condition e interior surfaces of the extruding area were kept well oiled. Also presses were used sometimes to better form the bricks. Represses were ften used in making paving brick.

If dry press brick were being made, finely ground shale was opped into the dry presses, where it was stored until a sufficient mount of the powder was in each magazine to form individual brick. hen tremendous pressure was applied to form brick that was practically ree of moisture. Enough oil was applied to make the brick "shed" from e magazines. The result was perfectly shaped brick that were suffi- ently stable to be stacked in preparation for drying. The dry press thod generally was used for making face or building brick.

After the brick were formed, they were stacked on cars holding to 300 brick for drying. In the earlier days much of the drying done by wheeling the cars out into the open air for drying, where y were subjected to the elements and could be damaged or ruined by favorable weather.

Later, most brick plants installed tunnel dryers approximately feet long. The tunnels were equipped with tracks on which successive were pushed from the entrance end to the exit end. The intensity of

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[73]State of Kansas First Biennial Report of the Bureau of Labor Industry for 1901 and 1902, (Topeka: State Printing Office, 1902), 151.

the heat was increased from the entrance end to the exit end. The journey through the drying tunnel took twenty-four hours. The tunnels were usually heated by steam, with the pipes being laid between the tracks. A later refinement was to circulate the hot air from the kilns that were being cooled into the tunnels by means of large fans.

Three general types of kilns were used at the turn of the century--beehive, rectangular, and continuous kilns. There were several variations of each.

Beehive kilns got their name from their shape, looking much like a circular bee hive with a domed roof. The beehive kilns were constructed of fire bricks that would withstand tremendous and frequent heat. Some of the fire bricks were of local manufacture, but they generally came from St. Louis or Mexico, Missouri, centers of the firebrick industry. The sides and domes of the beehive kilns were plastered on the outside with mud to aid in holding in the heat. Beehive kilns ranged considerably in size. Some burned 40,000 to 65,000 bricks others from 80,000 to 100,000.

Two variations of the beehive kiln were used, the updraft and the downdraft. In the updraft kilns the floors were constructed of fire brick with an arch running through the center in which the source of heat was located--in gas operated plants a gas burner. The heat from the burner passed through the brick stacked about 40 high and out the flue at the top of the dome. A major disadvantage of this type of kiln was the heat was greater at the bottom than at the top of the kiln, and the brick were burned unevenly.

In the downdraft kiln the heat was conducted from the fireplace by the burners upward to the top of the inside dome, where it was

deflected downward over the brick, then through a floor vent and to the chimney. Fig. 5 illustrates the operation of a downdraft kiln. This type of kiln had the advantage of providing better heat distribution among the bricks, and it avoided the problem of warped bricks caused by those at the bottom of the stack receiving too much heat, while being under too much weight from the bricks above.[74] Downdraft kilns generally were used for making paving brick, and they were more suitable than updraft kilns for burning other types of vitrified brick.

Rectangular kilns were what the name implies. The principle for firing of brick in these kilns was the same as for the updraft kilns. Their capacity usually approximated 400,000 to 600,000 bricks.

Both beehive and rectangular kilns were periodic kilns, in that the bricks that were to be burned were placed in the kilns before the burners were turned on and left in a stationary position during the entire firing and cooling processes. The entrance of the kilns were bricked up to hold in the heat, and the kilns were capable of receiving green brick only periodically.

Another type of periodic kiln deserves mentioning. The Hoffman kiln, used especially in non-natural gas areas, was designed to burn coal. This kiln was a huge tunnel kiln capable of burning several hundred thousands of brick at a time. Brick were placed in the kiln in the same stationary manner as in other periodic kilns. The kiln roof was equipped with small trap doors through which small shovelfuls of fine coal were thrown in to feed the fires. The frequency and amounts of coal shoveled

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[74] Ibid., pp. 151-152.

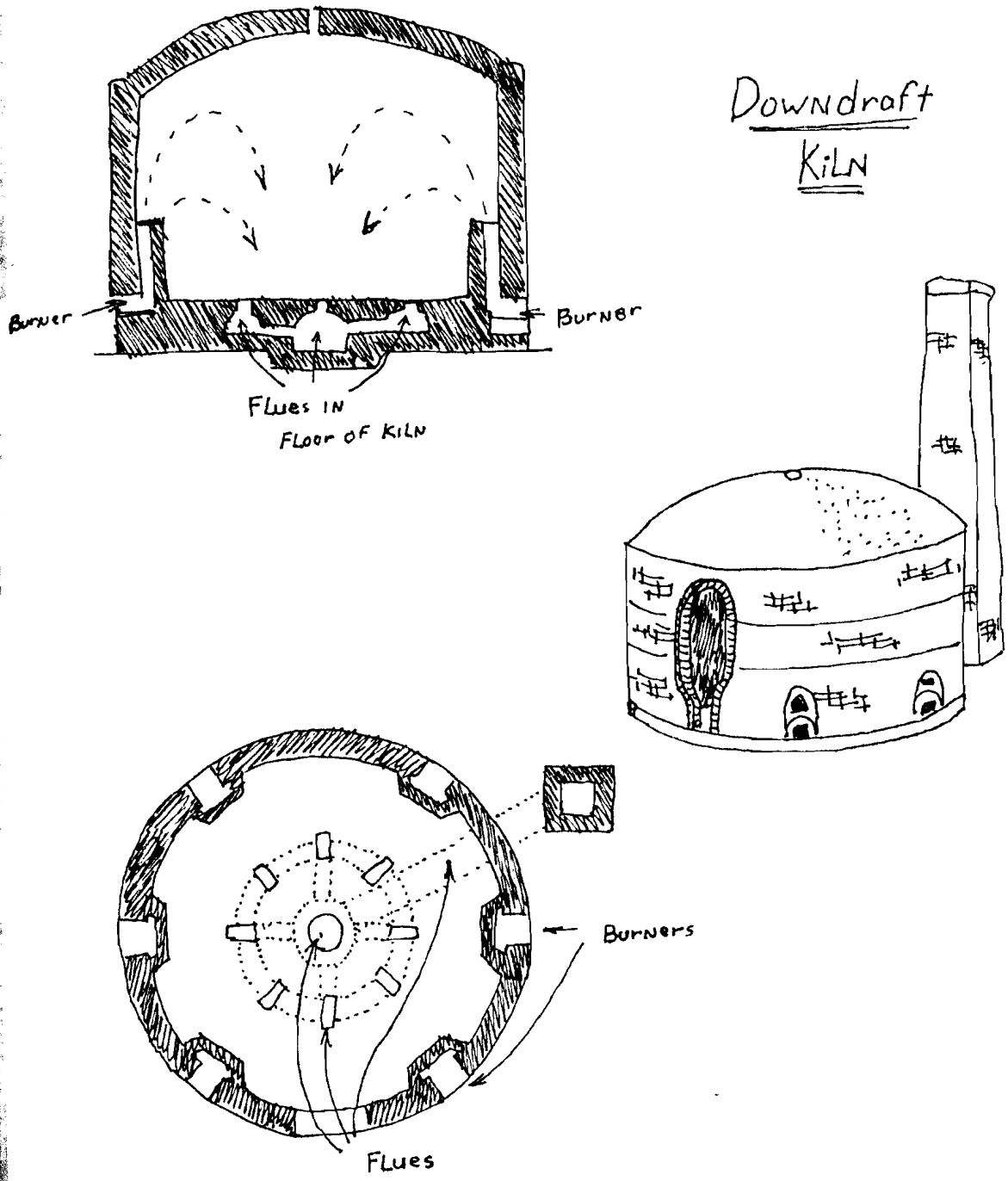

Fig. 5.--The above drawing shows the working principle of downdraft beehive kilns. The heat from the burners recessed in the walls is directed upward and deflected off the inside dome and down among the brick stacked in the center. Flues in the floor vent the kilns. Modern kilns do not have chimneys, but are sometimes vented through the drying rooms to provide heat for drying brick. Source: Daniel Rhodes, Kilns, (Philadelphia: Chilton Book Company, 1968), p. 49.

in to feed the fires depended upon the heat desired for the burning stages the bricks were passing through. Probably the only Hoffman kiln in the United States in use during recent years is the one at the Humboldt Brick Manufacturing Co. Plant.[75]

Continuous tunnel kilns are what the name implies. They are kilns in which brick are loaded on cars and sent on their journey through the kilns on tracks. The heat in the kilns, which range from 300 to 700 feet in length, is progressively increased from the entrance end to the middle of the kiln then decreased at the exit end of the kiln. A number of plants used large fans to cool the exit end of the kiln and channeled the excess heat to the drying tunnels. This technique is still in use.

Firing time for brick ranged from six to ten days for the different types of kilns and for different types of brick. The temperatures required for vitrification ranged from 1750 to 2000 degrees fahrenheit. Non-vitrified brick could be fired at lower temperatures.[76]

All brick kilns were cooled slowly to anneal the brick and to give them a hard and tough quality.

The final process in manufacturing brick was to unload the kilns, grade the brick, and load the railroad cars for shipment to designated markets. The earliest plants and those that did not reach a high degree of mechanization relied upon men equipped with two-wheeled trucks or wheelbarrows to move the bricks from the kilns to the cars on the siding.

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[75]Earl Strack, private interview at the Humboldt Brick Manufacturing Co. Plant, July, 1972. Mr. Strack was plant supertendent.

[76]First Biennial Report of the Bureau of Labor and Industry, pp. 151-152.

More highly mechanized plants installed conveyor belt systems to eliminate much of the drudgery associated with loading boxcars.

Production Problems

The adversities through which brick plants had to persevere to be successful were numerous. The most severe problem that brick plants had to solve was the shortage of natural gas. As previously stated, much of the natural gas supply had not been consolidated and much of that being consolidated was piped to the Kansas City Metropolitan Area. If the brick plants could not find adequate supplies of natural gas to supplement their faltering limited and local supplies, they were doomed to failure. Even some of the most successful plants temporarily halted production from time to time until they were able to find additional supplies of natural gas. Problems with natural gas supplies are treated with more detail in Chapter V on the decline of brickmaking in Kansas.

Probably the second most severe problem facing brick plants was the shortage of water. A number of brick plants were forced to close down temporarily when drought conditions caused their water supply to fail. Brick plants used large quantities of water to mix with clay or shale in both the soft and stiff-mud processes of brickmaking. Also, much of the power was supplied by steam engines. A number of plants started operations by depending upon a single well for a water supply, but they soon had to drill additional wells or lay pipe to nearby streams to insure an adequate supply of water. Until that dependable supply was found and piped to a plant, it was forced to shut down. Both the Tyro

Vitrified Brick Company and the Tyro Shale Brick Company were plagued by water shortages during much of their short lives.[77]

The Nelson Vitrified Brick Company of Mound Valley constructed a reservoir at the time the plant was built to hold over 100,000 barrels of water. Apparently the reservoir had a sizeable surface, because the management considered placing a gasoline launch on its waters to make regular excursion trips during July and August. However, the reservoir did not prevent the brick plant from having water woes. Early in 1910 the plant closed for lack of water. By late April the plant was having water shipped in on the Frisco Railroad. Plans were being implemented to lay a pipe to a nearby creek to pump water to the plant.[78]

The Coffeyville Vitrified Brick Plant at Cherryvale in September, 1899, was consuming 10,000 gallons of water daily. Its reservoir had gone dry, and it was getting water from the City. Pipes were laid to Drum Creek to get an adequate supply of water.[79]

Fires and explosions were a constant threat to brick plants. Most such fires and explosions were related to steam boilers, drying sheds, and kilns.

The fledgling Coffeyville Vitrified Brick Company lost a drying shed to fire in 1894, the year it started production. The shed, made of cheap lumber, was only a shell containing about 80 drying cars loaded

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[77]"Tyro Notes," Coffeyville [Weekly] Journal, Dec. 15, 1911, p. 3. Tyro Telegram, July 28, 1910, p. 3.

[78]Mound Valley Herald, June 9, 1905, p. 2. Mound Valley Herald, June 30, 1905, p. 2. "Brick Plant in Operation," Mound Valley Herald, Jan. 21, 1910, p. 3. "Local and Personal," Mound Valley Herald, April 29, 1910, p. 2.

[79]"Local Incidentals," Cherryvale Republican, Sept. 18, 1899, p. 3.

brick. The car beds were constructed of wood, so they were damaged
nsively. The loss was estimated to have been about $5,000. It was
covered by insurance, because the insurance company considered the
too great a risk. The replacement shed was constructed of brick
a metal roof to lessen the fire hazard.[80]

The drying rooms were entirely wrecked at the Lotterer Plant at
yvale in 1898, when a man attempted to light the gas burner in the
rooms. Luckily, he escaped being blown to pieces. This was the
time Lotterer's plant had suffered heavy damage. A high wind
blown down the drying rooms before they were entirely finished.[81]

Many of the later brick plants took their cue from Coffeyville
rified and constructed their drying rooms with metal roofs and brick
ls to minimize the danger of fires and damage caused by fires if they
break out.

Shale pits and explosives used to loosen the shale could pose
ards to the plants and men alike. The Iola Brick Company was partially
olished and the crusher broken by a blast of shale set off too close
the machine room. A crusher had to be brought in from the Company's
plant before brickmaking could resume.[82]

The Coffeyville Vitrified Plant at Cherryvale was closed down for
ek or two on two different occasions when the shale mounds caved in
damaged the steam shovel.[83]

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[80]Coffeyville Weekly Journal, Aug. 17, 1894, p. 1.

[81]"Local Incidentals," Cherryvale Republican, May 6, 1898, p. 3.

[82]"A Destructive Blast," Iola Register, Jan. 19, 1900, p. 5.

[83]"Mound Caved In," Cherryvale Weekly Clarion, May 9, 1902, p. 8.
yvale Republican, Oct. 30, 1903, p. 3.

Weather could also hamper brickmaking operations. Rains, ice storms, and snow could close down brick plants if adequate provisions for storage of shale was not made before such weather hit. Rains would make the shale too wet to use in brickmaking; ice and snow could make it impossible to work the pits.

Severe weather related situations could close down brick plants. Roofs on three kilns were demolished and other damage done at the Caney Brick Co. plant in May, 1912, when a near tornado swept that area.[84]

Flood waters of the Verdigris River in Coffeyville swept over a dam and other obstructions in September of 1895 and created havoc at the Coffeyville Vitrified Plant. The drying houses and one kiln were filled with green brick. The brick in the kiln were in the process of being burned and were only a few hours away from being through. The sudden invasion of a cold current over the white-hot brick caused the heat to be forced out of the top of the kiln, setting a board on fire. An explosion followed, shattering the side walls and scattering pieces of burning brick brands and broken brick over the surrounding area. In all about 240,000 bricks were involved, and the damage to the plant and the loss of brick was estimated at several thousand dollars.[85]

Except for those associated with the shortage of natural gas and water, calamities at brick plants had little bearing upon the success or failure of the companies. Probably no brick plants went out of business as a result of calamities of nature.

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[84]"Near Tornado Swept Caney and S. E. Kansas," Caney Chronicle, 17, 1912, p. 3.

[85]"Fire and Water," Coffeyville [Weekly] Journal, Sept. 20, 1895, 1.

Most problems encountered in brickmaking were associated with those of management. It took considerable managerial skill to keep the machinery working properly and to burn brick correctly. It was essential to produce quality brick capable of competing in the marketplace of an industry in which the profit margins were low. The key was in burning the brick. It took a skilled clayworker to burn the various clays found in the different localities at the appropriate temperatures to produce the different types of brick.

Most clays found in Kansas, and especially in the Gas Belt, were of high enough grade to produce quality brick if put in the hands of a capable clayworker.

If brick were fired at a temperature too low, they might come out a salmon color or a pink when a deep red was desired. If the firing was at a too high temperature, the brick might come out buff or green. If they were fired too quickly and at suddenly high temperatures, they would crack or explode, as they burn from the inside out. If the brick were not properly dried before being placed in the kilns, they might also crack.

One of the major obstacles that brick plants using gas for burning brick had to overcome was to avoid a white coating on the brick. Many plants had to use barium in the mud to avoid the white coating on burned brick. Barium is still used in many brick plants for this purpose.

Unless the fires were properly regulated throughout the kilns, the brick often were not uniformly burned. Architectural styles at the beginning of the twentieth century called for uniformity of brick, usually a deep or cherry red. Even uniformity was highly prized for brick to be laid in sidewalks and streets. The most desirable colors ranged from

cherry red to a deep bluish purple for paving blocks. The clayworker or company that could not meet the uniformity standards of the time was in trouble in such a competitive business.

Production and Marketing: General Statistics

Brick production in Kansas had first peaked in the early 1880's and was on the decline by the end of the decade. The first wave of municipal improvements in the 1880's had encouraged the setting up of brickyards in nearly every town of any size in Eastern Kansas to manufacture common brick needed for brick buildings. Such buildings were needed to replace frame business structures that constituted extreme fire hazards in the business cores of the developing towns.

Common brick of local manufacture and of lower quality were suitable for constructing fire walls, structural columns, sides, and backs of buildings, if not for their more decorative fronts. Other materials such as stone, wood, or metal in conjunction with glass were often used for fronts of the business houses. If brick fronts were used, the small quantity of brick needed could be shipped in without posing a burdensome expense.

The wave of municipal improvements declined sharply during the late 1880's and the decline continued until after the economic depression of 1893. Coupled with this economic decline was the decline in numbers of brick produced and the number of brickyards in existence. It was not

until 1900 that there were as many brick being produced as there had been in the early 1800's.[86]

The number of brickmaking establishments declined approximately 45 per cent from 1891 to 1894, and the number declined approximately another 33 per cent from 1894 to 1900.[87]

Not only were the number of brickmaking establishments declining, but they were becoming increasingly concentrated in the larger towns closer to the bigger markets and in Eastern Kansas nearer to the Kansas City Metropolitan Area. These changing patterns can be found in Figures 6-11, pages 78-83.

Brick production in Kansas began to climb sharply after 1900 and reached a peak of approximately 400 million in 1906, then it declined rather gradually until 1910. Production declined markedly after 1910 and bottomed out during the depression of 1930's. Table 3, page 84, indicates the rise and decline of brick production in Kansas during this period of time.

Even in its peak years, brickmaking in Kansas was not one of the top industries of the State, probably never ranking higher than eleventh among industries in value of production. Brickmaking never accounted for a large percentage of the total value of industrial output. Apparently the highest percentage was achieved in 1904, when the brick and tile

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[86]Richard L. Douglas, "A History of Manufactures in the Kansas District," Collections of the Kansas State Historical Society, Vo. XI, 1909-1910, p. 204.

[87]Polk's Kansas Gazetteer and Business Directory lists the following numbers of brickmaking establishments: 1891--128; 1894--72; 1900--48. While probably not all establishments were listed for each of those years, the listings should be good indicators of the decling trend in numbers of establishments.

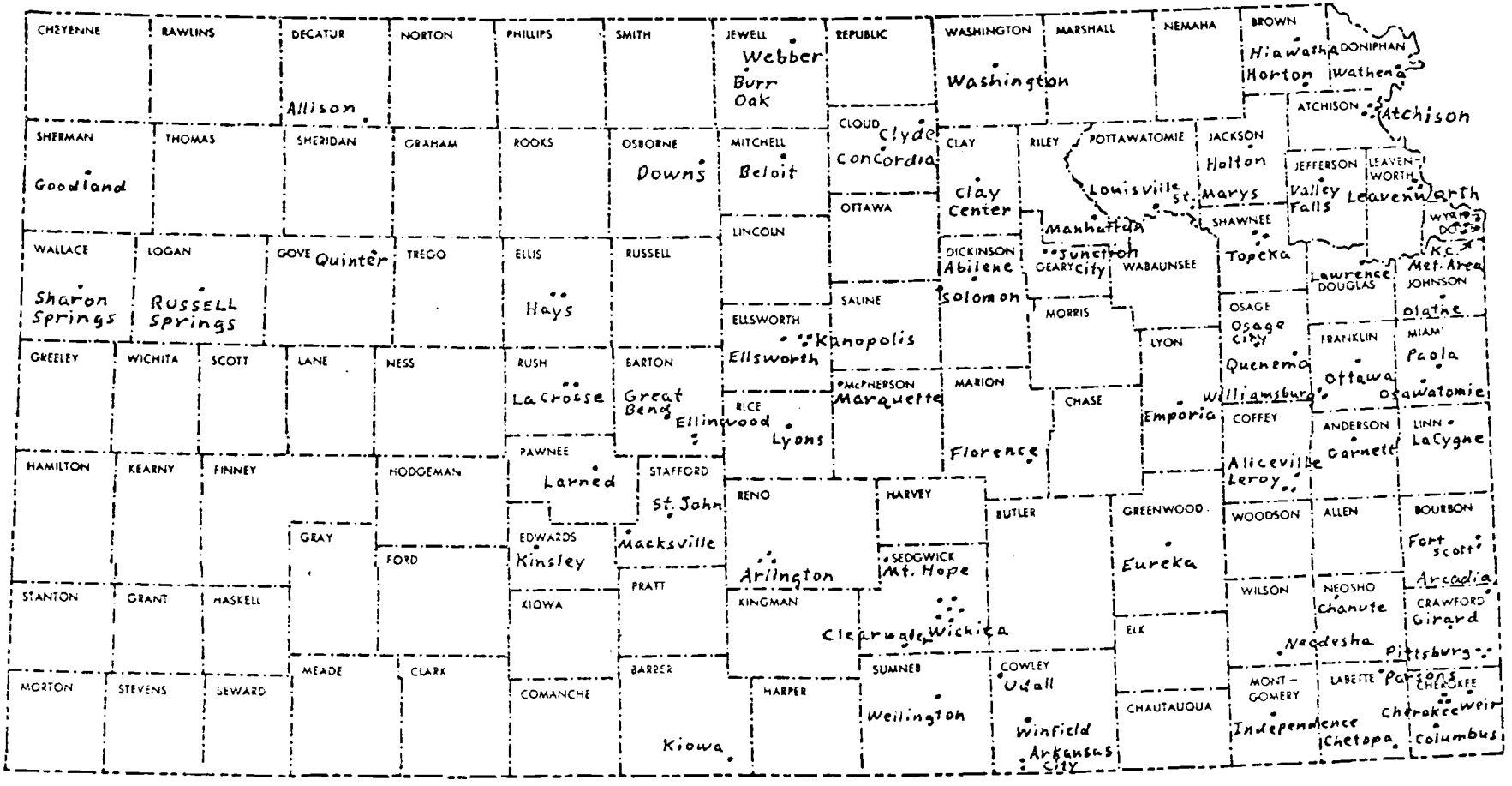

Fig. 6.--Location of operating brickmaking establishments in 1891. Each dot represents one establishment. Compiled from Polk's Kansas State Gazetter and Business Directory, 1891, pp. 965-966.

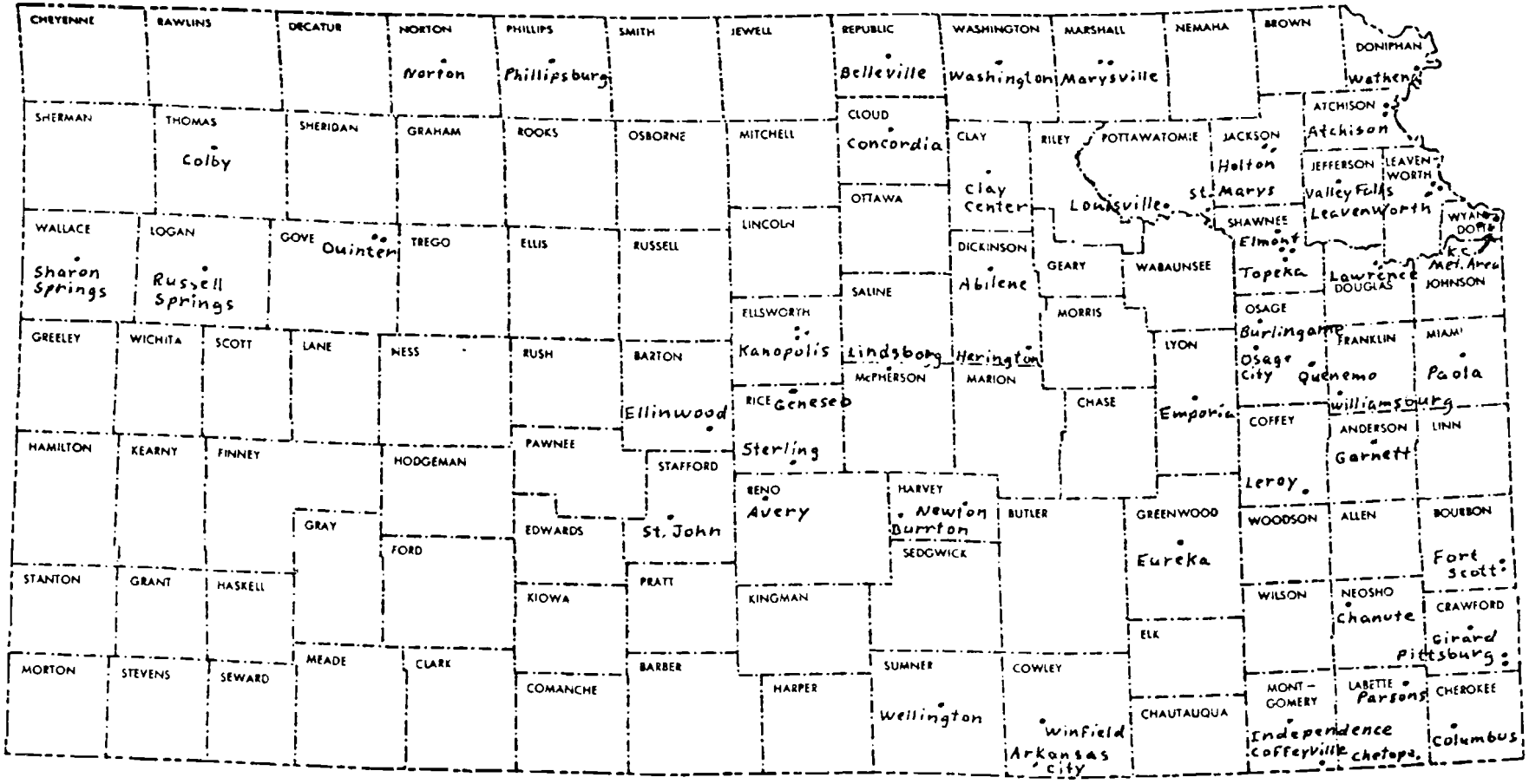

Fig. 7.--Location of Kansas brick plants in 1894. Each dot represents one plant. Compiled from Polk's Kansas Gazetter and Business Directory, 1894, pp. 1074-1076.

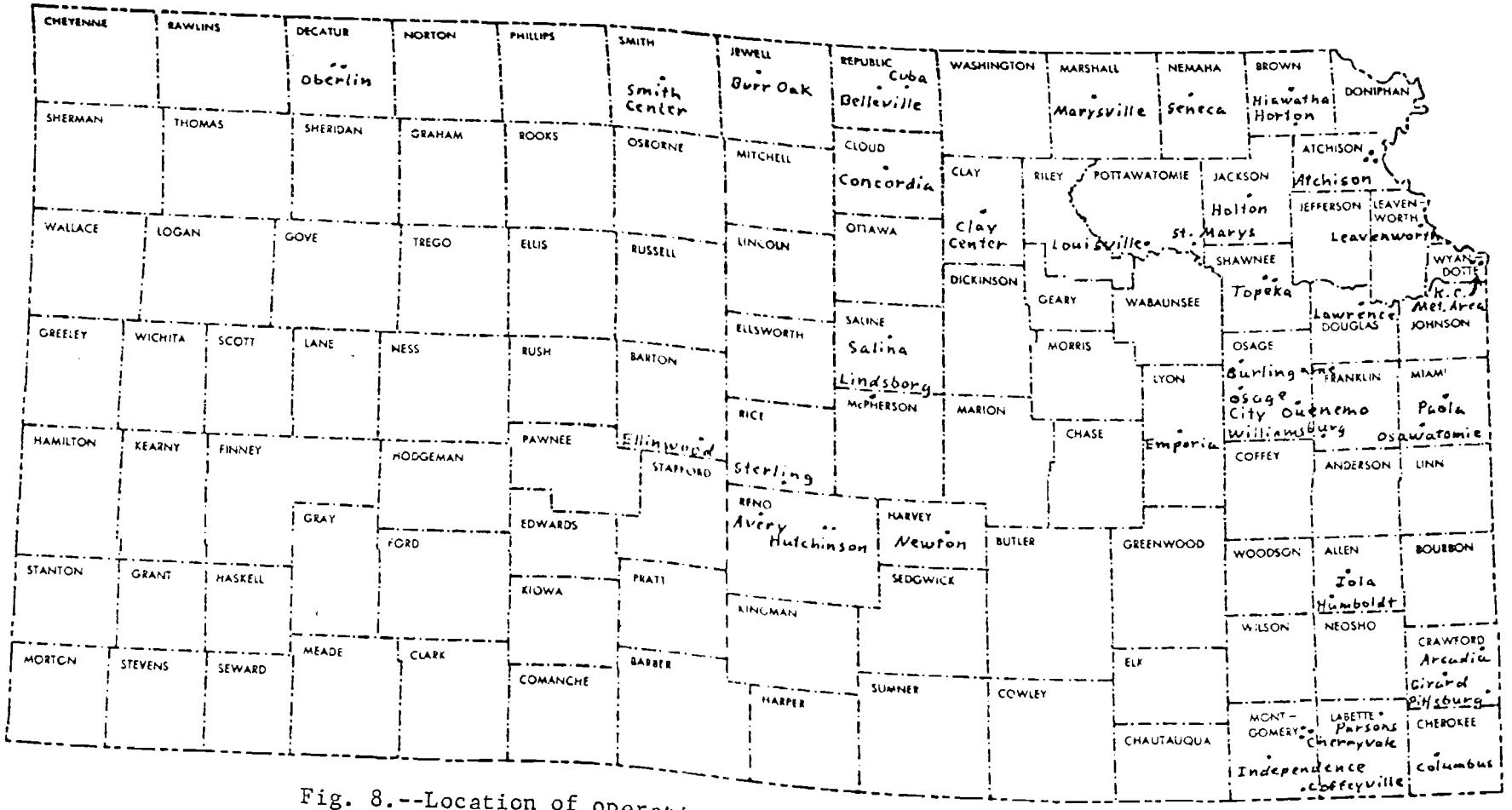

Fig. 8.--Location of operating brick plants in 1900. Each dot represents one plant. Compiled from Polk's Kansas Gazetter and Business Directory, 1900, pp. 1134-1136.

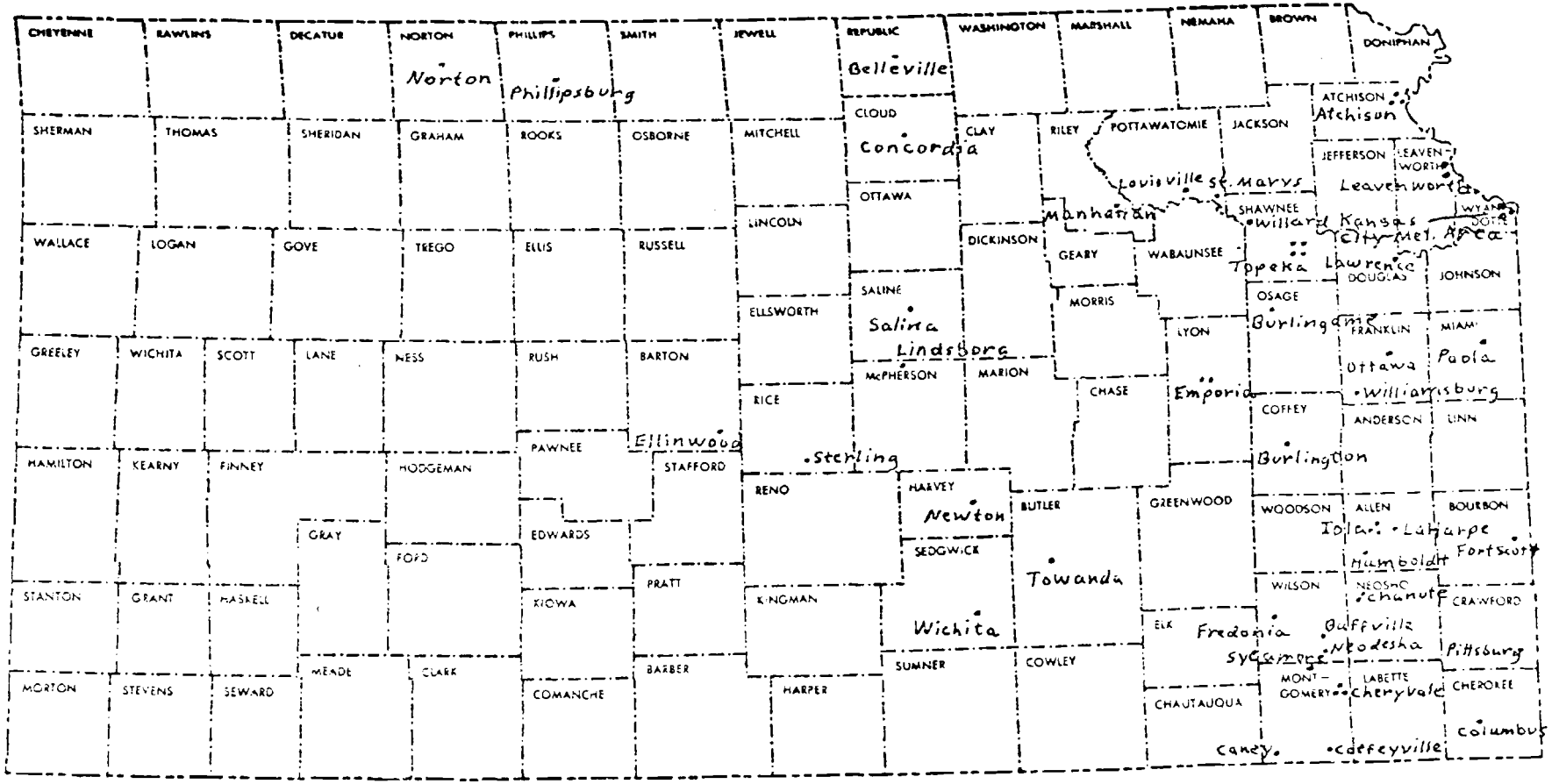

Fig. 9.--Location of Kansas brick plants in 1904. Each dot represents one plant. Compiled from Polk's Kansas Gazetter and Business Directory, 1904, pp. 1220-1222.

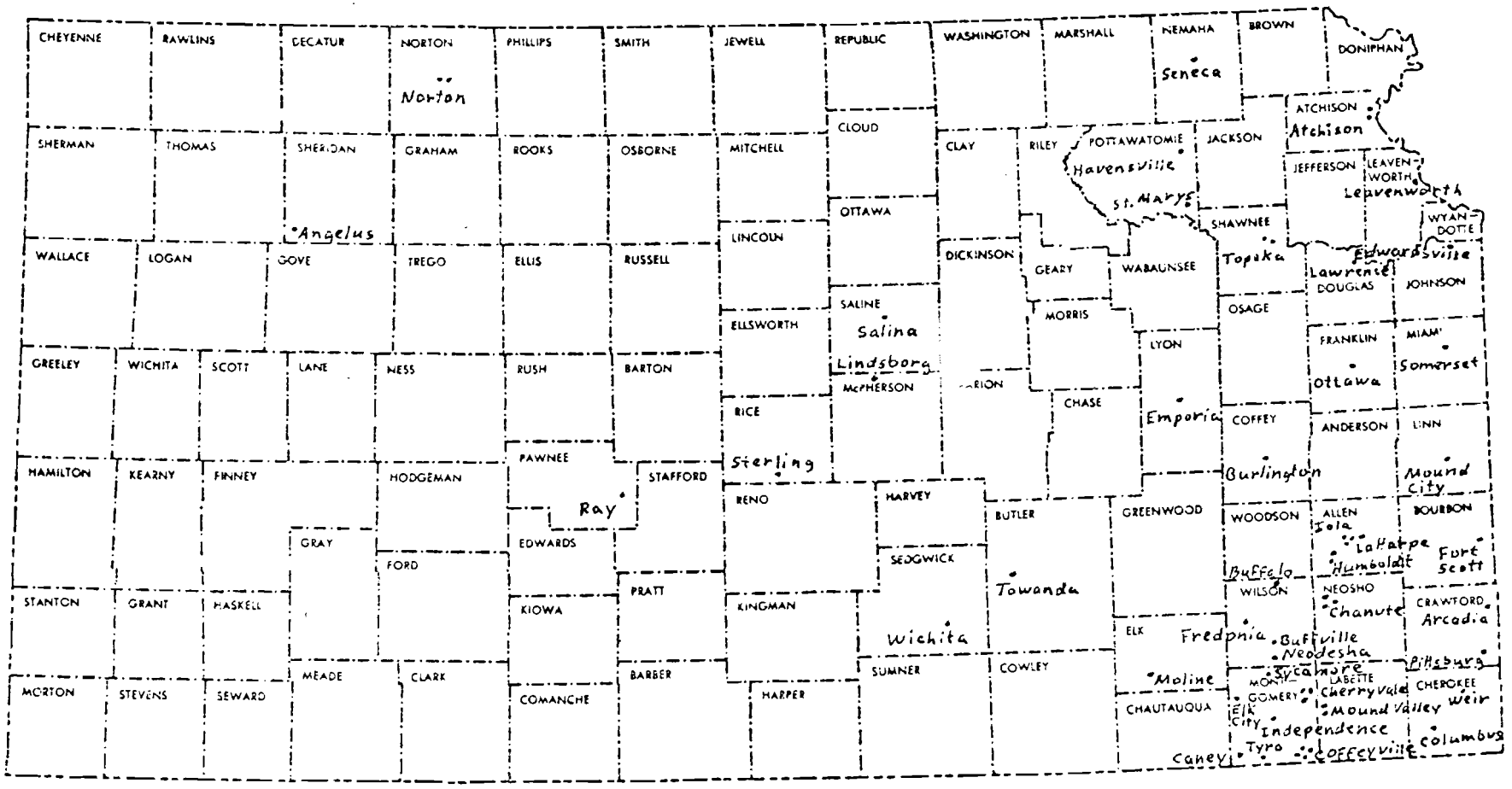

Fig. 10--Location of Kansas brick plants in 1908. Each dot represents one plant. Compiled from Polk's Kansas State Gazetteer and Business Directory, 1908, pp. 1401-1402.

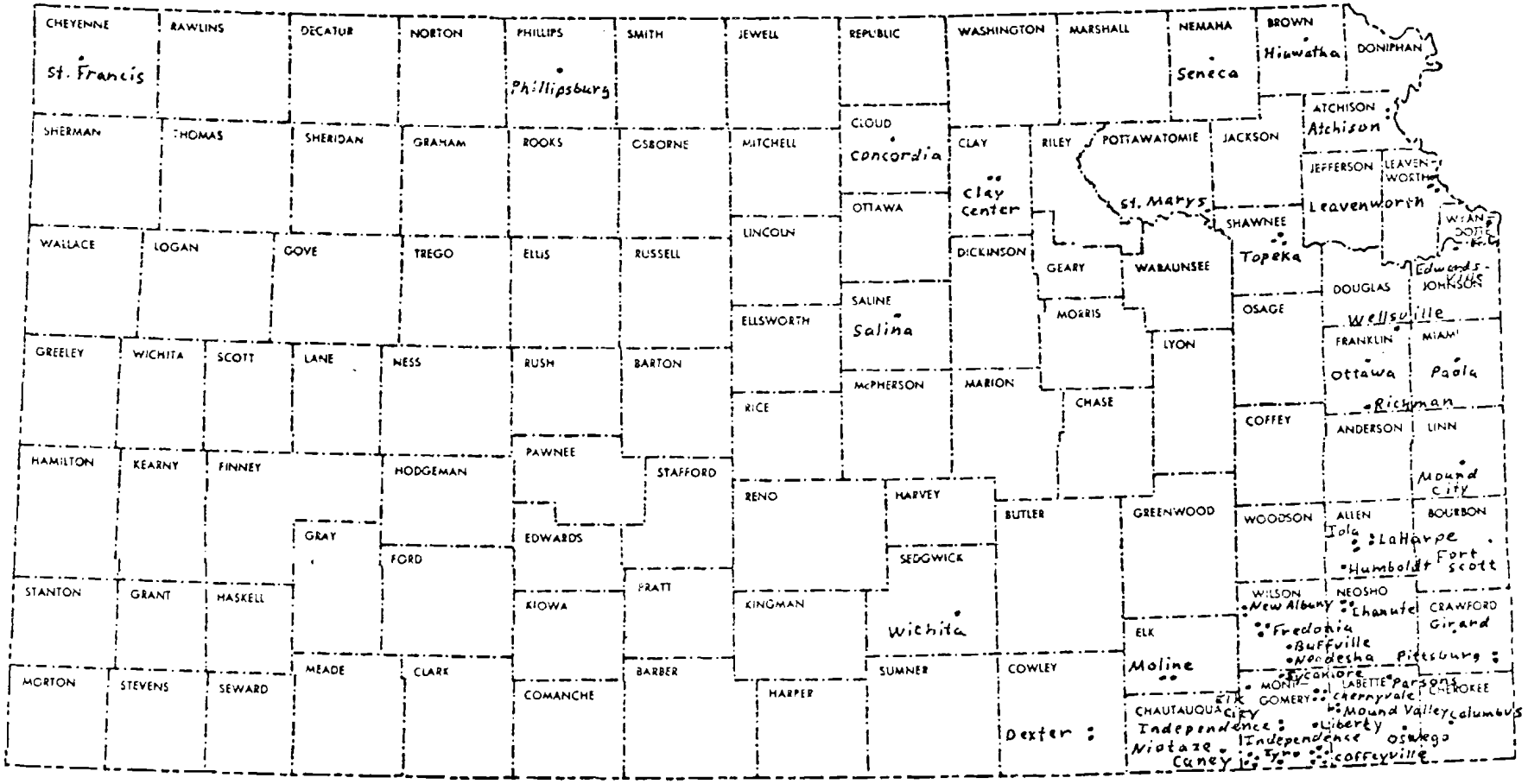

Fig. 11.--Location of Kansas companies chartered from 1900 to 1910 to produce brick. Each dot represents one brick company. Compiled from Kansas Corporation Charter Files.

TABLE 3

BRICK PRODUCTION IN THE STATE OF KANSAS

1905-1920, 1925, 1930, 1935

(Number of Brick Indicated in Thousands)

Year	Common Brick		Vitrified Br.		Face Brick		Total Br. Produced
	No. Prod.	% Tot.	No. Prod.	%Tot.	No. Prod.	% Tot.	
1905	214,273	69.4	75,826	24.5	18,743	6.1	308,842
1906	314,371	76.0	78,199	19.0	19,875	5.0	412,445
1907	263,887	70.7	85,110	22.8	24,381	6.5	373,378
1908	225,820	63.1	102,922	28.7	29,477	8.2	358,219
1909	254,890	66.3	103,264	26.9	26,170	6.8	384,324
1910	218,353	60.2	118,950	32.7	25,814	7.1	363,117
1911	183,809	62.3	83,337	28.2	27,887	9.5	295,033
1912	145,986	57.3	80,906	31.7	27,972	11.0	254,864
1913	122,465	56.9	53,382	24.8	39,451	18.3	215,298
1914	106,930	56.6	50,707	26.9	31,079	16.5	188,716
1915	110,839	58.4	47,511	25.0	31,429	16.6	189,779
1916	114,880	56.3	48,704	23.9	40,433	19.8	204,017
1917	103,232	56.2	42,774	23.3	37,579	20.5	183,585
1918	56,977	56.8	21,935	21.9	21,400	21.3	100,312
1919	62,189	49.5	32,961	26.3	30,429	24.2	125,579
1920	69,701	48.6	42,116	29.4	31,463	22.0	143,380
1925	85,257	50.0	47,908	28.1	37,414	21.9	170,579
1930	46,267	55.3	14,200	17.0	23,206	27.7	83,673
1935	15,497	16.1	--*---	--*-	80,609	83.9	96,106

Compiled from: Edward V. Kruger, The Outlook for Kansas Clay Products Industries (Lawrence: University of Kansas, 1940), Table IV, p. 18.

*Apparently no vitrified brick were produced after 1930.

manufacturing accounted for $1,907,000 or .96 per cent of the total value of $198,245,000 in industrial output in Kansas.

Brickmaking never accounted for a significant percentage of the total capital investment in Kansas industries. The general range during the peak years of production was from two to four per cent of the total capital investment in Kansas industries.

Kansas brick production also was not of commanding importance to the total production in the United States. Of the 4,215 brick and tile plants in the United States in 1910, Kansas could lay claim to only 55 or 1.3 per cent of them. Ohio had 517 brick plants; Illinois, 340; Indiana, 311; Iowa, 235; Missouri, 120; Nebraska, 78; Colorado, 69; and Oklahoma, 38. Apparently a number of small, local establishments were still operating in several of those states. The value of all bricks and tile produced in Kansas in 1910 was $2,336,438, compared with $92,776,504 for the entire United States. This represented only 2.5 per cent of the production value.[88]

Why did brickmaking attract so much attention in Eastern Kansas if it was not one of the leading industries of the State and did not account for a significant portion of the industrial income? Probably it was due to the fact that it was a highly visible industry. The products of the industry could be seen all around in a developing town. Other industries such as glass plants, smelters, and refineries were going to many of the same towns that had brick plants and were adding more to the

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[88]U.S. Department of Commerce, Bureau of the Census, Thirteenth Census of the United States, 1910: Manufacturers, Vol. VIII, General Report and Analysis, pp. 662-665.

industrial base of the towns, but it was the brick plants that were producing the brick needed for the additional buildings and the paving of streets. The numerous carloads and trainloads of brick leaving the brickmaking centers each day were reminders that the towns were exporting a product that served somewhat as "ambassadors of good will." Kansas brick, especially those from the Gas Belt, gained a good reputation over a wide area of the United States.

Types of Brick Produced

More common brick than any other type continued to be produced in Kansas throughout the "heyday" of brickmaking. Tables 4 and 5 on pages 87 and 88 show the comparison in production and value of brick and other clay products in Kansas during that period. Some brick plants produced only common brick, while most of the companies in the Gas Belt produced both common brick and pavers.

Common brick of that era can be fairly easily identified as a solid brick that was approximately 8¼ x 4 x 2½ inches with squared edges.[89] The texture of common brick varied somewhat, depending upon its place of manufacture. The clays used by a number of companies in the Gas Belt contained sufficient sodium chloride to give the brick a glazed effect without attempts to vitrify. Bricks produced in some localities were more porous and had varying degrees of drift or other impurities.

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[89]A brickmen's association in the Gas Belt in 1901 set uniform sizes for building bricks with the above mentioned dimensions. They also set a standard size for paving brick at 8½ x 4 x 2¼ inches. "Uniform Sized Brick," Coffeyville [Weekly] Journal, Feb. 8, 1901, p. 2.

TABLE 4

COMPARISON IN PRODUCTION OF DIFFERENT ITEMS
BY THE CLAY PRODUCTS INDUSTRY IN KANSAS,
1905-1920, 1925, 1930, 1935

Year	Total Value Clay Products	Common Bricks		Vitrified Brick		Face Brick		Drain Bldg. Roofing, Tile		Miscellaneous	
		Value	%Tot. Value	Value	%Tot. Value	Value	% Tot. Value	Value	%Tot. Value	Value	%Tot. Value
1905	1,758,972	917,084	52.14	580,695	33.01	180,201	10.24	20,014	1.14	60,982	3.47
1906	2,242,658	1,376,552	61.38	658,392	29.36	187,577	8.36	19,694	.88	443	.02
1907	2,173,973	1,189,263	54.70	727,979	33.49	236,876	10.90	15,320	.70	4,535	.21
1908	2,034,133	896,542	44.07	862,019	42.38	233,578	11.48	22,359	1.10	19,635	.97
1909	2,371,457	1,160,877	48.95	932,419	39.32	235,875	9.94	37,862	1.60	4,424	.19
1910	2,368,565	922,940	38.97	1,089,978	46.02	223,875	9.45	40,726	2.14	81,046	3.42
1911	1,980,601	694,586	35.07	823,505	41.58	213,711	10.79	51,132	2.58	197,667	9.98
1912	1,709,377	584,273	34.18	806,425	47.18	215,873	12.63	99,121	5.80	3,685	.21
1913	1,569,859	541,741	34.51	543,929	34.65	335,940	21.40	116,785	7.44	31,464	2.00
1914	1,597,698	486,854	30.47	594,229	37.19	271,104	16.97	122,557	7.67	122,954	7.70
1915	1,829,768	499,434	27.30	608,599	33.26	292,584	15.99	189,047	10.33	240,104	13.12
1916	2,436,363	596,271	24.48	628,638	25.80	380,332	15.61	267,333	10.97	563,789	23.14
1917	2,308,402	698,452	30.26	597,241	25.87	388,355	16.82	351,437	15.23	272,917	11.82
1918	1,681,939	511,876	30.43	364,587	21.68	292,069	17.37	388,616	23.10	124,791	7.42
1919	3,067,614	700,800	30.26	808,834	25.87	531,298	16.82	816,661	15.23	210,021	11.82
1920	4,027,229	1,092,460	27.13	1,217,718	30.24	662,849	16.46	817,226	20.29	236,976	5.88
1925	2,791,296	749,392	26.85	951,291	34.08	590,895	21.17	499,718	17.90	-------	-----
1930	1,195,548	336,304	28.13	251,295	21.02	294,205	24.61	313,744	26.24	-------	-----
1935	273,401	127,133	46.50	----*----	--*--	80,609	29.48	65,659	24.02	-------	-----

Compiled from: Edward V. Kruger, The Outlook for Kansas Clay Products Industries (Lawrence: University of Kansas, 1940), Table IV, p. 18.

*Apparently no vitrified brick were produced after 1930.

TABLE 5

QUANTITY AND VALUE OF BRICK MANUFACTURED
IN KANSAS
1905-1920, 1925, 1930, 1935
(Quantities in Thousands)

Year	Common Brick		Vitrified Brick		Face Brick	
	Quantity	Value Per M	Quantity	Value Per M	Quantity	Value Per M
1905	214,273	$4.28	75,826	$7.66	18,743	$9.61
1906	314,371	4.38	78,199	8.42	19,875	9.44
1907	263,887	4.51	85,110	8.55	24,381	9.72
1908	225,820	3.97	102,922	8.38	29,477	7.92
1909	254,890	4.55	103,264	9.03	26,170	9.01
1910	218,353	4.23	118,950	9.16	25,814	8.67
1911	183,809	3.78	83,337	9.88	27,887	7.66
1912	145,986	4.00	80,906	9.97	27,972	7.72
1913	122,465	4.42	53,382	10.19	39,451	8.52
1914	106,930	4.55	50,707	11.72	31,079	8.72
1915	110,839	4.51	47,511	12.81	31,429	9.31
1916	114,880	5.19	48,704	12.91	40,433	9.41
1917	103,232	6.77	42,774	13,96	37,579	10.33
1918	56,977	8.98	21,935	16.62	21,400	13.65
1919	62,189	11.27	32,961	24.54	30,429	17.46
1920	69,701	15.67	42,116	28.91	31,463	21.07
1925	85,257	8.79	47,908	19.86	37,414	15.79
1930	46,267	7.27	14,200	17.70	23,206	12.72
1935	15,497	8.20	*	*	5,931	13.59

Compiled from: Edward V. Kruger, The Outlook for Kansas Clay Products Industries, (Lawrence: University of Kansas, 1940), Table IV, p. 18

*Apparently no vitrified brick were produced after 1930.

Most common brick were wire-cut and did not have as smooth surfaces and rounded edges as did repressed brick formed individually in magazines or represses. Common brick seldom were imprinted with the name of company and place of manufacture. Since not as much care and expense was involved in producing common brick, they generally were not as perfectly formed as vitrified brick.

Common brick sold at a considerably lower price than did vitrified paving brick. For the comparative prices of brick see Table 5, page 88. Pavers were selling for $12 per thousand in Caney in 1911, while common brick were selling for $3.50 per thousand.[90] Because common brick brought a much lower price, the market was much more localized than for paving brick. Pavers were high enough in price and in great enough demand to bear the freight expenses to be shipped much longer distances.

Paving brick and blocks also commanded more attention from the public than did common brick, because not just any company could produce quality paving brick. Most any company could produce acceptable common brick.

It is difficult to determine the exact importance of face brick in the overall production picture of brick plants in Kansas, because the distinction between face brick and common brick was often not clear. Apparently face brick remained a rather insignificant part of the total brick production during the "heyday" of brickmaking, but they became increasingly important prior to World War I. Face brick production has since become the dominant type of brick production in Kansas. It is practically the

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[90]"Brick Business Better," Caney Chronicle, March 17, 1911, p. 1.

only type of brick produced in the State. Table 3, page 84, shows the increasing significance of face brick production.

Another feature of the brick industry that confused the face brick production picture was that sidewalk paving brick were commonly used as face brick on buildings erected in the early part of the twentieth century. Even paving block were occasionally used as face brick on buildings. One wonders if references to face brick might have been to vitrified paving brick or vice versa.

A number of references are made to fancy brick being produced by some plants. Coffeyville Vitrified Brick and Tile and Kansas Buff Brick Manufacturing Company of Buffville were two producers of fancy brick used for special architectural effects. Coffeyville Vitrified produced one pattern of cornice brick that commanded a price of one dollar each.[91]

No accurate accounting of the numbers of fancy brick production was kept, but it appears that it did not account for a significantly large part of the total production.

Little information appears to be available concerning terra cotta production in association with brickmaking. At least six companies included "terra cotta" in their corporation names and reasons for incorporating from 1887 to 1928.[92] Apparently some was produced, but it undoubtedly was listed in reports under the heading of miscellaneous or other products and is not discernible.

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[91] "Our Products," Coffeyville [Weekly] Journal, Aug. 17, 1900, p. 5.

[92] Kansas Corporation Charter Files, 27:217; 34:294; 33:638; 37:152; 42:251; 122:95.

Few brick plants produced firebrick, as most clays in Eastern Kansas are not suitable for firebrick production. In 1901 only three plants in Kansas produced firebrick, and the total production was 25,000.[93] This was equal to only a day's run for a relatively small brick plant. Most firebrick for the kilns of the brick plants and refractories at glass plants, smelters, and refineries, came from Mexico, Missouri, and St. Louis.

Tile production in Kansas brick plants was rather insignificant during the early years of the "heyday" of brickmaking in Kansas, but it later became more important to the clay products industry as brick plants began to diversify their production to better meet the competition in the industry. More specialized products such as roofing tile, hollow building tile, silo tile, sewer pipe, drain tile, and flue liners could command a better price and could be shipped longer distances as a consequence. Table 4, page 87, indicates the increasing importance of manufacturing the above mentioned items.

The W. S. Dickey Corporation, which still operates a plant producing sewer pipe and other related products at Pittsburg, was about the first company in Kansas to devote its entire production to tile. The Pittsburg Brick and Pipe Company, which had been chartered in 1900 by local interests and was struggling along for lack of working capital, was taken over by the paving brick magnate Robert Nesch. He later sold the plant to the W. S. Dickey Clay Manufacturing Company, and it became

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[93] State of Kansas First Biennial Report of the Bureau of Labor and Industry for 1901-1902, p. 161.

lt of that industrial organization.[94]

Another early giant in the tile producing business in Kansas was udowici-Celadon Roofing Tile Company, which purchased the Western ing Tile Company of Coffeyville, incorporated in 1903. The Company purchased the Midland Brick Company at Peru and produced roofing there until the plant was closed. The Ludowici-Celadon Company was ted to be the largest producer of clay ornamental roofing tile in nited States into the 1940's.[95]

Other brick plants were converted to production of tile after the ay" of brick making in Kansas. The Denison Clay Company purchased ankrupt Yoke Vitrified Brick Company of Coffeyville in 1912 and began cing hollow building tiles with interlocking features on which the any had a patent.

Coffeyville Shale Products Company was another company that con- trated on producing tile during the delining years of brickmaking. rporated as the Coffeyville Shale Brick and Roofing Tile Company in , it produced mainly street paving and sidewalk bricks in its earliest

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[94]Fred M. Howell, "Some Phases of the Industrial History of sburg, Kansas," Kansas State Historical Quarterly, Vol.I, May 1932, 2. Howell states that Nesch sold to Dickey in 1900, but it appears later, as Pittsburg Brick and Pipe was not chartered until 1900. Corporation Charter File, 59:139.

[95]John G. Clark, Towns and Minerals in Southeastern Kansas, ial Distribution Publications 52, (Lawrence: State Geological Survey ansas, 1970), p. 56. Clark states that Ludowici-Celadon built a new at Peru. This seems to be in error, as interviews with a number ople and a visit to the plant would indicate otherwise. Numerous d,Peru bricks are at the site, indicating previous brick production .

years. The Company was changed to the Coffeyville Shale Brick Company in 1904 and again to the Coffeyville Shale Products Company in 1914.[96]

Coffeyville Vitrified Brick and Tile and several other plants produced tile during much of their existence, but the tile production nowhere compared with their brick production.

Vitrified Paving Brick and Paving Of Streets and Sidewalks

Production in the brickmaking industry, as in all industries, had to follow demand. The changing demand for paving bricks fairly closely followed in time sequence the increasing utilization of and decline of natural gas supplies.

Brick paving came to Kansas because the developing towns and cities were seeking a suitable paving material to eliminate the mudholes in their streets. Cobblestones, cedar blocks, and macadam had been tried and found wanting.

Brick paving was introduced to Kansas in 1887 when J. C. Alderson of Wheeling, West Virginia, who had recently settled in Atchison, remembered that brick had been used in his home town as paving material. He was laughed at by the city fathers, because they had never heard of the hard vitrified brick. The only brick they had any experience with was the ordinary clay brick, which would crumble under the weight of a wagon.[97]

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[96]Clark, Towns and Minerals, p. 56. "Prosperity at the Brick Yards," Coffeyville [Weekly] Journal, March 1, 1912, p. 8.

[97]"Paving Brick," Moline Review, Aug. 17, 1906, p. 2.

Alderson sent to Wheeling for some specimen of vitrified brick and placed them on exhibition. He also sent for brick from Galesburg, Illinois, the nearest city making vitrified brick at that time. The brick were tested, and property owners consented to paving two blocks with Galesburg brick.

Shale was brought back from Galesburg and found to be very similar to that which abounded in the hills around Atchison. The chief engineer of the Atchison, Topeka & Santa Fe Railway sent some of the shale to St. Louis, where it was fired and found to be vitreous clay. Samples were sent to Wheeling, West Virginia, Keokuk, Iowa, and to Galesburg, Illinois, where they confirmed the test made at St. Louis.[98]

A brick plant was established in Atchison to capitalize on the new find. Thomas Beattie, who was associated with the plant, made the first glazed paving brick in 1887.[99]

The Atchison, Topeka & Santa Fe Railroad was instrumental in convincing Atchison and other communities along its tracks to start brick plants for making vitrified paving brick for the freight business it would provide the railroad.

Other cities in Kansas began to emulate Atchison and pave their streets with brick. Topeka laid its first brick streets in 1890 at a cost of $1.78 per square yard. Topeka proved to be a partial testing area for paving brick, as the city had previously used various paving materials.

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[98]Ibid.

[99]Eighth Biennial Report of the Kansas State Board of Agriculture (Topeka: State Printing Office, 1893), p. 151.

The first pavement laid in Topeka was natural lake asphaltum in 1887, at a cost of $2.80 per square yard. The pavement was guaranteed for five years, but after the expiration of the guarantee, the city soon had to pay out 10 per cent of the original cost in repairs.

Colorado sandstone blocks were laid from 1887-1889 at a cost of $2.23 a square yard. The pavement was quite satisfactory where traffic was heavy and by 1904 required only few repairs.

Red cedar blocks were laid in 1887 and 1888. By 1904, the blocks were in a failing condition and would soon have to be replaced.

Some paving was done in Topeka in 1890 with native blue limestone, but by 1904 it had almost entirely disintregrated and was in need of replacement.[100]

In order to meet the growing demand for paving brick, plants were established in several cities or existing plants converted much of their production to manufacturing paving brick. Early paving brick centers in Kansas, in addition to Atchison and Topeka, were Leavenworth, Lawrence, and Pittsburg. All of them burned their brick with coal, because at that time it was thought that gas-fired brick were not durable enough for paving. Gas-fired brick were more porous, and it was claimed that they could not be burned as hard. Coffeyville Vitrified Brick and Tile Company and other Gas Belt companies would soon prove them wrong. Also, gas was not available in those early brickmaking centers.

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[100]"Street Pavements in Kansas," (Digest of a paper read by James F. McCabe, City Engineer of Topeka, at a meeting of the Kansas Municipality League), Municipal Journal and Engineer, Quoted in "Brick Paving All Right," Weekly Republican (Cherryvale), Feb. 12, 1904, p. 10.

The use of gas in production of paving brick was not significant until after 1900. Most companies organized in the Gas Belt were not chartered until after that date. The towns in the Gas Belt having brick plants did their earliest street paving with coal-fired brick manufactured elsewhere.

One of the first cities in the Gas Belt to pave its streets was Iola, which let a contract in the fall of 1902. The specifications called for Iola brick to be laid edgewise. The cost of the paving was $1.43 per square yard and 30 cents per lineal foot for curbing.[101]

The Iola Brick Company, supplier of the brick for the project, soon announced it was discontinuing production of paving brick. The reason was paving brick required much more time and trouble than did other brick to produce, and the price did not warrant making them.[102]

Considerable criticism was voiced about the first paving contracts in Iola, and the paving contract let in 1903 specified that Pittsburg or some other kind of vitrified brick equally as good be used. Other brick-making towns such as Caney and Chanute were turning to Pittsburg brick for their paving.[103]

Later in 1903, Lawrence was shipping paving brick to Iola, while Iola was shipping fifty cars of building brick there. This was because Iola did not produce pavers, and Lawrence did not produce building brick.[104]

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[101]"Paving Contract Is Let," Iola Register, Oct. 3, 1902, p. 1.

[102]"Brick May Cost More Now," Iola Register, Dec. 3, 1902, p. 4.

[103]"Ten Blocks of New Paving," Iola Register, Feb. 23, 1903, p. 4.

[104]"Lawrence and Iola Brick," Iola Register, Dec. 2, 1903, p. 4.

An account of how the brick were laid at Iola provides an interesting insight of the brick paving business. The first paving was done by placing a double layer of brick above a layer of concrete. Specifications on a later contract provided for a cinder foundation with a double layer of brick. Another contract called for a six-inch concrete base, topped with an inch of sand, on which one layer of brick was laid. Over the brick was poured a thin "slush" of cement, which set in the sand at the bottom of the brick, making them solid and filling the cracks between the brick.[105]

Despite all of its adversities, Iola reported in the fall of 1905 that it soon would complete the paving of twenty-six blocks of its principal streets. The City was also paving and curbing a number of alleys. The street improvements accomplished in a little more than two years had cost over $200,000.[106]

Other towns in the Gas Belt generally paved their streets later than Iola and normally used brick made in their local areas for their paving projects.

Cherryvale let the largest paving contract in its history in 1906, when it paved nineteen blocks. Most of the paving was done on East Main Street, where the brick have endured traffic well for 70 years and can be seen today.[107]

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[105] "More than $90,000 Worth," Iola Register, Oct. 19, 1903, p. 1.

[106] "Spends $18,000," Iola Weekly Register, Oct. 20, 1905, p. 7.

[107] Weekly Republican (Cherryvale), May 18, 1906, p. 4.

Although the Coffeyville brick companies were shipping paving brick in large quantities to a large area by 1910, Coffeyville was having difficulty getting its streets paved. A contract had been let for a considerable amount of paving, but work was being held up due to the inability of securing brick.[108]

Coffeyville had laid some of its locally produced paving brick at a fairly early date. In 1900 a brick in one of the main intersections in downtown Coffeyville was taken up after being down two years. It was fitted into the mold used for making such brick. It was found that the brick had lost only one thirty-second of its weight and size. It was calculated that such brick would last for sixty-four years. The opinion was expressed that nothing compared with good paving brick for durability against both heavy and light traffic and for sanitation. Asphalt pavement was warranted for light traffic for only ten years.[109]

The cost of brick paving varied somewhat from town to town and from year to year. Costs for street paving were computed on the per yard basis, with curbing computed on the lineal foot. One of the higher paving contracts in Southeastern Kansas was for $1.71 per square yard in Iola in 1903.[110] McPherson, Junction City, and Kansas City were paying $2 per square yard in 1912, largely due to shipping costs. One of the apparently low bids was for $1.14 per square yard at Independence.

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[108]"A Scarcity of Paving Brick," Coffeyville [Weekly] Journal, July 29, 1919, p. 7.

[109]"Brick with Long Lives," Coffeyville [Weekly] Journal, Dec. 7, 1900, p. 1.

[110]Iola Register, Oct. 19, 1903, p. 4.

Coffeyville had let contracts for as low as $1.21 and $1.50 per square yard in 1912, but the City was criticized by W. G. Buckles of the Coffeyville Vitrified Brick and Tile Co. for expecting and receiving bids for such low costs. He claimed that the City was forcing contractors to substitute lower quality brick and to lose money in order to under bid each other. Brick plants were also expected to take losses in order to provide Coffeyville with cheap paving. Buckles claimed the main result for the City was to get vastly inferior brick paving done. It was also detrimental to the economic stability of the brick plants in the area. Companies that were paving with brick were receiving considerable competition from companies who were using asphalt costing $1.50 per square yard.[111]

By 1912, towns were turning to asphalt paving, although they didn't consider that type of paving as satisfactory as brick. Within a few years concrete would be competing effectively and replacing brick as a major paving material.

Coffeyville, one of the greatest paving brick producing centers of the world, had to endure muddy streets until a rather late date. The City was accused of being so busy shipping some forty carloads of brick daily for streets of other cities that they had forgotten to pave their own streets, which were a disgrace.[112]

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[111]"The City's Threat Angers Brick Men," Coffeyville [Weekly] Journal, July 26, 1912, p. 6.

[112]Coffeyville [Weekly] Journal, April 27, 1904, p. 6.

To save further embarrassment, Coffeyville embarked upon a street paving program in 1904. Paving had reached such a pace in 1908 that a contractor, who could lay 80,000 brick a day, had to furlough some of his workers. The brick companies of Coffeyville could not keep up and still fill all out-of-town orders.[113]

Brick companies of the Gas Belt and other areas of Kansas that produced quality paving brick shipped orders over a large section of Central United States during the first decade of the twentieth century. Large numbers of brick went to Oklahoma, which was developing as a territory and later as a new state. An order for eight million Coffeyville bricks was placed in 1909 by a contractor who was paving the streets of Guthrie, Oklahoma. Shipments were being made daily, ranging from 40,000 to 77,000. The contractor claimed the Coffeyville brick were the best on the market.[114]

Paving brick were used extensively in the first part of the twentieth century for constructing buildings, as well as for paving streets and sidewalks. Numerous red brick buildings standing throughout Mid-America attest to the quality of vitrified brick produced in the Gas Belt. Such brick are readily recognizable for their bright red color, glazed appearance, and curved edges. An experienced eye can usually detect the brick produced by Coffeyville Vitrified, Verdigris Valley Vitrified, Buffalo Vitirified, or other companies.

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[113]"Delay by Brick Scarcity," Coffeyville Journal, Aug. 28, 1908, p. 7.

[114]"Big Order for Paving Brick," Coffeyville [Weekly] Journal, Sept. 3, 1909, p. 5.

The newly formed Coffeyville Shale Brick and Roofing Tile Company within a period of a few days filled orders for 750,000 sidewalk paving brick for Omaha, Nebraska; 500,000 to build a Standard Oil refinery at Kansas City; 500,000 for a business block at Fort Smith, Arkansas; and 350,000 for a school at Carterville, Missouri.[115]

Paving blocks nearly four inches thick were made for later paving projects. It is difficult to pinpoint just when they came into general use for paving, as references were made to paving brick without specifying which was meant. Most of the brick paving that still exists in Central United States is of the larger variety, lending credence to the speculation that most of the paving bricks produced in the Gas Belt and actually used to pave streets were paving blocks and not bricks. Later varieties of paving blocks were produced with rougher surfaces to provide for better traction.

Ellsworth claims to be the site of the first brick sidewalk laid west of the Missouri River. This sidewalk at the Ellsworth Museum is made of relatively thin square brick. The brick were not made locally.[116]

The first brick sidewalk was laid at Coffeyville by the Long-Bell Lumber Company in 1885. Brick for the sidewalk came from Pittsburg, because there were no brick plants in Coffeyville at this time. The brick sidewalk replaced a flagstone walk, and it in turn, was replaced by cement in 1912.[117]

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[115]"The Paving Matter" Coffeyville [Weekly] Journal, April 22, 1904, p. 1.

[116]Francis L. Wilson, President, Ellsworth County Historical Society, personal letter, Aug. 26, 1972.

[117]"Tear up First Brick Walk," Coffeyville [Weekly] Journal, April 12, 1912, p. 4.

Brick generally used in sidewalks were little or no different than the smaller brick used in earlier days for paving streets. Sometimes brick with sharper edges were used in sidewalks than in streets, because edges were not as likely to be chipped off under lighter sidewalk traffic. Some companies imprinted a special design on sidewalk brick to provide for better foot traction when wet. One company "waffled" their brick with a diamond design. Others used squares, circles, and half circles in fancy designs.

Most sidewalk brick did not have a fancy design, but they were imprinted with the company name and place of manufacture. Imprinted brick generally were laid face down in sidewalks of towns not having brick plants or in towns where a competing town's brick were used.

The practice of laying sidewalk bricks with the imprinted sides down was not appreciated by a loyal former Iola woman who had a brick sidewalk laid in Wichita. The men had nearly finished laying the walk when they went to supper. After they left, she turned over one of the bricks to read "Iola Vitrified Brick." She immediately began turning over a string of brick in the walk, and when the men returned, they were instructed to leave the brick as she had laid them.[118]

Pride in their hometown and hometown company products dictated that the brick laid in sidewalks of a brick town be laid face up to advertise the pride to outsiders who came to visit.

The standards by which vitrified paving brick usually were measured in the early days of brick paving in Eastern Kansas were either the

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[118]"A Brick for Loyalty," Iola Register, Jan. 26, 1900, p. 4.

rington brick, produced at Galesburg, Illinois, or those produced by the Pittsburg Vitrified Paving Brick Company owned by Robert Nesch.

Nesch and John Moore moved from Atchison to Pittsburg in 1890, organized the Pittsburg Vitrified Paving Brick Company, and began producing coal-fired paving brick. Moore soon retired, and Nesch later purchased the Pittsburg Brick and Pipe Company. He converted the plant to making mostly sewer tile before selling it to the W. S. Dickey Corporation.[119]

Nesch also operated a plant in Leavenworth for a number of years, first known as the Nesch-Carr plant then later changed to the Pittsburg Vitrified Paving and Building Brick Company.

In 1902 Nesch purchased the Sycamore Vitrified Brick Company, which had been organized in 1900. He completed the plant that had been started and produced gas-fired brick a number of years before the gas supplies failed.

At the time Nesch bought Sycamore Vitrified, he was reported to own several plants in Missouri, and the Kansas City Metropolitan Area, as well as his Kansas plants. He was reputed to be able to ship at least a trainload of paving brick each day from one of his plants.[120]

Testing of Paving Brick

One of the important aspects in the marketing of paving brick was to test them for durability. The first coal-fired brick produced in the

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[119]Howell, "Some Phases of the Industrial History of Pittsburg," pp. 289-292.

[120]"Sycamore's Good Luck," Neodesha Register, April 25, 1902, p. 1.

state often were tested for durability against brick manufactured to the east of Kansas. Since gas-fired brick produced in Kansas later had to compete on the market with coal-fired brick, they often were tested against coal-fired brick made within the state. A lot of doubters had to be convinced that companies could produce gas-fired brick that equaled coal-fired brick in durability.

Four tests generally were used to determine the durability of brick and their suitability for contracted paving: (1) absorption; (2) transverse strength; (3) crushing strength; and (4) the rattler test for abrasion.[121]

For the absorption tests brick were dried and weighed. They then were left in water for forty-eight hours and re-weighed. Their gain in weight was expected not to be over 2 per cent. This test was later abandoned, because those testing the brick believed that if the brick could meet the other tests, they could meet the absorption test and there should be no concern about the effects of freezing.

The transverse tests were made by placing the brick edgewise on two knife edges six inches apart. Pressure was applied at the center of the top edge through means of a third knife edge until the brick ruptured. The load pressure was measured at the point of rupture. Transverse and crushing test results on some brick tested at Kansas University

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[121]F. O. Marvin, "Notes on Some Kansas Paving Brick," Transactions of the Kansas Academy of Science, ed. by G. P. Grimsley, Vol. XIX, (Topeka: State Printing Office, 1905), p. 90. State of Kansas First Biennial Report of the Bureau of Labor and Industry for 1901 and 1902, p. 152.

re given in Table 6, page 106.

Crushing tests were made on half brick broken in the transverse tests. The half brick was commonly bedded edgewise in plaster of Paris, top to bottom. It was placed in a crushing machine of 100,000 pounds capacity before the plaster was set. It was allowed to set under a light load of one to two hundred pounds about ten minutes. Pressure was then applied until fracture.

The rattler test was designed to furnish evidence of the brick's ability to withstand impact and abrasion, or its ability to withstand the blows of horses' hooves and vehicles without wear and chipping at the edges.

The standard rattler used at the University of Kansas for testing was a cast iron barrel with fourteen sided polygons for ends and fourteen staves with small cracks between them for the sides. It was 20 inches long and 28 inches in diameter. Enough brick, usually 22 to 26, to equal 15 per cent of the volume were placed in the barrel to be revolved. The brick, which were weighed before and after the test, clattered against each other, chipping and wearing as they revolved. The percentage of loss in weight was then calculated. The brick having the lowest percentage of loss were considered to have met the test better than those having a higher percentage.

A shot method was later used, because the former method caused the brick to lose too high a percentage of their weight and to cause too much emphasis to be placed on the test in comparison to the other tests. In the shot method of testing, 12 bricks were placed in the barrel with 225 pounds of cast iron cubes 1½ inches in size and 75 pounds of cast iron blocks 2½ x 2½ x 4¼ inches. Results of the test were

TABLE 6

RESULTS OF TRANSVERSE AND CRUSHING TESTS

ON CERTAIN SELECTED BRICK

AT THE UNIVERSITY OF KANSAS

...ation of Brick Plant	Transverse Test	Crushing Test
	Average Load At Rupture	Crushing Load Per Sq. Inch
...chison	7,950	6,852
...ffeyville	11,185	11,040
...la	7,900	6,790
...rence	12,516	9,550
...venworth	10,919	7,806
...desha	7,747	4,832
...ge City	8,100	6,879
...tsburg	8,970	10,447
...ka "Capital City"	8,450	11,464
...lesburg, Illinois	9,600	9,516
... Moines "Capital City"	13,700	7,147
... Moines "Flint"	10,702	7,783
... Moines "Iowa"	13,580	5,607
... Moines "T"	12,001	7,390

Compiled from: F. O. Marvin, "Notes on Some Kansas Paving Brick," ...ransactions of the Kansas Academy of Science, ed. by G. P. Grimsley, ...l. XIX, (Topeka: State Printing Office, 1905), Tables I, II, pp. 97-98.

calculated in the same manner as they were in the other rattler test.

The Coffeyville brick did well in all four tests, while the gas-fired brick from Iola and Neodesha didn't do well in their tests. This would indicate that gas-fired brick compared favorably if the right shale was used and the right techniques were used to fire the bricks.[123] Rattler test results for brick from certain companies are given in Tables 7 and 8, pages 108 and 109.

Spirited competition among brick companies caused them to hold impromptu tests using homemade rattlers. Sometimes it was done at the urgings of a city wishing to determine the best brick to use for a paving job. At other times it was to prove that gas-fired brick were equal in quality to coal-fired brick. Or could be to settle an argument as to what company produced the best gas-burned brick. Undoubtedly, a few wagers were made on the results.

Chanute was to pave some of its streets in 1903, so a test was made in Iola of the Diamond brick made in Kansas City and Coffeyville brick to determine the durability of each product. A rattler test was made with a drum using 936 revolutions. The Diamond brick lost 12.5 per cent of their weight, while the Coffeyville brick lost 6.1 per cent in weight.

Tests of the Coffeyville brick had been in comparison to those of Pittsburg. The Coffeyville brick had won eight out of ten tests, but there was no more than 2 per cent difference between the two brands.

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[123]Marvin did not identify the Coffeyville company, but it must have been Coffeyville Vitrified. The tests were made in 1897 and 1900, and it was the only company in Coffeyville making paving brick at that time.

TABLE 7

RESULTS OF RATTLER TESTS CONDUCTED

AT THE UNIVERSITY OF KANSAS

ON CERTAIN SELECTED VITRIFIED PAVING BRICKS
(Per Cent of Volume Method)

Location of Plant	Per Cent Weight Lost At Certain Revolutions							
	100	200	400	600	800	1,100	1,400	1,800
Coffeyville	4.9	8.6	13.0	16.5	18.6	21.8	24.3	27.0
Lawrence	5.2	9.0	14.7	19.2	23.0	27.7	31.8	36.1
Leavenworth	6.0	8.8	12.1	16.2	19.7	23.5	27.0	30.8
Pittsburg	5.1	8.6	13.7	17.6	20.6	24.8	27.9	31.9
Topeka	7.9	13.6	22.2	28.2	34.2	39.0	43.3	47.4
Galesburg, Ill. Purington	6.6	11.3	17.0	21.0	24.9	28.0	30.7	33.5
Veedersburg, Ind. "Boston Block"	5.0	7.7	12.6	16.1	18.5	21.9	23.7	26.0
Des Moines "Capital City"	4.7	8.2	14.0	19.0	22.8	26.8	30.3	33.2
Des Moines "Flint"	7.2	13.1	20.4	25.9	29.6	33.0	35.6	39.9

Compiled from: F. O. Marvin, "Notes on Some Kansas Paving Brick," Transactions of the Kansas Academy of Science, ed. by G. P. Grimsley, Vol. XIX, (Topeka: State Printing Office, 1905), Table III, p. 98.

TABLE 8

RESULTS OF RATTLER TESTS CONDUCTED

AT THE UNIVERSITY OF KANSAS

ON CERTAIN KANSAS VITRIFIED PAVING BRICKS
(Cube Shot Method)

Location of Plant	Per Cent Weight Lost at Certain Revolutions							
	100	200	400	600	800	1,100	1,400	1,800
Coffeyville	3.1	5.0	7.6	9.4	11.2	13.1	14.9	17.0
Buffalo	3.9	6.0	9.4	11.5	12.8	14.7	17.1	18.5
Iola	3.8	7.2	11.3	14.7	17.6	21.5	24.2	28.6
Lawrence	---	4.2	6.6	8.5	10.4	13.0	15.1	17.5
Leavenworth	2.8	5.0	8.0	11.0	13.5	16.8	19.7	23.2
Pittsburg	3.4	5.2	8.2	11.1	13.1	15.2	17.6	20.2

Compiled from: F. O. Marvin, "Notes on Some Kansas Paving Brick," Transactions of the Kansas Academy of Science, ed. by G. P. Grimsley, Vol. XIXX (Topeka: State Printing Office, 1905), Table IV, p. 98.

Chanute used the Coffeyville brick for paving.[124]

The rattler used in a test of brick from Coffeyville Vitrified Brick Company and the Coffeyville Shale Brick and Tile Company in 1904 was a wooden cylinder 25 inches in diameter, 48 inches in length, and lined with iron. Into it were placed pieces of cast iron varying in weight from a few ounces up to four or five pounds. Five bricks from each plant were placed in the drum. The rattler was revolved slowly and continuously at the rate of three revolutions per minute for fifteen minutes. The brick were taken out, weighed, and put back in to be revolved thirty minutes for the actual test. The fifteen-minute rattling was merely to allow the loss of any slivers, chippings, corners, etc. The Coffeyville Vitrified brick lost only 3.08 per cent of their weight, while the Coffeyville Shale brick lost 6.45 per cent of their weight.[125]

Soon after this test the Cherryvale Iron Works made and sent a rattler to Coffeyville for testing Coffeyville brick because each plant was claiming to produce the best paving brick. That particular rattler was a large drum lined with iron spikes. No records could be found of the results of the tests.[126]

Individual Plant Capacities and Production

Data relating to individual plant capacities and production is imprecise. Plant capacities usually were stressed in the newspapers

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[124]"Our Brick Won Out," Coffeyville [Weekly] Journal, July 17, 1903, p. 8.

[125]"Tested Paving Brick," Coffeyville [Weekly] Journal, Nov. 25,

[126]"Rattler Made at Cherryvale Iron Works for Coffeyville," Cherryvale [Weekly] Journal, Dec. 9, 1904, p. 5.

when the plants were being built and going into production, but most plants never measured up to their stated capacity.

Brick plants in Kansas ranged in capacity from 15,000 to 100,000 or more. Some had stated capacities of 120,000, but they seldom went over the 100,000 mark in daily production. Brick plants in the 15,000 bricks per day category usually were small family-owned and operated enterprises or partnerships that were not well mechanized due to the lack of capital. Such enterprises did not produce paving brick, as a general rule, but limited production to common brick. An indication of daily production capacities is given in Table 9, on page 112.

Lack of dryer and kiln space for drying and burning brick usually was the most important factor in limiting the plant capacity. Normally the machinery could produce bricks at a faster pace than they could be dried and burned.

Another factor in limiting production was the percentage of the production devoted to making paving brick. The represses used in making them could only produce 20,000 brick per day. Most plants used two represses, thus limiting paving brick production to 40,000 per day. More care had to be exercised in burning pavers, and downdraft kilns were required. Companies usually had limited downdraft kiln space. When a plant was producing only paving brick, it could be expected to produce only approximately half or two-thirds the brick it could produce if making common brick.

The daily production capacity of many plants increased somewhat in later years, but the capacity of a number of plants remained relatively low throughout the "peak period."

TABLE 9

DAILY PRODUCTION CAPACITY OF BRICK & TILE PLANTS

IN KANSAS DURING 1901-02 TIME PERIOD[a]

	Vitrified	Fire Brick	Common Building	Fancy	Tile
Number of Plants	9	3	17	3	2
Total Capacity	281,000	25,000	560,000	65,000	57,000
Average Capacity	31,222	8,333	32,941	21,667	28,500
Median Capacity	25,000	8,000	15,000	9,000	[b]

Compiled from: State of Kansas First Biennial Report of the Bureau of Labor and Industry for 1901 and 1902, Table I, pp. 160-161.

[a]Does not account for all plants, as all did not report.

[b]One plant could produce 50,000 daily, the other 7,000.

The daily production sweepstakes went to the Coffeyville Vitrified Brick and Tile Company, which operated plants at Coffeyville, Independence, Cherryvale, and Chanute in Kansas. It later established plants at Fort Smith, Arkansas, and Collinsville, Oklahoma.

The Chanute plant was operated only about six years by Coffeyville Vitrified. The plant originally was established by the Chanute Vitrified Brick and Clay Manufacturing Company, then sold to Coffeyville Vitrified in 1902. The plant was dismantled by the Coffeyville firm and taken to Collinsville in 1908.[127]

The Independence plant was purchased by Coffeyville Vitrified the first part of 1899, and was operated by it until about 1914.[128]

The Coffeyville, Cherryvale, and Independence plants of the Coffeyville Vitrified Brick and Tile Company had a daily capacity of 320,000 bricks, and they were actually producing 300,000 per day in late 1901. The Company came close to being the highest producer of brick in the United States in 1900 by producing 40,000,000. The Purington plant at Galesburg, Illinois, produced 44,000,000 to rank first.[129]

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[127] "Bought Chanute Brick Plant," Cherryvale Weekly Clarion, Jan. 24, 1902. Coffeyville Journal, Aug. 21, 1908, p. 7.

[128] "Big Companies Consolidate," Coffeyville Journal, Jan. 13, 1899, p. 8. "Lands Good Contract," Coffeyville [Weekly] Journal, April 10, 1914, p. 2.

[129] State of Kansas First Biennial Report of the Bureau of Labor and Industry for 1901 and 1902, p. 152. "A Big Shovel," Cherryvale Republican, Oct. 4, 1901, p. 1. "Coffeyville Brick Co. Led in Brick Output by only One Company," Coffeyville [Weekly] Journal, March 15, 1901, p. 6.

A complete breakdown of the capacity of the plants operated by the Coffeyville firm is difficult to make. At the time the Company established the plant at Cherryvale in 1899, the plant in Coffeyville had a capacity of 100,000 bricks and 10,000 lineal feet of tile a day. The Independence plant could turn out 60,000 bricks a day. The Cherryvale plant was designed to produce 160,000 bricks a day and to make sewer pipe ranging from three to twenty-four inches.[130]

There is no indication that the Cherryvale plant ever reached its full daily capacity in production in a ten-hour day. However, within a few weeks after going into operation, it went on a twelve and one-half hour day to attempt to meet the demand for brick. The plant and the nearby Lotterer plant were reported to be 10,000,000 bricks behind on orders. At that time the plant was producing 80,000 bricks per day.[131]

The production capacity of Coffeyville Vitrified Brick and Tile was expanded at least once in the ensuing years. The plant at Coffeyville was enlarged in 1908 to enable it it produce 150,000 common or 75,000 paving bricks per day.[132]

It seems that a large portion of the production was achieved at Cherryvale. Activity was so brisk that Coffeyville Vitrified opened its own machine shop to make repairs and to build machinery for its plants and the plants of other companies producing brick in the area.

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[130]"Soon Will Operate," Illustrated Industrial Supplement of the Cherryvale Evening Clarion, March 2, 1899, p. 32.

[131]Cherryvale Republican, June 16, 1899, p. 3. Cherryvale Republican, June 23, 1899, p. 3.

[132]"Fire Proof Brick Shed," The Coffeyville [Weekly] Journal, May 27, 1908, p. 5.

The Coffeyville Shale Brick and Roofing Tile Company was somewhat of a giant in production from its single plant. The plant turned out 112,000 bricks in a ten-hour day in the summer of 1905, which was reputedly the largest single day production by any of the brick plants. The Company frequently turned out 100,000 bricks a day. Coffeyville Shale Brick shipped out 900 carloads of bricks from January to September of 1905. By 1907 the plant had achieved the production of 20,000,000 bricks in a year's time, 8,000,000 of them had been used in Coffeyville. However, there is no indication that the Company ever achieved its stated daily production capacity of 100,000 stiff mud bricks and 40,000 dry press bricks.[133]

Other companies occasionally reached high daily brick productions. The Nelson Vitrified Brick Co. of Mound Valley reached production peaks of 100,200 and 106,000 common bricks per day.[134] The Tyro Vitrified Brick Company turned out 9,600 bricks in an hour and 423,000 in a sixty-hour production week.[135]

Most brick plants did not achieve such high production capacities, and if they did, they didn't maintain them long. Most daily production figures ranged from approximately 30,000 to 75,000.

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[133]"Made Many Bricks," Coffeyville [Weekly] Journal, Sept. 1, 1905, p. 6. "The Coffeyville Shale Brick Company," Supplement to the Coffeyville Journal, April 5, 1907, p. 32. "The Machinery Bought," Coffeyville Weekly Journal, Jan. 2, 1903, p. 1.

[134]"The Nelson Brick Plant," Mound Valley Herald, March 16, 1906, p. 2. Mound Valley Herald, Sept. 4, 1908, p. 3.

[135]"Making Some Brick," Coffeyville [Weekly] Journal, June 30, 1911, p. 5.

Brick Quality

Some variations existed in the quality of bricks produced in Kansas in the first decade of the twentieth century, but bricks produced in the Gas Belt were generally of good quality. It was said that a person could strike a gas-fired vitrified paving brick a sharp blow, and it would ring like a bell. There were several factors that affected the quality of brick, one of them being the type of shale or clay used.

Most companies did not have much trouble finding suitable shale. However, clay qualities could change in a distance of a few feet and considerable care was needed to fire clays with varying mineral content at the proper temperatures for the proper length of time.

Some clays were fat or too pure, possessing too much alumina and too little silica. The brick made from them were too brittle. A Leavenworth company was having trouble of this nature at the turn of the century. The auger mechanism that was driving the clay through the pug mill created a rotary motion to the clay stream being extruded, causing an internal series of concentric layers. These layers separated to some degree during the burning process. The company overcame the problem by modifying its machinery and dies and adding sand to the clay to reduce its richness.[136]

Another factor that affected the quality of brick was the firing temperature. Brick were fired at temperatures ranging from 1700 to 2000 degrees fahrenheit. Firing the brick at too low a temperature would cause them to be soft. If they were fired too fast, they would crack or explode, especially if the carbon content of the clay was high. If fired at too

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[136]Marvin, "Notes on Some Kansas Paving Brick," pp. 91-92.

high a temperature the bricks would reach their fusion point--the temperature at which a pre-formed material will deform under its own weight. Different clays have different fusion temperatures, that of clays used for firebrick being somewhat higher.

Another factor affecting quality of brick is the coloration and variations of coloration. As previously stated, brick produced by gas in Eastern Kansas generally were red, due to the rather high iron content of the clays and shales used. The desired color at that time was a rather deep cherry red. However, the shades of the brick could vary somewhat in the same kiln. The brick on the outside of the pile could be a salmon color, while the brick in the center of the stack could come out the desired deep red. Considerable skill needed to be exercised to avoid an excess in variation of the brick.

Coal-fired brick generally were a deeper red, reddish brown, almost a purple, or black. This coloration was caused by the coal smoke.

There was one notable exception to the rule that the brick plants in the Gas Belt produced only red brick. This was the Kansas Buff Brick and Manufacturing Company at Buffville. The shales at Buffville were reputed to be the only shales in the region that would produce brick with the color and durability equal to or superior to the brick produced at Milwaukee, which had earned its reputation as the "Cream City." The Kansas Buff Brick Co. established quite a reputation of producing brick ranging from a deep red to a light buff, with fifteen to twenty shades in between. The plant was said to be the only buff brick plant west of St. Louis at that time.[137]

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[137]"The South Brick Plant," Altoona Tribune, Jan. 4, 1906, p. 3. "The Kansas Buff Brick Mfg. Co.", Altoona Journal, Feb. 27, 1903, p. 1.

Variations in the quality of brick produced by the different plants in the Gas Belt were so minor that outsiders soon associated the bright red color and durability characteristics of brick produced by one plant to nearly all of the brick produced in the Gas Belt. The reputation had been established, making it easier to market the brick.

Marketing of Brick

The marketing area for brick produced in the Gas Belt during the "heyday" of brickmaking ranged from selling for local construction to selling hundreds of miles away, and occasionally into other countries. The reputation for gas-fired brick developed quite early and continued to grow considerably during the ensuing years.

A number of Kansas brick companies exhibited their brick at the St. Louis World's Fair in 1904 and won prizes on their products. The Coffeyville Vitrified Brick and Tile Company won a silver medal on its ornamental brick. Other companies exhibiting and winning prizes were the Columbus Brick and Tile Company, Clay Center Brick Company, Cherryvale Brick Company, Caney Brick Company, Capital City Vitrified Brick Company of Topeka, Atchison Paving Brick Company, LaHarpe Shale Brick Company, Federal Brick Company of Cherryvale, Lawrence Vitrified Brick Company, and Pittsburg Paving Brick Company.[138]

The trade territory for Kansas brick generally extended to the south and southwest, as the area to the north and northeast was being supplied by plants in existence in the late 1890's. However, the Gas

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[138]"Zinc Company Grand Prize," Iola Register, Dec. 30, 1904, p. 3.

Belt brick plants did make considerable inroads in the Kansas City marketing area in competition with brick plants in the Metropolitan Area. One of the early large orders sold in the Kansas City area was for nine million bricks sold by the Coffeyville Vitrified Brick and Tile Company for construction of the Cudahy Packing Co.[139]

Before the first kiln of brick was produced at the Southwestern Brick Company plant at Cherryvale in 1903, the entire output of the plant for a year had been sold to Kansas City outlets.[140]

Oklahoma had not yet become a state during the early years of high brick productivity in Kansas, but it was developing as a territory. There was considerable demand for Kansas-produced brick in Oklahoma before and after statehood. The Nelson Vitrified Brick Co. of Mound Valley sold one hundred carloads of brick to be used in Lawton in the summer of 1907.[141]

As early as 1899 the Coffeyville Vitrified Brick Co. had sold paving brick for such diverse places as Shrevesport, Louisiana; Houston, Texas; and Lincoln, Nebraska. The contract for two million bricks to pave in Lincoln was in competition with the Purington Brick Co. of Galesburg, Illinois, the giant in the industry.[142]

The Kansas Buff Brick Manufacturing Co. received an order in 1907 for several carloads of buff brick to build a bank in Cananea, Mexico.[143]

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[139] "9 Million Coffeyville Brick," Coffeyville Journal, June 2, 1899, p. 1.

[140] Cherryvale Weekly Clarion, Sept. 13, 1907, p. 3.

[141] Mound Valley Herald, Aug. 7, 1908.

[142] "Our Brick Down South," Coffeyville Journal, Aug. 4, 1899, p. 1.

[143] "Kansas Brick to Mexico," Caney News, June 8, 1907, p. 6.

Three trainloads of Coffeyville Vitrified paving brick were marketed in Florida in 1926, a number of years after many of the Gas Belt brick plants had closed. The brick were shipped by train to Texas City, Texas, then transferred to ships for the voyage to Tampa to get around the "railroad embargo."[144]

The Cherryvale Brick Company, a much smaller company than the Coffeyville Vitrified Brick Co., claimed in 1905 to have markets for its brick in Arkansas, Missouri, Nebraska, Iowa, Indiana, and the Oklahoma Territories.[145]

After the fame of Gas Belt brick had spread, many of those seeking to purchase came to the plants to place orders. Some plants sold through outlets, but a number of the plants sent out salesmen to acquaint prospective customers with the quality of their brick and to take orders. The Bush-Wadsworth Brick Company of Iola had a man on the road within weeks after the first kiln of brick were fired. He found no difficulty in booking orders in the Kansas City area.[146]

The Coffeyville Vitrified Brick and Tile Company produced minature brick one inch by three inches in size to be distributed by their salesmen as souvenirs or paper weights. Of course the brick had the Company's name emblazoned on them.[147]

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[144]"Two Trainloads of Coffeyville Brick Bound for Florida," Coffeyville Daily Journal, Jan. 13, 1926, p. 2.

[145]"The Cherryvale Brick Company," Supplement to Cherryvale Weekly Journal, Aug. 11, 1905, p. 6.

[146]Iola Register, April 27, 1900, p. 6.

[147]"Little Souvenir Bricks," Coffeyville [Weekly] Journal, June 8, 1900, p. 1.

Probably the most effective means of advertising was the use of an imprint on the brick giving the company's name and location. Prospective customers were inclined to remember the impression if they ever had a need to purchase brick.

Brick companies in the Gas Belt found little need to promote their products as long as their price was right, they could produce the brick, and there was a demand for their brick--the reputation had been established. The price probably could be considered right, for at no time in the "heyday" of brickmaking in Kansas did the plant price of common brick average as much as $5 per thousand. Paving brick never averaged more than $10 in price, although some prices quoted were as high as $12 per thousand. Table 5, page 88 indicates the quantities of brick produced and the value per thousand.

Transportation of Brick

Virtually all of the brick produced during the peak years of production that were not used locally were transported by railroad. This was the day before truck transportation had developed, and few who owned teams and wagons wished to transport heavy loads of brick long distances. The brick plants were somewhat as the mercy of the railroads that had promoted them.

One of the major problems that plagued the brick manufacturers was the shortage of railroad boxcars. Plants in Coffeyville and Cherryville were hampered more than other plants, because vast numbers of railroad cars were needed each year to haul their production to distant markets.

As early as 1901 the brickmen of the Gas Belt were complaining about not receiving rail rates as low as they deserved. The brick plants

were making more brick than they could sell in the immediate area, so they wished to obtain more favorable rates to enable them to appreciably extend their marketing territory. They complained that the railroad men would spend a whole day inducing a man to ship a car of cattle over their lines, but not for shipping brick, which was less trouble and less risk. It was suggested that brick could be shipped to Texas in the empty railroad cars that had been used to ship cattle to market.[148]

Apparently, the brickmen had gained favorable rates by 1906 and 1907, but the problem had shifted to a shortage of boxcars. In January of 1906 the Federal Betterment Corporation of Cherryvale shut down for a few days due to a shortage of boxcars. By November all of the Cherryvale brick plants reported they were badly in need of cars to haul brick.[149]

By February, 1907, the boxcar shortage had reached critical proportions, as the brick industry had suffered from the shortage for six months. It was emphasized that the railroads had encouraged the industry and promised to haul the products to market, but they were not coming through with enough cars. It required 200 cars a day to haul the brick produced in the Gas Belt to market.[150]

It was reported that only half of the required number of cars were available for hauling brick, and the brickmen were asking that the industry

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[148]"Brickmen Want Better Rates, Iola Register, March 22, 1901, p. 9.

[149]"Brick Plants," Cherryvale [Weekly] Journal, Jan. 4, 1906, p. 1.

[150]"Brickmen Protest," Coffeyville [Weekly] Journal, March 1, 1907, p. 4.

get its share of cars. They had received only one-fourth as many cars as had been received the year before. The brickmen asked the State Railroad Board to investigate the Missouri Pacific; Santa Fe; Frisco; and the Missouri, Kansas and Texas Railroads to determine if the brick industry had been provided its due share of cars.[151]

The shortage of railroad cars was not eased in the ensuing months, so a group from Coffeyville, Cherryvale, Elk City, Humboldt, and Iola held a meeting in Cherryvale in September and planned a trip to Topeka to meet with Santa Fe officials to demand more railway cars. They were determined if the meeting with the Santa Fe officials did not produce results, they were willing to ask the Kansas Railroad Commission to act. Within a few days the Santa Fe Railroad announced that it had purchased 100 coal cars for the exclusive use of the brick manufacturers.[152]

The boxcar shortage was especially critical in and around Cherryvale, where there were twelve million bricks waiting to be shipped out--four to five million in excess of the usual stock on hand. It was claimed that Cherryvale was furnished only 15 to 25 per cent of its portion of cars by the Santa Fe. One company had an order for 150,000 bricks from Amarillo, Texas, that had been delayed sixty days for lack of transportation. At the same time the Santa Fe was sending hundreds of empty cattle cars a day to the Southwest.[153]

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[151]"Brickmen in Session," Coffeyville [Weekly] Journal, March 1, 1907, p. 2.

[152]"Brickmen in Session," Coffeyville [Weekly] Journal, Sept. 27, 1907, p. 4.

[153]"9,000 Cars Brick Made," Cherryvale [Weekly] Journal, Sept. 19, 1907, p. 1.

One brick manufacturer claimed that 9,000 cars of brick were shipped from Cherryvale a year, but the brickmen were being discriminated against. Industries requiring no more than 2,000 cars a year in the Cherryvale area got special equipment and cars when they needed them.[154]

Relief from the shortage of railroad cars that the brickmen received in September of 1907 apparently was short in duration. Within a few days the brickmen were complaining again about the shortage of cars. One manager said he had to lay off his loading crew, because they had plenty of men, plenty of orders, and plenty of everything but cars. Shortly after laying off his loading crew the Santa Fe rushed in cars by the dozen and filled his siding to an overflow. The rest of the cars had been taken over by other brick shippers. He got the brick loaders in to load the cars within a few days, then he had no cars again.

The boxcar shortage probably did not ease appreciably in the next few months, but brick production was dropping off some at that time and would drop off considerably in the next few years.

It is difficult to arrive at any significant figures concerning transportation costs, but they were relatively high in relationship to the value of brick being shipped. A study made in 1930 revealed that the average cost of railroad transportation equaled approximately 26.52 per cent of the average wholesale price of the brick at their destination. While railway rates were lower in the first decade of this century, it appears that the costs equaled approximately 20 per cent of the wholesale price at the point of destination.

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[154]"Brickmen Still Angry," Coffeyville [Weekly] Journal, Oct. 4, 1907, p. 4.

One final interesting note about transportation is the evidence that a boxcar held an average of 10,000 bricks, enough to build an average home.

CHAPTER V

THE DECLINE OF BRICK MANUFACTURING IN KANSAS

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The second decade of the twentieth century was marked as much by the decline of brick production in Kansas as the first decade had been with growth. It was during this decade that unprecedented numbers of brick companies with fairly large production capabilities went out of business.[1] The decline continued during the 1920's and was accentuated by the economy of the depression in the 1930's.

Several factors account for the decline with the following among the most important: (1) declining natural gas supplies; (2) inroads made by concrete and steel in the construction business; (3) decline in the pace of development in the mid-section of the United States; (4) changing architectural styles and demand for brick; (5) almost complete abandonment of brick as paving material; and (6) high transportation costs in ratio to value of the product being shipped.

The most important factor influencing the decline probably was the shortage of natural gas. In fact, the depletion of the gas supply caused brick plants to close before the other factors came into play.

As previously indicated, most companies at their inception depended upon gas from their own leases or from leases in a limited area.

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[1]Indications are that no fewer than twenty plants in the Gas Belt ceased to operate between 1910 and 1920. The exact date on which plants ceased to operate is difficult to find in many instances. However, several of the corporations were dissolved during this period. Fig. 12, page 128, shows the location of remaining brick plants in 1912. Note fewer numbers of plants compared to those in production in 1908 shown in Fig. 10, page 82.

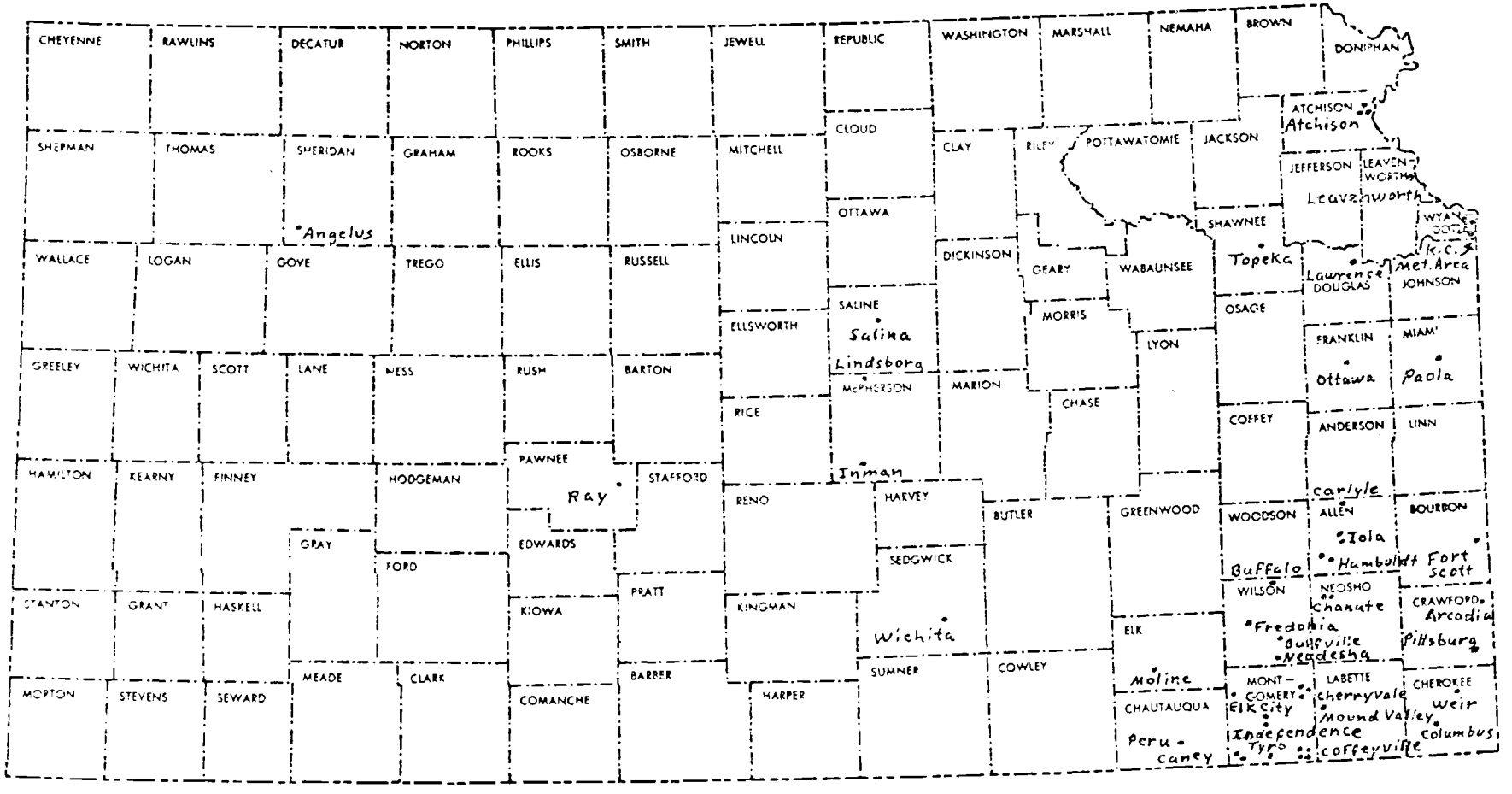

Fig. 12.--Location of Kansas brick plants in 1912. Each dot represents one plant. Compiled from Polk's Kansas Gazetteer, 1912, p. 1091.

Most plants had not expanded their supplies of natural gas appreciably during their years of operation. They were in trouble when the once considered inexhaustible natural gas supplies dwindled.

One of the most serious deficiencies of the Gas Belt was the lack of an efficient pipeline network for equitable distribution of natural gas throughout the region.

A movement was underway during the first years of the twentieth century that was to have a serious impact upon the Gas Belt when local supplies began to decline. Of the 466 producing gas wells of Montgomery County in 1907, Kansas Natural Gas Company owned 203. The Company had been gaining control of a large number of leases and much of the production with the avowed objective of piping gas out of the region and into the Kansas City Metropolitan Area.

Kansas Natural Gas, as early as 1904, gained control of enough production that it was going ahead with its plans to pipe large quantities of gas out of the area. By May of that year opposition to the Company's plans had grown to the point where the Kansas Gas Protective Association was formed to oppose piping gas outside Kansas, and especially to Kansas City. Representatives from the industrial towns of the Gas Belt met in Chanute to form the organization, to urge county commissioners to oppose the piping of gas across road right-of-ways, and to convince authorities that gas was too dangerous to pipe.[2]

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[2]"Opposed to Piping Gas," Weekly Republican (Cherryvale), May 27, 1904, p. 8.

The Kansas Natural Gas and Oil Company had been chartered in Delaware, but because of the opposition of the Kansas Gas Protective Association, the State Charter Board at first refused to give the Company permission to conduct business in Kansas. Kansas Natural later received permission to do business in Kansas, and a permanent injunction was issued in the district court restraining the county officials of Montgomery County from interfering with construction of pipelines across road right-of-ways.[3]

The court order was the outgrowth of an incident in which the sheriff arrested twenty-seven laborers, mostly Italians, in October, 1904, for laying pipe across a county road without a permit.[4]

The Kansas Gas Protective Association withdrew its opposition to Kansas Natural Gas in July, 1905, and the Company proceeded with plans to pipe gas to Kansas City, Atchison, Leavenworth, Topeka, Lawrence and intermediate points.[5]

The failure of the Kansas Gas Protective Association to keep Kansas Natural from piping large quantities of gas out of the Gas Belt did not have an immediate impact upon brick plants and other industries of the Belt. Most areas still had plentiful supplies of natural gas, and more

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[3]"Permanent Injunction," Weekly Republican (Cherryvale), Dec. 2, 1904, p. 8.

[4]Weekly Republican (Cherryvale), Oct. 28, 1904, p. 1.

[5]"Given a Charter," Weekly Republican (Cherryvale), July 21, 1905, p. 1.

brick plants and other factories were being built. However, the Company's consolidation of large supplies of gas and piping them out of the area would have long-range consequences. Within a few years, when the supply of natural gas was critical in the Gas Belt, Kansas Natural was still piping much of the dwindling supply from the region. It would have been much better for the Gas Belt if Kansas Natural had consolidated the supply of natural gas for distribution within that region.

The watershed year for adequate supplies of natural gas for brick plants and other industries in the Gas Belt seems to have been 1907. From this point on, the brick plants and other industries began to experience frequent interruptions or operations due to undependable natural gas supplies, forcing more and more plants to close.

Other factors contributed to the brick industry problems such as mismanagement, unfavorable economic conditions associated with the recession of 1907, lack of initial capital, and a lack of a dependable supply of water. However, the lack of a dependable natural gas supply was the most severe of their woes.

Financially unstable companies were the first to go, because they did not have sufficient capital formation to adjust to the dwindling gas supplies. Brick companies had four main options: (1) seek a more dependable supply of natural gas, (2) switch to an alternate and more costly fuel; (3) move to another location where the supply of gas was more dependable; or (4) close down. The first option became increasingly more difficult to exercise. The second option required capital to make the plant conversion and required higher operating costs. The third option was taken by several companies--moving to Oklahoma, where gas and oil

fields were being developed. The fourth option was rather natural, because most of the plants experiencing fuel shortages were already closed down temporarily--waiting for some miracle so they could resume operations. The miracle seldom occurred.

One of the first, if not the first, of the brick plants in the Gas Belt to convert to oil was the Union Brick Co. of Iola, which did so in May 1907. It had been feared that using oil to burn the brick would discolor them, but Union Brick found that this did not occur.[6]

Brick plants outside the Gas Belt also were affected by the natural gas shortage. Lawrence Vitrified Brick and Tile Company, chartered in 1899, had first burned brick with coal. It later converted to gas to better compete with companies using gas. When the gas shortage struck, it had to convert to more expensive fuel oil and be at a disadvantage in competition with the companies still having a dependable natural gas supply. This disadvantage is thought to have contributed to the company's demise after about twenty years of operation.[7]

Salina Vitrified Brick Company converted to oil in 1906 and found the costs were high--about the cost of $3 coal.[8] This was considerably higher than the prevalent fuel costs in the Gas Belt and about four times

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[6]Tyro Weekly Herald, May 10, 1907, p. 3.

[7]Kenneth A. Middleton, The Industrial History of a Midwestern Town (Lawrence: University of Kansas, Kansas Studies in Business, No. 20, 1941), pp. 71-72.

[8]"Making Brick With Oil," Weekly Republican (Cherryvale), April 13, 1906, p. 2.

the earlier costs.

Added to the problem of gas shortages was that the brick industry was not as efficient as other industries, with labor costs disproportionately high. Consequently, it was more difficult for brick companies to accumulate sufficient working capital to adjust to the new technology associated with switching to oil or coal as alternate fuels.[9]

Cement and steel began to make inroads into the construction business and replace common brick for structural support materials after the first decade of the twentieth century. This change came about somewhat as the result of further urbanization in which taller buildings were being built. It became evident that the thickness of brick walls needed for the support of the buildings increased all out of proportion with the height of the buildings. It was more practical to use concrete or steel than common brick for supporting buildings. Also common brick that were not as architecturally pleasing could not be used in taller buildings.[10]

Cement offered an additional advantage over brick in shipping costs. Only the portland cement had to be shipped to the city in which construction was taking place. The sand to mix with the cement could be secured locally. The brick industry found it hard to compete with cement.

The pace with which public improvements had been undertaken in the first few years of the twentieth century began to slacken in the second

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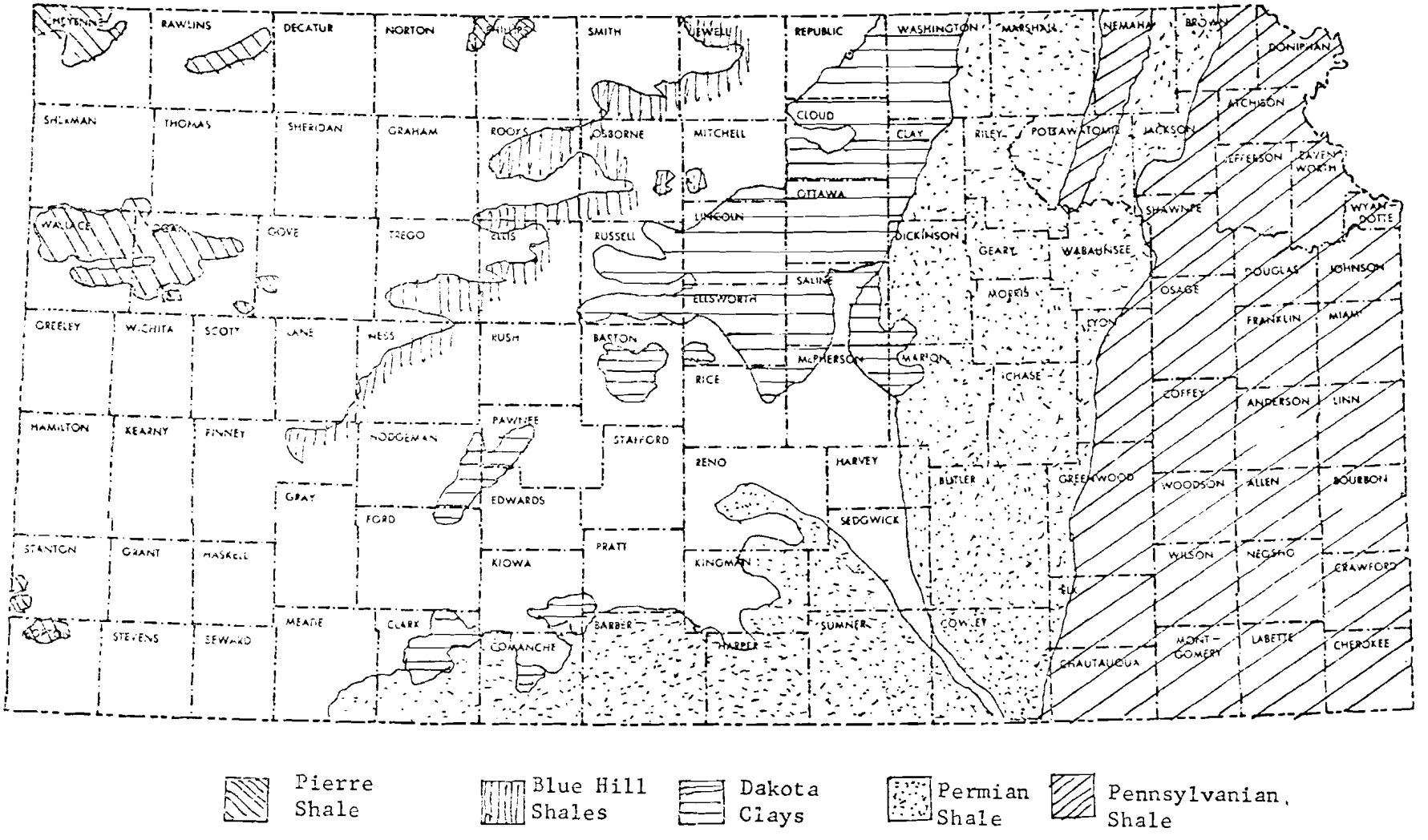
[9]Clark, Towns and Minerals in Southeastern Kansas, pp. 129-130.

[10]Kruger, The Outlook for Kansas Clay Products Industries, p. 24.

Fig. 13--Kansas Shale and Clay Formations. Source: Ronald G. Hardy, Inventory of Industrial, Metallic and Solid Fuels in Kansas (Lawrence: Kansas State Geological Survey Bulletin 199, pt. 5, 1970), p. 8, Figure 5.



Some companies did attempt to produce various colored brick. Different substances were used in some plants for "flashing" the brick. Sometimes the kilns were turned off and coal or zinc were thrown in the kilns to produce coppertone or yellow brick.[11] The Verdigris Valley Vitrified Plant at Neodesha used asphalt for flashing to produce black brick.[12]

Kansas brick producers did not make significant progress in producing buff brick until the four brick plants were established in the Dakota clay deposit areas of Central Kansas after World War II.

Vitrified paving brick production in Kansas hit a peak in 1910 when over 118 million were produced. Production dropped approximately 35 million the next year and continued to drop sharply until after World War I. Production leveled off during the 1920's, and then declined sharply to hit rock bottom in 1930. There seems to have been no production of vitrified brick after 1930. Refer back to Table 3 on page 84 and Table 4 on page 87 for production trends in vitrified brick.

First asphalt and then concrete were replacing brick as prefered materials for paving city streets. Concrete was also effectively replacing brick for constructing sidewalks. Brick had never seemed to be practical for highway paving, so when the Kansas highway system was developed in the 1920's little consideration was given to brick. Only a few small segments of highway were so constructed.

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[11]Oliver Kingsbury, private interview, June, 1975. Mr. Kingsbury was employed at the Fredonia Brick Co. plant.

[12]C. V. Coleman, private interview, June 1975.

The Coffeyville Vitrified Brick and Tile Company plants at Collinsville, Oklahoma, and Fort Smith, Arkansas, were also sold in the merger.

United Clay Products immediately dismantled at least five plants within its empire in its consolidation efforts. By the late 1940's, the Company had been reorganized into the United Brick and Tile Co., and it had closed down six plants in Kansas. The Company then was operating only one plant in each of the following cities: Coffeyville, Iola, Pittsburg, Weir, and Wichita.[15]

Acme Brick Company of Ft. Worth, Texas, purchased United Brick and Tile in 1963. Of the eleven Kansas brick plants involved in the merger in 1926, only the Acme plant at Weir survives.

Several of the brick plants within and outside the United "empir operated sporadically through the depression years of the 1930's and the war years of the 1940's. There were twenty-seven plants operating in Kansas in 1927. By 1933 the number of operating plants had dropped to ten. By 1935 the number was back up to twelve. It was estimated in 194 that Kansas plants operated at only 20 per cent of capacity.[16]

The Verdigris Valley Vitrified plant at Neodesha closed down during World War II and reopened after the War. Kansas Buff Brick Compa of Buffville also closed down during the war, but never resumed operatic

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[15] It's Made in Kansas, 1949-50 (Topeka: Kansas Industrial Develo ment Commission, 1950), p. 54.

[16] Kruger, The Outlook for Kansas Clay Products Industries, p. 20

The Kansas brick industry revived somewhat after World War II, and there were sixteen operating plants in 1950. Two new plants were in operation--Cloud Ceramics, Concordia; and Great Bend Brick & Tile Co., Great Bend.[17]

Brick plant closings resumed in the 1950's and 1960's until only seven were operating in 1965. The Great Bend plant had been purchased by Acme by this time and closed. By 1968 Acme had closed its plant at Buffalo. It was one of the few remaining plants that could trace its beginnings to the "heyday" of brickmaking in Kansas.

One of the main reasons that brick plants were closing in the 1950's and 1960's was that antiquated machinery was still being used.

Although some brick plants resumed operation and others were built after World War II, there seems to have been no appreciable increase in production. Only 52,310,000 common bricks were produced in 1947. Production was up to 81,098,000 in 1954, some five million fewer bricks than were produced in 1935.[18] By 1959 production had increased to 136,757,000, but it dropped approximately 15 million in 1960.[19] Production in Kansas appears to have dropped off more during the 1960's, with the closing of additional plants, and to have leveled off in the early 1970's.[20]

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[17] It's Made In Kansas, 1949-50 p. 54.

[18] U.S. Department of Commerce, Bureau of the Census, Census of the United States, 1947: Census of Manufacturers, Vol. II Statistics by Industry, Table 6-B, p. 505. Census of the United States, 1954: Census of Manufacturers, Vol II, pt. 2, Table 6-B, p. 32b-15.

[19] Walter H. Schoewe, The Mineral Industry in Kansas, 1960, (Lawrence: State Geological Survey of Kansas Bulletin 152, pt. 3, 1961) p. 74.

[20] Current production appears to range between 90 and 107 million

CHAPTER VI

BRICK MANUFACTURING IN KANSAS TODAY

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Manufacturing Techniques

Brick manufacturing in Kansas, once a highly competitive industry with numerous participants, is now carried on by only six plants. These plants and locations are: Humboldt Brick and Tile Co., Humboldt; Excelsior Brick Company, Fredonia; Acme Brick Company,Weir; Cloud Ceramics, Condordia; Kansas Brick and Tile Company, Hoisington; and Acme Brick Company, Kanopolis.

Brickmaking techniques vary in the Kansas plants, but they are basically the same in each and quite similar to those used during the "heyday" of brickmaking. Some of the equipment used in the three plants founded in that era is believed to be the original equipment. This is especially believed to be true at the Excelsior plant at Fredonia, where an American Clay Manufacturing Co. pug mill is in use. It can not have been of recent vintage as American Clay went out of business in the 1930's.[1]

A few basic differences exist today in the machinery used in brickmaking compared with those used at the start of the twentieth century. One difference is that large electric motors have replaced steam as a source of power. Another difference is that a disintegrator or a hammer mill type grinder is used to grind the clays in some plants, replacing the dry pan with its huge rollers. The use of the disintegrator permits grinding of wetter clays.

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[1]Personal visit to the Excelsior Plant and interviews with Jack Lance, kiln foreman; and Chester Matney, mill foreman, June, 1975.

The clays, water, bonding agents, and other additives are mixed in the pug mill and the column of clay is extruded in the same manner as was the case seventy years ago, with one exception. The extruded column is not solid, but has holes approximately one inch in diameter. The number of holes depends upon the size of the brick being manufactured at that particular time. Brick having such holes are known as cords.

Cords have replaced solid common and face brick for three reasons: (1) less weight; (2) better burning capabilities with less fuel; and (3) better mortar bonding capabilities.[2]

Another major innovation in the brick production processes before the brick reach the cutting table is the introduction of a roller approximately a foot in diameter with burr mill type protrusions or rough surface of some type to groove or texture the top of the clay column as it passes by on a conveyor belt. This technique gives the face of the brick a special appearance when burned. Often a slurry is splashed on the column at this point to produce desired colorations when the brick are fired.

The green brick are cut in the next stage of production with a reel cutter rigged with wires much like those used seventy years ago.

A reel cutter is pictured on page 143.

The cut brick are set on the cars by workers the same as they were seventy years ago, except the drying tunnels will accept larger carloads

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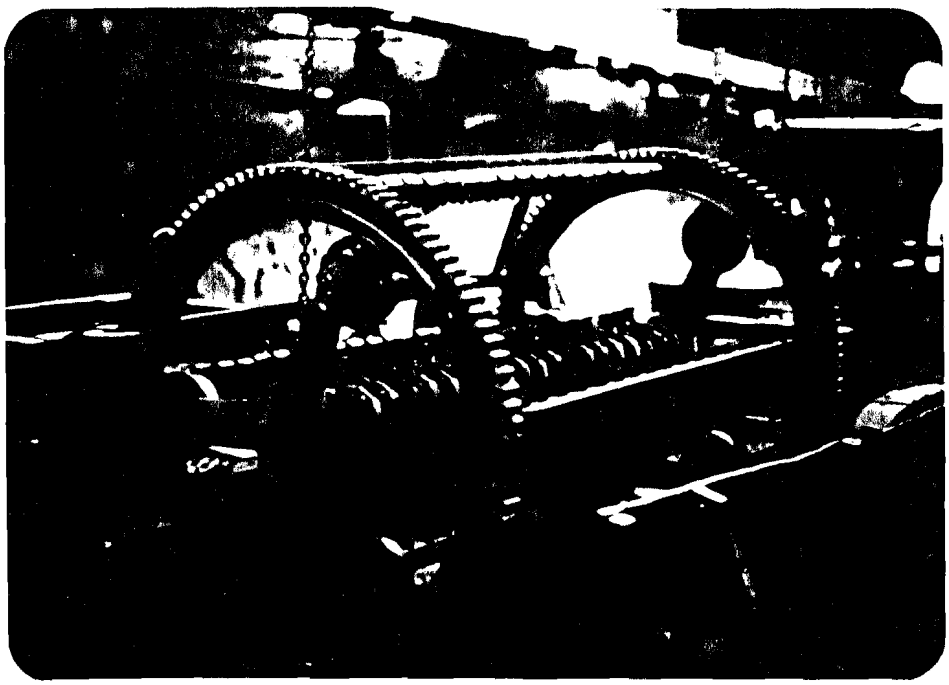
[2]The author has not been able to determine at what date the change from the production of solid brick to cords was made. It probably occurred in the 1920's. No evidence of them being produced was found at brick plant sites where plants closed as late as 1915.



This reel brick cutter is the one used at the Excelsior plant at Fredonia.

than those used at that time. Tracks are utilized to move the cars of green brick to the dryers and kilns in the same way as some seventy years ago. A worker setting brick is shown on page 144.

The drying and kiln time remains basically the same as it did seventy years ago--a total of about six days.

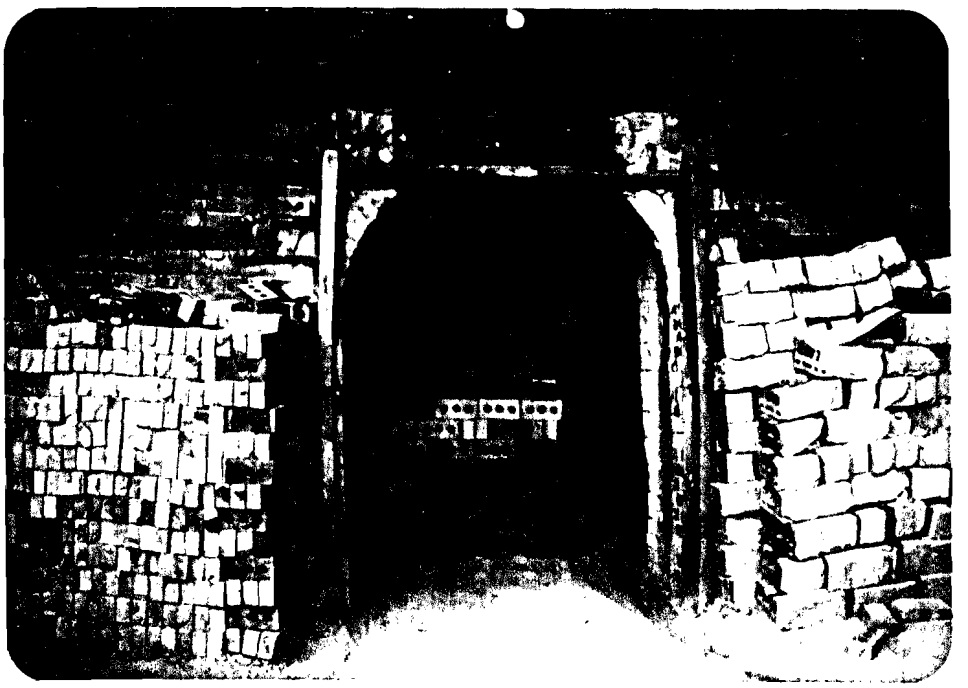
The dryer and kiln time varies with the types of clays being used. Some clays can be dried faster but require more kiln time. Others may be virtually free of carbon and require a relatively short time for burning Temperatures maintained in the dryers range to approximately 200 degrees fahrenheit or higher. The heated air is circulated around the brick with huge fans. Often the heat is drawn off the exit end of the tunnel kilns or from the beehive kilns when they are being cooled.

One of the women employed as a setter at Excelsior Brick Co. is shown taking green brick from the conveyor belt and stacking them on a car in preparation for drying and burning.

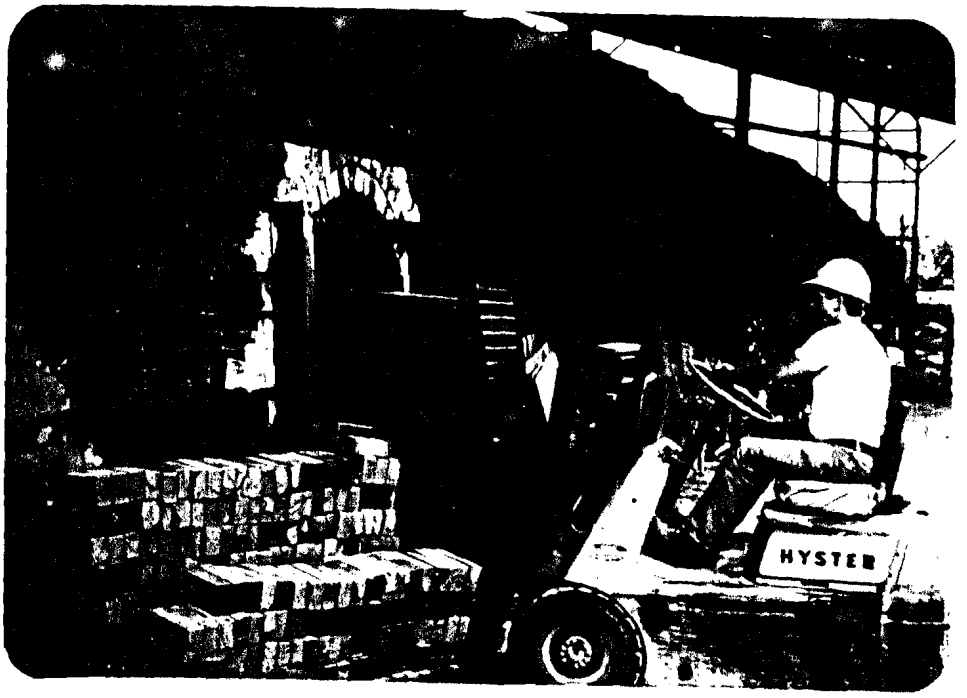
Tunnel kilns only are used at three of the plants, both tunnel and beehives at one, a Hoffman and beehives at one, and only beehives at one.

Major improvements have been made in handling brick after they have been burned. Forklifts are used to transfer brick from the kiln areas to the storage yards, whereas two-wheelers or wheelbarrows powered by men were used seventy years ago. The photograph on page 146 shows a forklift being used to transport brick.

A beehive kiln is shown ready to accept green bricks at the Excelsior Plant.

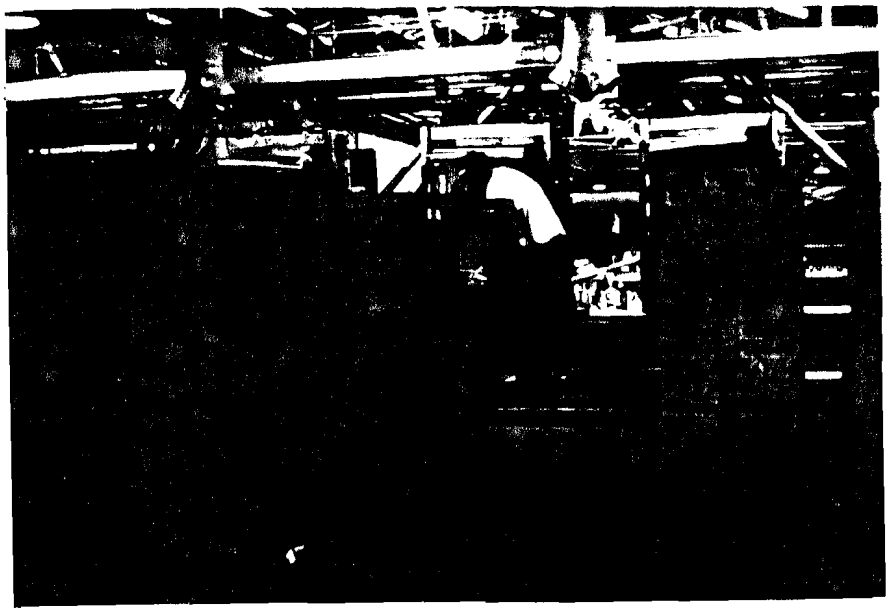


A beehive kiln is shown loaded and ready to be closed up for burning at the Excelsior Plant.



A laborer operating a forklift is shown removing burned brick that have been cooled from a beehive kiln at Excelsior.

A certain amount of muscle power is used today in grading, shading, and packaging brick, but much of the work is done by a carrousel automatic strapper. Workers are stationed at different points around the carrousel, which is an oval device some thirty feet long. As the workers pick up the brick placed on their platform, they shade and grade them. They then place the brick in a "pocket." When the pockets are filled, the carrousel is rotated, delivering the brick to another platform. There the brick are grouped together and strapped in packages of approximately 500 and placed on pallets by the machine. The packaged brick are then transported by forklift to boxcars or the storage yard. A carrousel automatic strapper is pictured on page 147.



A worker is shown shading, grading, and placing brick in the pockets of the carrousel strapper at the Acme brick plant at Kanopolis.

The production capabilities of the six Kansas plants are limited by a combination of drying and firing time for brick and the amount of kiln space. This seems to have been the main limiting factor in daily production throughout the history of modern brickmaking in Kansas and other areas. Usually machinery at brick plants have been capable of producing brick faster than they could be burned.

To overcome this handicap an experimental automated brick plant was opened by the General Shale Products Corporation of Johnson City, Tennessee, in 1967, which promised to revolutionize the brickmaking industry. The main innovation of the plant was an automated kiln to replace continuous tunnel kilns and the traditional beehive kilns. Beehives had

been changed little since the days of the Egyptian Pharaohs.[3]

The automatic kiln was designed to burn the same number of brick ten times as fast as the traditional beehive kiln and five times as fast as the more efficient tunnel kilns developed after World War II. The General Shale kiln accommodated only a single layer of brick, whereas the older kilns accommodate as many as 17 layers of brick. Only 700 bricks were burned as a time in a kiln, compared to 3,600 per load in a standard tunnel kiln. However, the ten-minute time required to harden the brick compensated many times over for the accommodation of fewer brick. The plant was designed to burn at least 90,000 bricks in an eight hour shift. It would take a beehive kiln 100 hours to finish as many brick and a tunnel kiln 45 hours.[4]

The flow system was designed to permit operation of the plant wit three men per shift, compared with 28 to produce the same number of brick in an old style plant.[5]

Unfortunately, the high automation of the plant of General Shale Products Corporation was a failure. One of the basic problems was the design and construction of tunnel kiln cars used to transport the brick through the kiln. The fast cycle caused rapid deterioration of the refractories, and the expense of producing a very level car deck was too

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[3]"Brick Kiln Builds Up Its Speed," Business Week, No. 1976, (July 15, 1967), pp. 72-74.

[4]Ibid.

[5]Ibid.

great. Another company in Ohio attempted the same one-layer principle of burning brick and went bankrupt as a result of the venture.[6]

Some automation of plants for setting brick and unloading cars of brick coming from the kilns has been introduced in Kansas and throughout the nation in recent years, but little has been done to speed up the burning time for brick and making the kilns more efficient.

Production and Marketing

Practically all brick production in Kansas today is that of face brick of many variations in size, texture, and coloration. Three basic sizes of brick are being made today--modular, king-size, and twelve inch brick. Modular brick measure approximately 2 ½ x 3 ½ x 7 5/8 inches. King-sized brick measure about 2 5/8 x 3 x 9 5/8 inches.

Textures of brick produced in Kansas today vary considerably. The greatest demand upon Kansas production is for antique brick requiring special treatment for desired texture and coloration. They are usually grooved by a roller with burrs passing over the top of the clay column as it is extruded from the pug mill. Valours are produced by using a wire to roughen the top of the column of clay. Normally the column has a smooth surface when extruded. "Rugs" are produced by using a roller with a special surface to make small surface folds on the clay to give the finished brick surfaces similar to carpeting. Some brick are chipped mechanically after firing to give them the appearance of stone. Brick are sometimes placed in a tumbler and rotated to chip them, producing

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[6]W. E. Hawkins, Vice-President for Manufacturing, General Shale Products Corporation, personal letter, May 27, 1976.

a "used" look. Brick grog, sand, cement, and other solid materials are added to the clay or sprinkled on top to gain a special texture.

Desired colorations of brick are achieved in a number of ways. The clays used at the Concordia, Hoisington, Kanopolis, and Weir plants are suitable for burning buff to almost white brick. The clays used at the Fredonia and Humboldt plants have a higher iron content, thus limiting somewhat their production capabilities to various shades of pinks and reds. The burning temperatures are also regulated to achieve different colors. Red brick are burned at approximately 1850 to 1900 degrees fahrenheit, and buff brick are burned up to about 2175 degrees fahrenheit.

Slurries or powdered materials are often sprinkled over the column of shale or brick to achieve desired colors or variations of colors on individual brick. Sometimes red shale dust or cement is sprinkled on the column of clay to produce the appearance of a used brick. These are known as "Old Chicago" bricks and are in great demand. Manganese is used to produce browns, grays or black splashes on brick. Clays of other colors are also used as slurries to splash the column of clay.

All of the Kansas brick plants report the demand for antique brick is so brisk they could devote their entire production capabilities to antique brick and still not keep up with the demand. Antique brick vary somewhat from plant to plant, but generally they are various shades of brown with grooved surfaces and with darker or black splashes on them.

Humboldt Brick and Tile Company continues to produce common brick and reports a good demand for them, especially for constructing sewer manholes. Kansas Brick and Tile makes a few split pavers and simulated bricks as specialty items. Except for the above mentioned items, the production in Kansas is devoted almost entirely to face brick.

Brick prices at the plant in 1976 range from approximately $70 per thousand for seconds and lower grades to $95 per thousand for top grades.

The marketing area is still somewhat localized, but all plants ship their products to several Midwestern States. Their marketing area occasionally extends considerably beyond the Middle West.

All of the brick plants in Kansas appear to have weathered the recession economy of the past few years well and have not had to cut back on their production. This was not true with all plants in the United States. Some plants built up quite a stockpile of brick and had to shut down temporarily. With the renewed construction pace, the demand for brick has risen sharply. A nation-wide shortage of quality brick seems to exist. All the Kansas plants produce quality brick, especially in comparison to those produced by some plants in the southern part of the United States.[7]

The demand for Kansas brick is so good that some of the plants have their production sold for months in advance. Cloud Ceramics, in June 1976, reported its production sold out until October. The Acme plant at Kanopolis reported its production is sold out until after the first of 1977, and their salesmen have been placed on allocations. Kansas Brick and Tile reported it could sell all of its production in Wichita.[8]

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[7]Larry Smith, manager of Kansas Brick and Tile Co., private intervie June, 1976.

[8]Larry Smith, private interview, June, 1976. Don White, loading and shading foreman, Acme Brick Co., Kanopolis, private interview, June, 1976. Richard Cooke, Cloud Ceramics, private interview, June, 1976.

Fuel Shortages and Rising Costs

History is repeating itself somewhat in regard to the Kansas brick industry. Shortages and high prices of fuel are at this time causing some problems and concern within the industry. The Humboldt Brick and Tile Plant was closed down for some time last winter, because it is on a standby supply of natural gas that is subject to shutoff during periods of peak demand. The Humboldt plant sometimes uses it Hoffman kiln, which utilizes coal, and makes only common brick during periods its gas is shut off. The Acme plant at Weir also receives surplus rates on its natural gas, but can convert to fuel oil when the gas is shut off. Cloud Ceramics is considering switching to fuel oil. Kansas Brick and Tile owns two gas wells, which provide more than an adequate standby supply of natural gas.

The Kansas brick producers are caught in a cost-price squeeze that is reported to have driven up to forty brick companies out of business in recent months within a seven-state region of Mid-America. The squeeze is well indicated by the experience of Kansas Brick and Tile. The price of natural gas the Company is buying from Kansas Power and Light went up 50 per cent in May of 1976, and it has gone from 26 cents to $1 per thousand cubic feet in the past five years. At the same time the average price of brick has risen only from about $80 to $95 per thousand.[9]

The cost-price squeeze may have some ominous consequences for the Kansas brick plants. It appears they can only remain competitive by being

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[9]Richard Cooke, private interview, June, 1976. Larry Smith, private interview, June, 1976.

as efficient as possible, which can be achieved by only the more modern plants. Factors in their favor are top quality products; a generally good, dependable labor force; a good distribution system; and a good reputation.

A potential for future expansion of the brick industry in Kansa exists if the conditions are right. It is needless to point out that there is an abundant supply of shale. The reopening of some Kansas coal mines could furnish a good supply of reasonably priced coal. Kansas br plants, high consumers of fuel, can never again expect natural gas or oil to supply cheap sources of fuel for the expansion of the industry.

The State Geological Survey of Kansas, through its studies of t Dakota clay formation of Central Kansas a number of years ago, proved that those clays were suitable for producing buff brick. It was instru mental in encouraging plants to be established in that area after World War II. It has since made a study of the suitability of the clays for making firebrick, and has found them suitable for certain types of fire brick.[10] Figure 14 on page 154 indicates the area covered in the study of the Dakota clay formation.

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[10]Norman Plummer, M. P. Bauleke, and W. B. Hladik, Dakota Forma Refractory Clays and Silts in Kansas (Lawrence: State Geological Survey Kansas, Bulletin 142, 1960), p. 37.

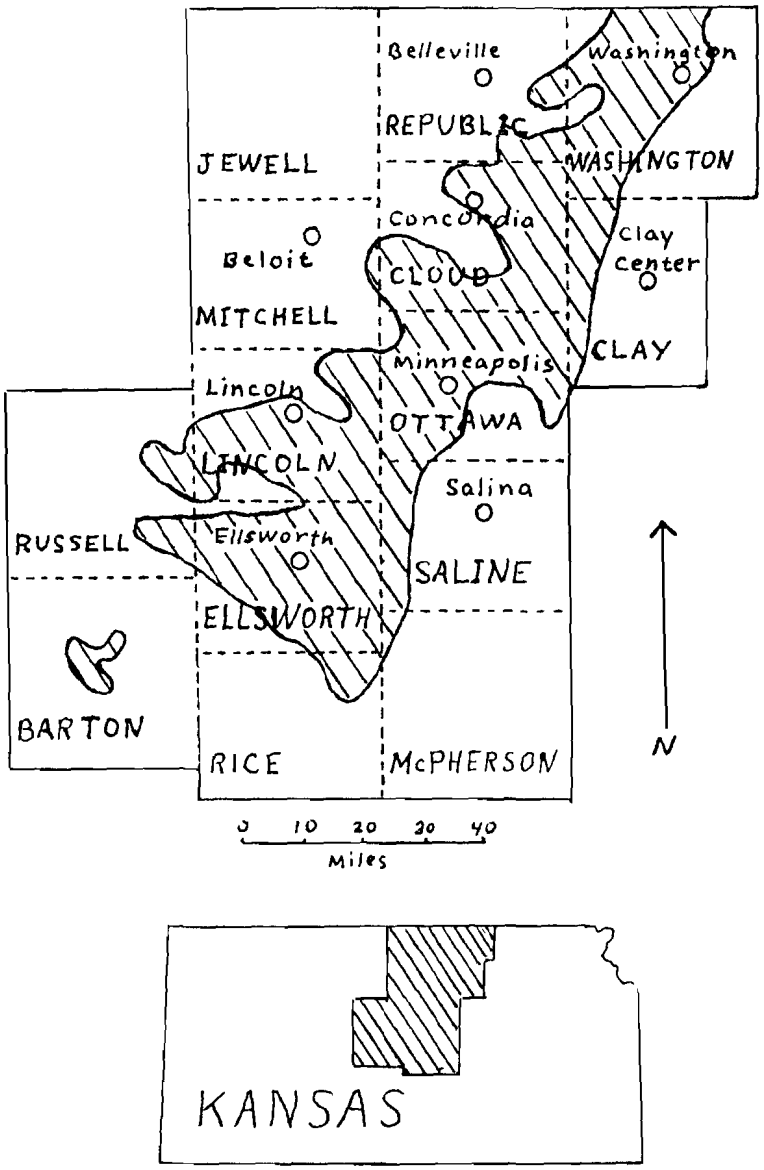

Fig. 14.--Map showing Dakota Formation from which clay and silt samples were taken to determine suitability for Firebrick production. Source: Norman Plummer, M. P. Bauleke, and W. B. Hladik, Dakota Formation Refractory Clay and Silts in Kansas (Lawrence: Kansas State Geological Survey, Bulletin 142, 1960), p. 8, Fig. 2.

Certain Aspects about Individual Plants

The plant operated by the Humboldt Brick and Tile Co. is the oldest in Kansas. The Company was organized by local men and chartered in 1897 as the Humboldt Brick Manufacturing Company with a capital stock of $15,000. The Company went through several name changes, but it remained under the control of the original corporation until April 1, 1976. The Company is now owned by the CMS Corporation, a construction company at Pittsburg, Kansas. The Company continues to operate under the old name.

The Humboldt plant, for years, made building and drain tile, but the bottom dropped out of the building tile market after World War II. In recent years plastic pipe has pretty well replaced drain tile.

The Humboldt facility has a daily capacity of approximately 50,0 bricks, and the new management expects to produce about 10 million brick per year.

The Company does not have a continuous tunnel kiln, but it relie almost exclusively upon downdraft beehive kilns. As previously stated, the plant does have a Hoffman kiln of approximately 300,000 brick capaci which it uses occasionally. The kiln is believed to be about the only one of its kind in the United States that is operable.

Most of the production is devoted to producing antique brick in varying shades of red, but the plant can, with special techniques, produ whites and blacks. The major marketing area for Humboldt brick is withi a radius of 200 to 250 miles in Kansas, Missouri, Oklahoma, and Arkansas

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[11]Earl Strack, private interview, July, 1972, and visit to the plant. John Clark, vice-president of CMS Corporation, private interview June, 1976.

The Excelsior Brick Company of Fredonia is the second oldest brickmaking corporation in Kansas. It was chartered in 1904 with a capital stock of $30,000. The Company soon established a plant about a mile west of Fredonia at the base of a huge shale mound. After over 70 years, the company is still shaving shale from the side of the mound with a planer. It is estimated that the mound still contains enough shale to last the plant another 100 years.

The Excelsior plant is the most antiquated brick plant in Kansas, with a daily production capacity of 42,500 bricks per day. The Company was reputed to have a daily capacity of 55,000 bricks when placed in operation. The plant did make 64,000 bricks in a nine and one-half hour run in 1905.[12] The brick-producing capacity of the machinery, although very old, is considerably greater than the burning capacity of the kilns. After the daily capacity has been run through the pug mill, the machine is shut down and the setters grade, shade, and package the brick in the yard by hand.

Ten downdraft beehive kilns provide the only means of firing brick at Excelsior. Each has a capacity of thirty to forty thousand bricks. There is a delapidated Haight continuous kiln at the plant with a capacity of one million bricks, but it has not been used for a number of years.

Due to the type of shale used at Excelsior, production is limited to different shades of red and antique reds, but different textured bricks are made in modular and king-sizes. The photograph on page 157 shows the various red brick produced at Excelsior.

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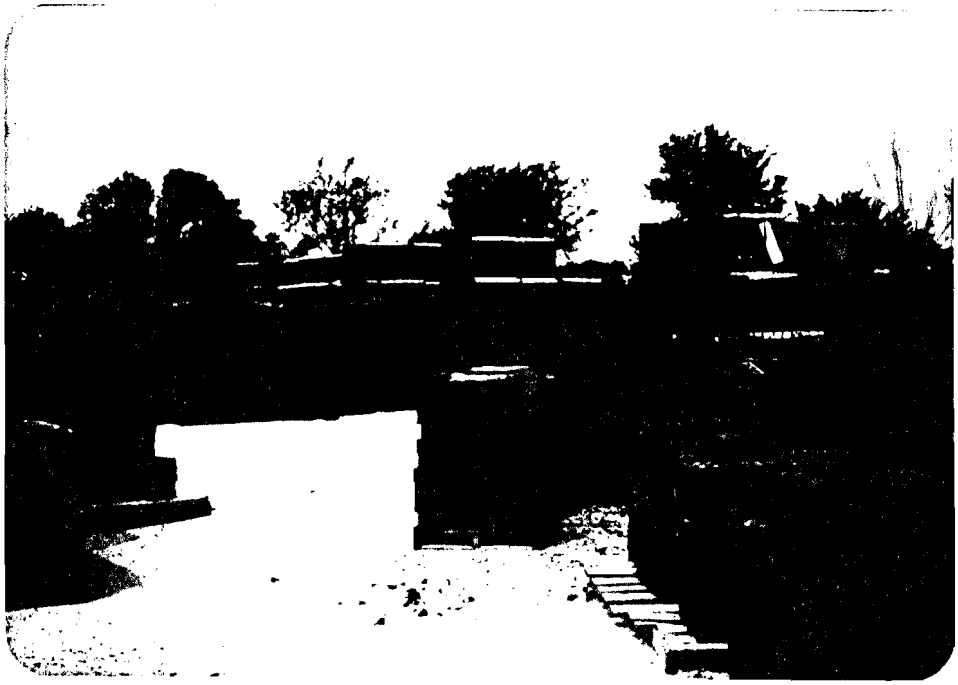
[12]Jack Lance, and Chester Mathey, private interviews, June, 1975. "The Excelsior Brick Plant," Wilson County Citizen, June 23, 1905, p. 3.



Antique brick of different shades of red and varigated coloration are shown at the Excelsior plant awaiting shipment or packaging ready for shipment.

Excelsior brick are marketed by Lusco Brick & Stone Company of Wichita through its Wichita, Kansas City, Kansas, and Oklahoma City offices The Excelsior Company can market its brick within seventy-five miles from Fredonia.

Excelsior employed thirty-four persons in 1975, including four women who worked in the plant.

The Acme Brick Co. plant, approximately one-half mile south of Weir, dates back to the "heyday" of brickmaking in Kansas and was first known as the Weir City Brick Co.[13] As previously stated, the plant was

[13]The author was unable to determine the date the plant was established. It probably was started between 1904 and 1908. Polk's Kansas State Gazetter and Business Directory, 1904, does not list the plant as a producer of brick, but the 1908 edition does.

involved in the big merger of 1926 and was purchased by Acme in 1963.

The Acme plant employs approximately thirty-four men and has a daily capacity of approximately 60,000 bricks. All of the brick are burned in a continuous tunnel kiln, which imposes a limit on the capacity of the plant.

Acme uses soft shales, buff and red, which overlay a fourteen inch strata of coal. Under the coal strata is a clay strata that changes at a greater depth to firebrick clay. The two shales are mixed to produce various shades of buff. The shale pit is over an abandoned coal mine, and water can be drained from the pit into the mine below.

Antique brick of the three popular sizes constitute a major portion of the production at the Weir plant. Manganese is used to produce glazes on brick. The plant is able to get more of a glaze on its brick than any other Acme plant, probably due to the zinc or lead in the shale.[14]

Cloud Ceramics, located approximately three miles southeast of Concordia, was established by Charles Cooke in 1946. The major reasons for locating the plant there were to take advantage of excellent clays from the Dakota formation with which to burn buff brick, nearby railroad facilities, and economical natural gas from a nearby pipeline. The Company is a wholly owned division of the General Finance Corporation.

Cloud Ceramics operates the most modern and efficient brick plant in Kansas, with a daily capacity of 94,000 bricks or 24 million per year. All of the brick are burned in a 403-foot Harrop tunnel kiln.

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[14]Leon Chapman, manufacturing foreman, private interview, and visit to the plant, July, 1972.

Cloud Ceramics produces brick in nine sizes, twenty-four colors, and six textures--a total of 822 different bricks. The shades include burgandy, brown, cameo, coral, charcoal, white, six different grays, and black.

Five different fire clays--light ivory, light buff, rose, burgandy, and terra cotta--are used in combination with termperatures ranging from 2130 to 2195 degrees fahrenheit to produce the various colors

Brick produced at Cloud Ceramics are marketed in a thirty-state area, but the principal market area is the Kansas City Metropolitan Area, Nebraska, and the Southwest. Approximately 80 per cent of the production of the plant is shipped by rail. The Company maintains an inventory of approximately 8 million bricks.[15]

Although Cloud Ceramics is the most modern and efficient plant in Kansas, rather arduous manual labor is still performed by the setters.

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[15]Richard Cooke, private interview during visit to the plant, June 1976.

Kansas Brick and Tile Company, located two and one-half miles south of Hoisington, was started by Ray Smith in 1954. Mr. Smith convinced 280 persons in the locality to invest a half million dollars in his plant. Major reasons for locating the plant at that site, other than to take advantage of the Dakota clays ideally suited for making brick, were: a main gas line, a 66,000 volt power line, and a branch railroad all ran between the proposed plant and the clay pits.

Kansas Brick and Tile opened a highly automated cement and haydite block division in Wichita in 1970. The Company also maintains sales offices at Wichita and at the plant. A fleet of thirteen trucks are used to deliver products from the two plants.

The Hoisington plant makes 1300 different bricks in different combinations of textures, sizes, and colors. Colors range from earth tone to black. Four different Dakota clays found in successive layers of light buff, peach pink, pink, and red are used to produce the great number of shades.

Kansas Brick and Tile produces 22 million bricks a year. Approximately 80 per cent of the market is in Kansas and 20 per cent in the neighboring states. However, the Company sells as far away as Canada.

Brick are burned in both downdraft beehive kilns and a tunnel kiln. The company has found that downdraft kilns are more suitable for burning antique brick than are tunnel kilns.

The Company employs eighty at the Hoisington plant and twenty at the Wichita plant.[16]

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[16]Larry Smith, private interview during visit to the plant, June 1976.

The Acme Plant, located at the east edge of Kanopolis, was established as a branch plant of the Great Bend Brick Company about 1954. The two plants were later purchased by Acme and the Great Bend plant closed.

Front-in loaders are used at the Acme Plant at Kanopolis to move the clay from the storage yard to the area where it is mixed and ground.

The Kanopolis plant has a daily capacity of 80,000 bricks and employs approximately thirty-seven, one of them being a woman kiln attendant. As in the case with the other plants, the production line works one shift for five days a week, but the kilns must be monitored around the clock.

Three Dakota clays, used singularly or in combination, are burned in a tunnel kiln at temperatures from 2045 to 2175 degrees fahrenheit to produce seven different shades of brick. The plant produces brick with four different textures and several sizes, one of them being a ten-inch

brick. The great demand for brick produced at Kanopolis is attributed to the very popular "heritage" or antique brick.[17]

[17] Don White, loading and shading foreman, private interview during visit to the plant, June 1976.

CHAPTER VII

HISTORIC REMNANTS OF BRICKMAKING IN KANSAS

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Brick Plant Sites and "Ghost" Towns

Nearly seventy years have elapsed since a large number of the brick plants in Kansas closed. Time has erased much evidence that the once proud plants existed, but one can still find their remains if the approximate location can be determined. The only evidence that remains of many plants are some brick chards, low areas that were once clay or shale pits, small pieces of rusted machinery, some foundations for buildings and machinery, and evidence of rail spurs. Brick often were used for constructing foundations for buildings and machinery at brick plants. Fire brick and brick of local manufacture were used for constructing drying tunnels and kilns. When the plants were dismantled, it was impractical to tear down much of the masonary construction. Much of it has remained for decades after the machinery, drying cars, tracks, steel buildings, steam shovels, etc., were removed. Many of the sites have become areas for dense growths of trees, brush, and weeds--a wasteland--surrounded by pastures or farmland.

The sites of early brickmaking operations of local nature along the banks of streams have almost all been obliterated.

A number of the sites of brick plants that closed several years after the first decade of the twentieth century are much more visible tha those that closed earlier. Buildings, portions of buildings, and large foundations often stand as monuments to a by-gone era. One such site is that of the American Brick Co., located in a pasture a short distance northeast of Caney. It is pictured on page 165.

Pictured above are some of the brick foundations for clay working machinery at the site of the American Brick Co. plant near Caney.

Pictured above are some of the foundations and bolts awaiting the machinery for a brick plant that "never was," the How-Kim plant near Excelsior between Cherryvale and Mound Valley. The plant was promoted by two women from St. Joseph, Missouri, but never completed.

Some sites of brick plants that closed in the forties, fifties, and sixties are even more intact, with a number of buildings and kilns still standing but in delapidated condition. Examples are the Acme Brick Co. plants abandoned at Great Bend and Buffalo. These two plants, abandoned in the 1960's, have numerous such delapidated kilns and buildings. Not all of the machinery was removed from the Buffalo plant, and as late as 1972 the Acme plant at Weir was still removing replacement parts from the abandoned Buffalo plant.[1]

Much of the plant operated by Midland Brick Co. and Ludowici-Celadon Roofing Tile Co., located east of Peru,near U.S. Highway 166, is still standing. The owner of the property has enclosed the plant site with a fence to keep out the curious and those who would pilfer Midland imprinted brick. She has been cleaning up the site and selling imprinted brick at her residence in the old company office for 50 cents each.

Far less remains of the Verdigris Valley Vitrified plant west of U.S. Highway 75 between Neodesha and Sycamore, which was closed in 1953. About all that remains of the plant are piles of brick, the shale pit, pieces of machinery,foundations, and evidence of tunnels used for drying brick.

Sites of Kansas brick plants being used for many different purpos and much of the evidence that a brick plant once existed has been erased. The site of the Salina Brick and Tile plant, in operation until 1954, is now Indian Rock City Park. The shale pit serves as a small fishing lake that is reputed to be almost forty feet deep. About the only evidence

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[1]Leon Chapman, private interview, July 1972.

that a brick plant existed there are a few chips of brick and a short brick driveway.

The shale pit of the Kansas Buff Brick Co. plant at Buffville, two miles south of Altoona, has been converted to a family and commerci recreation area for boating, swimming, and fishing by the current owner Jerry and Betty Holliday. The Hollidays live in a brick house, which once served as the Company office.

The old shale pit of Kansas Buff Brick Co. is not a placid recreational area.

Portions of the brick structures and kilns of the Kansas Buff Brick Co. dot the landscape of the farm, and considerable amounts of brick are scattered around the feedlots and pastures, but little exists that is discernible of Buffville, the town that brick built. A portion of a brick structure at the plant is pictured in the photograph on page 168.

The remains of a structure, once a part of the Kansas Buff Brick Plant, stand as a reminder of a bygone era.

The site of the Mound Valley Brick Company served as a city dump for Mound Valley in recent years.

The site of the Fredonia Brick Co., at the south edge of Fredonia, is now serving as a place for a confined, disease-free swine raising operation. The drying shed for the plant, with its numerous tunnels, is still pretty much intact. This building is outside the quarantine area.

The abandoned shale pit of the once great Coffeyville Vitrified Brick and Tile plant at Coffeyville is still visible close to the bypass skirting around Downtown Coffeyville. That Company's plant site in Independence has been erased by subsequent construction, but the shale pit is still visible in the Squaw Creek area of the Elk City Reservoir. The remains of the Coffeyville Vitrified plant at Cherryvale, probably

the largest to ever operate in Kansas, are in a brush-overgrown pasture. Remains of the plant dot the landscape. Adjoining the site are the remains of Corbin City--some fifteen to twenty houses in need of repair and which face gravel streets. Much of the glory is gone from the "queen of the Kansas brick towns."

G. J. Ollmann and J. J. Kuntz operated a brick plant for a short time east of Kanopolis. Local stories are told that Ollmann loaded the kiln, started the fires, went to town and got drunk. The partially burned bricks were left in the kiln and can be seen today.[2]

Ollmann and Kuntz then went to New Albany and received a charter in 1916 to operate a plant there. The company probably never got off the ground.[3]

Imprints in History

Probably the most interesting remnants of the "heyday" of brick-making in Kansas are the imprinted paving brick that can be found throughout much of Eastern Kansas, to a lesser extent in the rest of Kansas and neighboring states, and occasionally in scattered locations throughout

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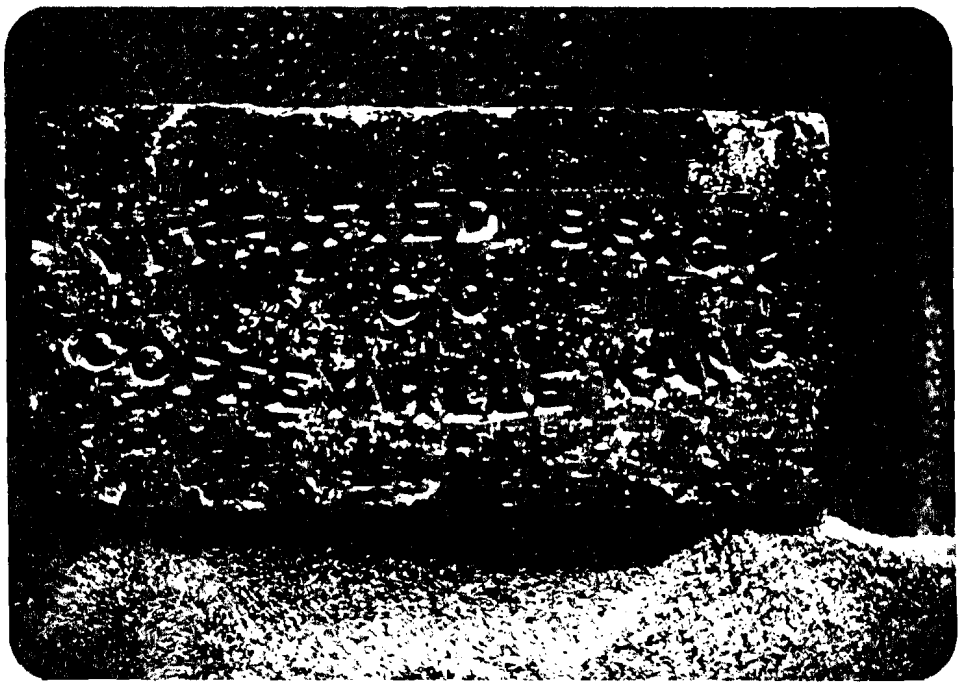
[2]Francis L. Wilson, personal letter, Aug. 26, 1972. The author of this thesis visited the site of the plant on June 3, 1976, in an attempt to determine the authenticity of the story. The walls of the old kiln are somewhat intact, but the roof has caved in. The height of the mound of debris in the kiln indicates there probably were brick in it when the roof caved in.

[3]Kansas Corporation Charter File, 88:292. The author has found no indication that a company titled Ollmann Brick and Mining Company ever produced brick at New Albany.

the United States and in some foreign countries.[4]

Companies imprinted their brick mainly to advertise their products, but the imprinted brick did provide a side benefit of being less slippery than smooth brick when wet.

Many of the imprinted brick still remain in the sidewalks of the towns making brick during the era, and to a lesser extent in other towns of Eastern Kansas. Caney, Cherryvale, and Coffeyville probably have more brick sidewalks than any other towns in the area. Brickmaking was so much a part of Coffeyville's heritage that Coffeyville Vitrified Brick and Tile Company imprinted brick have been imbedded in concrete in crosswalks and other areas in Downtown Coffeyville urban renewal projects as reminders of its brickmaking past.



Coffeyville Vitrified Brick Co. sidewalk pavers like this one have been included in the urban renewal project as a reminder of Coffeyville's brickmaking era.

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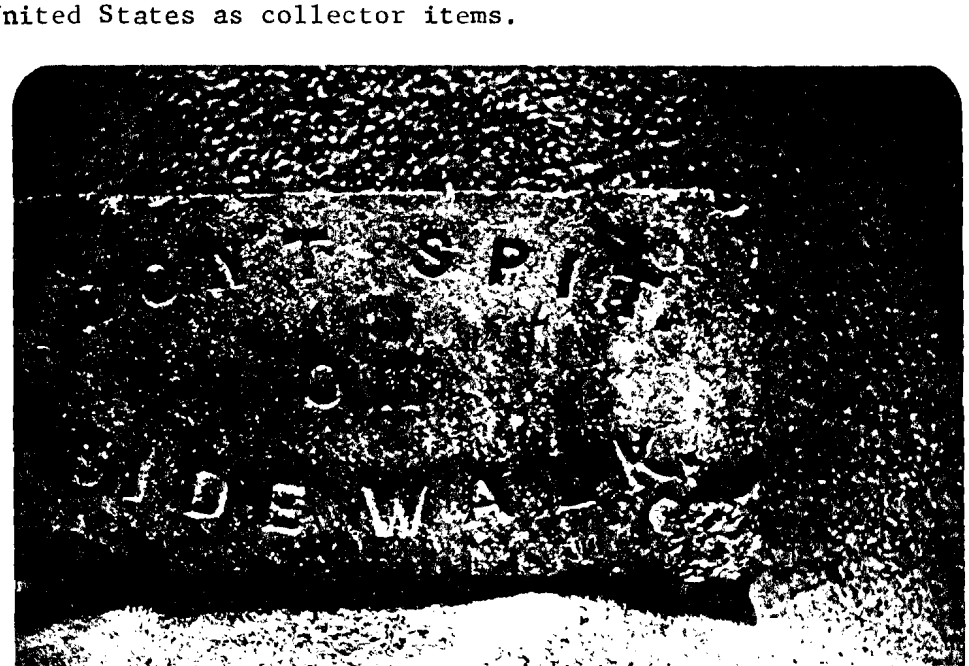
[4]I. L. Pfalser, personal letter, June 11, 1972.

The most famous imprinted brick were those made as an outgrowth of the crusade to stamp out tuberculosis spearheaded by Dr. Samuel J. Crumbine. The slogan "Don't Spit on Sidewalk" became so popular that a Topeka brickmaker began to imprint the slogan on sidewalk brick.[5] Such brick are said to command prices of up to $15 in some sections of the United States as collector items.



An interesting story in the history of Kansas lies behind brick like the one above.

A majority of the imprinted brick bore only the company's name, the location of the plant, and the fact that it was vitrified brick. Th information was usually printed in depressed letters. There were excep to this general rule. The Coffeyville Vitrified Brick and Tile Company Verdigris Valley Vitrified Brick and Tile Company, Buffalo Brick Co., a the Capital City Brick Co., which all used several ways of marking thei

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[5]Samuel J. Crumbine, Frontier Doctor (Philadelphia: Dorrance & Company, Inc., 1948), p. 147. Other towns claim to have produced the b but the author has found no evidence that they did.

brick. On some of their brick they used raised letters or a combination of depressed letters and raised letters.

Apparently the desire to advertise in oversized letters outweighed the concern for proper abbreviation of Coffeyville on brick like the one above.

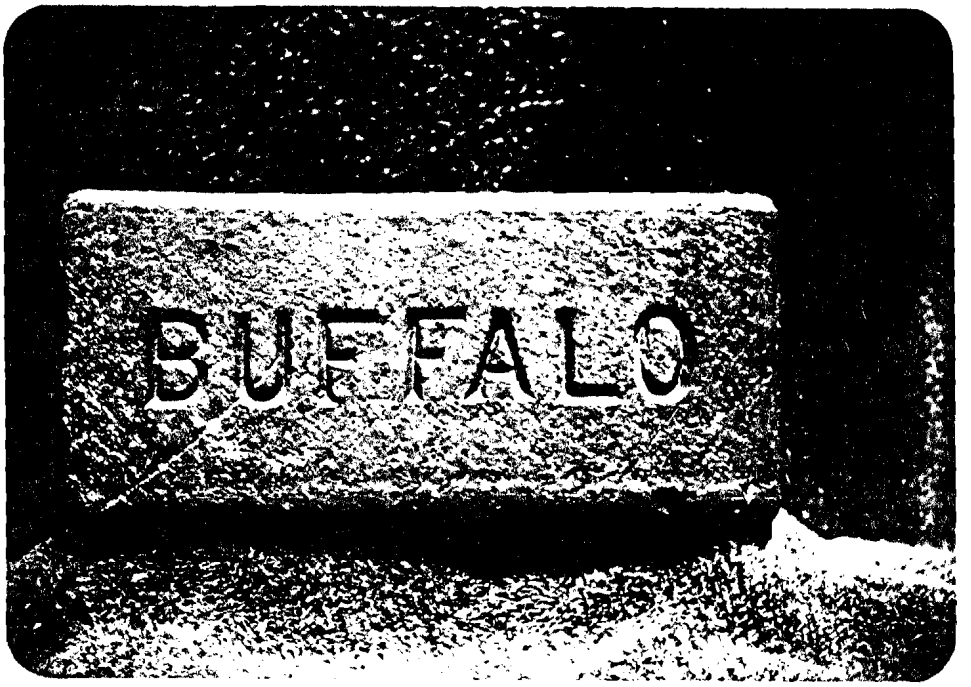
Three other photographed examples of such imprinted brick are on pages 173 and 174.

One of the most distinctive imprinted brick using only depressed lettering was that produced by the Buffalo Brick Co. with only the word "Buffalo" in large letters. The Company could use this imprint without contributing to the confusion as to which company the brick was advertising, because it was the only company at Buffalo. A photograph of a Buffalo brick is shown on page 174.

The distinctive triple V's on the brick above stand for Verdigris Valley Vitrified, Neodesha. Note the combination of raised and depressed letters.

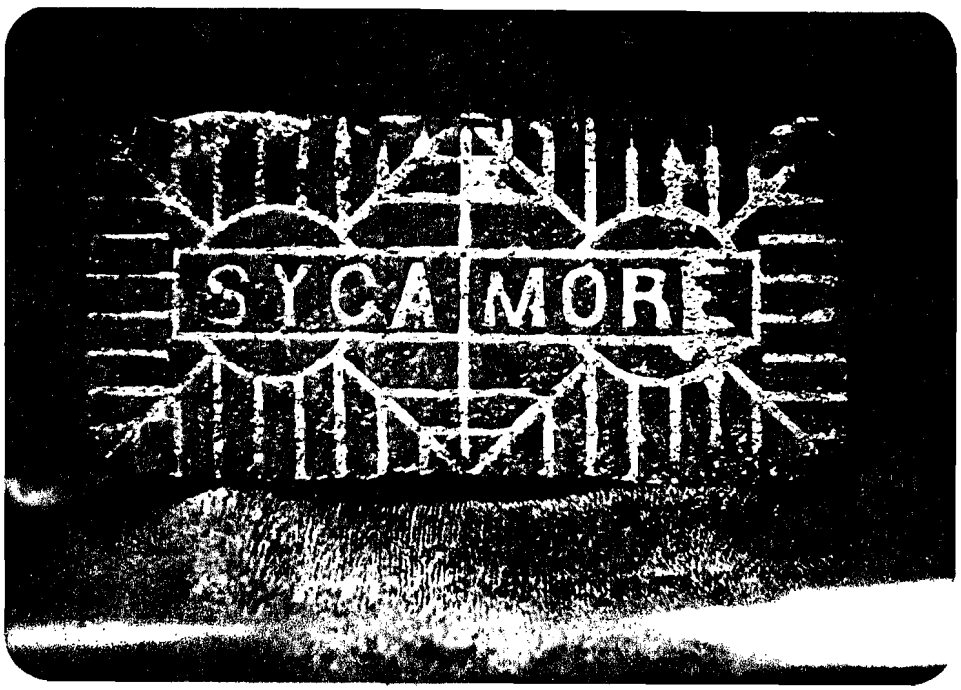
Note the knobs put on some Buffalo street pavers to improve traction.

This street paver was made in Topeka. Note the bars for better traction if the pavers were laid face up.



Note the deep color and hard appearance of the street or sidewalk paver shown above.

An elaborate design was used at Sycamore Vitrified Brick Co. to imprint its brick with just the name of the town; however, there could be no mistake made concerning what company it was advertising. It was the only company at that location.

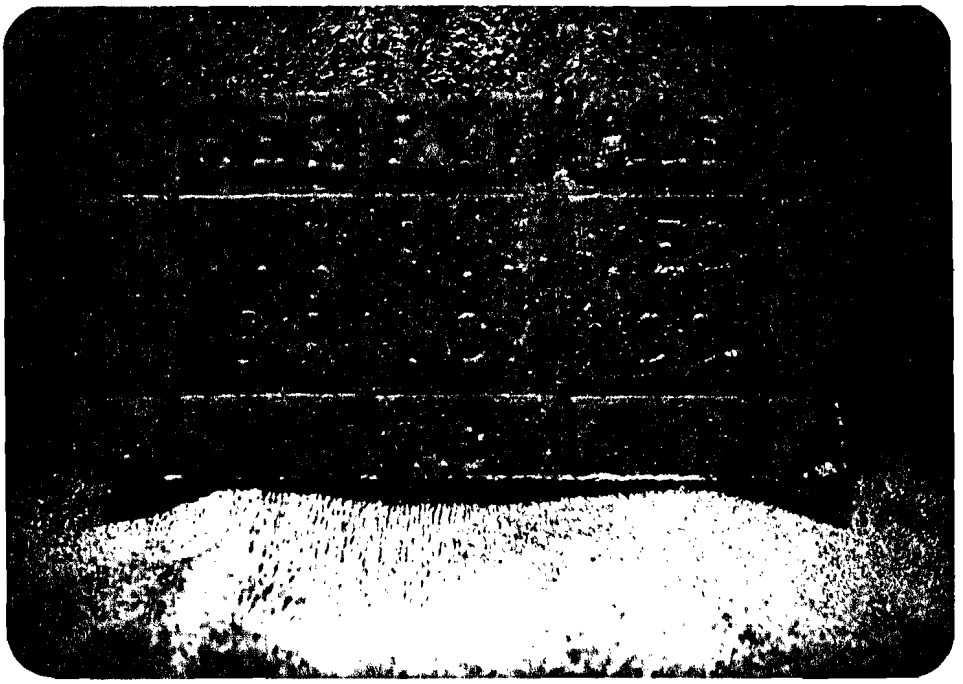


The above brick probably is rare. The Sycamore plant was sold to Robert Nesch soon after or before it went into operation. He then began putting the Pittsburg label on the brick.

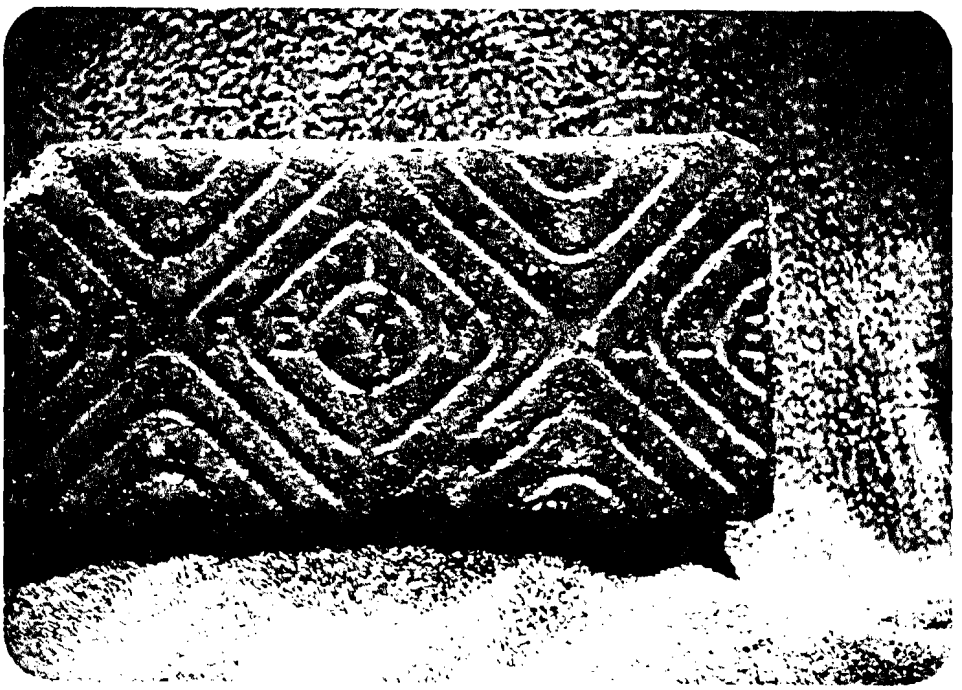
Later, Robert Nesch, who began putting the Pittsburg imprint on the brick produced at Sycamore to advertise the parent company located at Pittsburg

Other brick companies incorporated elaborate designs with the company name to imprint brick. The Cherryvale Vitrified Brick Company used a series of intersecting lines, creating a square patterned effect, pictured on page 176.

One of the Coffeyville brick companies used a pattern of concentric squares with rounded corners with "Coffeyville" imposed across the design as shown on page 176.

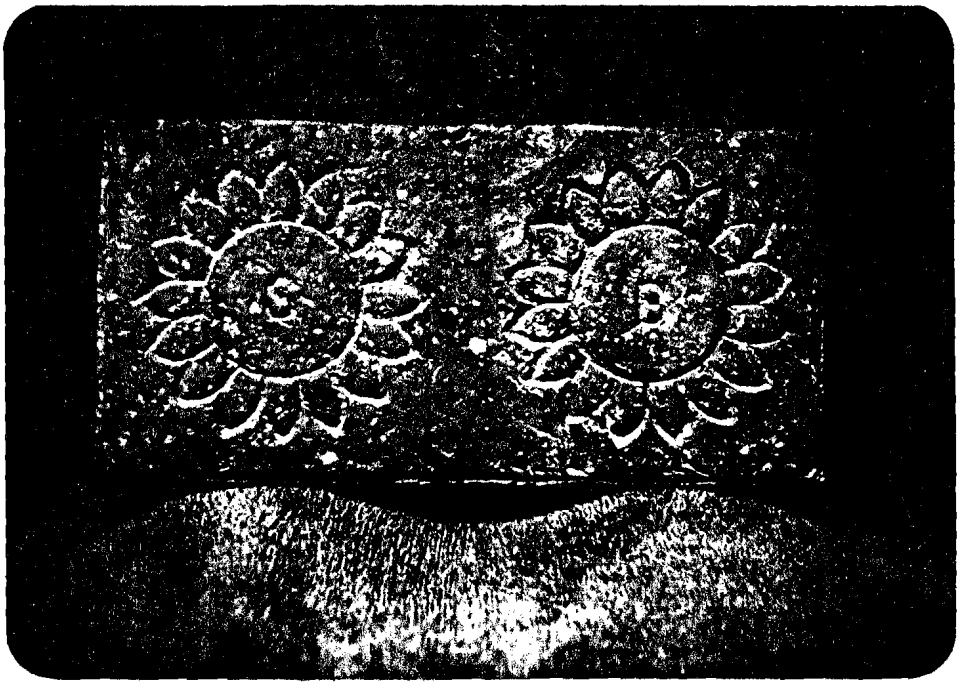


Note the waffled pattern on the above brick, which should give better traction for pedestrians.



The above brick may not have been made in Coffeyville. If it was made by Coffeyville Vitrified Brick and Tile, it could have been made in Cherryvale. Brick made in Cherryvale bore the Coffeyville stamp.

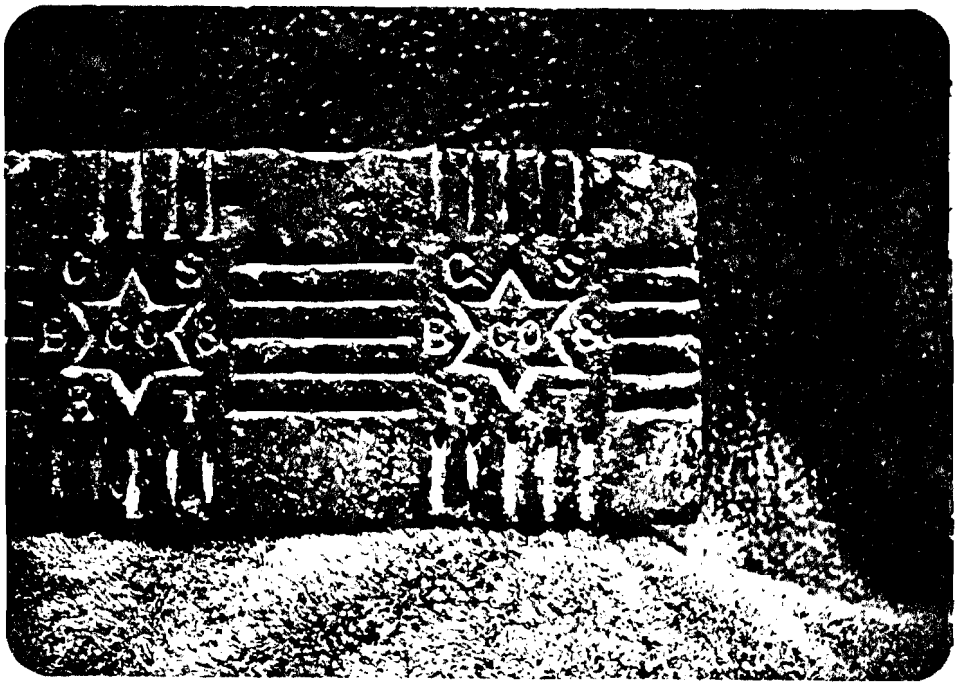
The Coffeyville Shale Brick Company used an elaborate scroll design to embellish some of its brick. Some of the Company's designs were quite attractive, but were difficult to decipher as to what company had made them. One such design was imprinted with double sunflowers, an "S" being in the center of the one on the left and a "B" in the one to the right to stand for "Shale Brick." Another design was even more difficult to figure out for those unaware.



The Coffeyville Shale Brick Co.'s sunflower brick made an attractive sidewalk.

Another photograph on page 178 shows the elaborate Coffeyville Shale brick imprints.

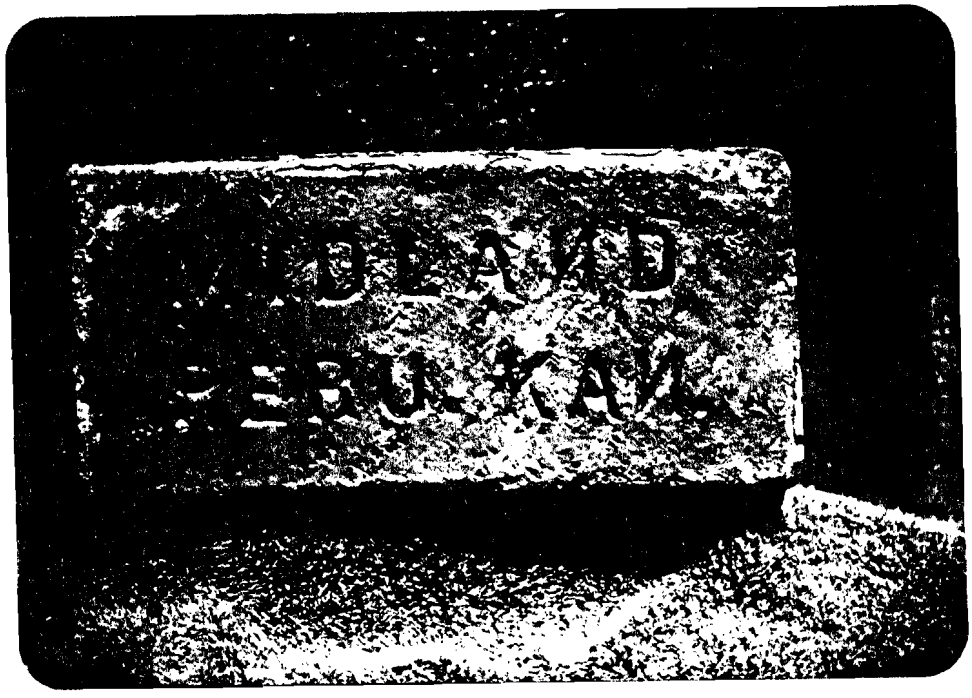
The imprint that stands out as being the most appropriate and unique was that used by the financially-troubled Yoke Vitrified Brick Co. of Coffeyville. This brick displays an oxen yoke with other information concerning the Company. The photograph on page 178 shows a "Yoke" brick.



The letters arranged around the star stand for Coffeyville Shale Brick and Roofing Tile. Not the "Co" in the center of the star.

One needs not guess which company made this brick.

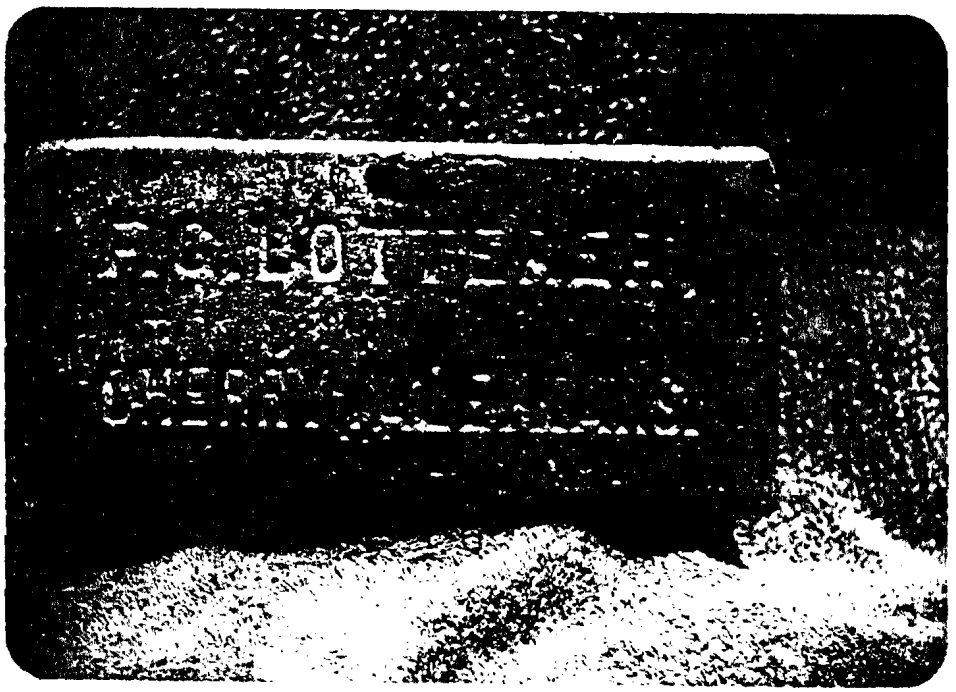
One wonders if the same confused person set the imprint dies at different brick plants in Southeastern Kansas. The Caney Brick Co., the Midland Brick Company of Peru, and others had brick imprinted with a backward "N."



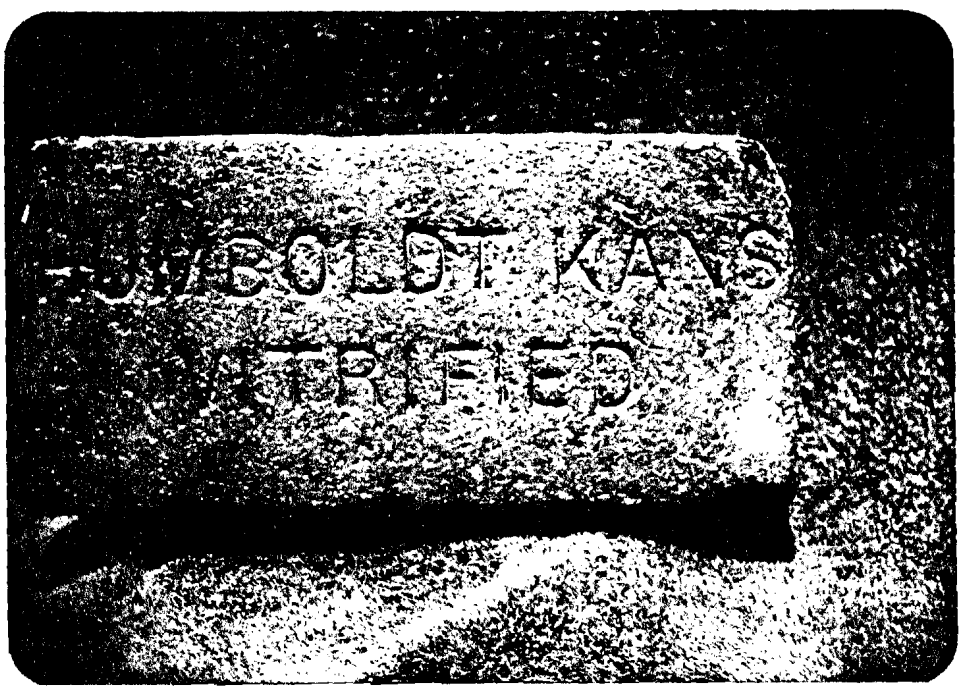
Note the backward "N" on the brick made by Midland at Peru.

An unusual imprint was used by the Columbus Vitrified Brick Co. advertising not only the town but the state of Kansas. It shows a sunflower on a reclining stem with "Columbus" above the stem and "Kansas" below.

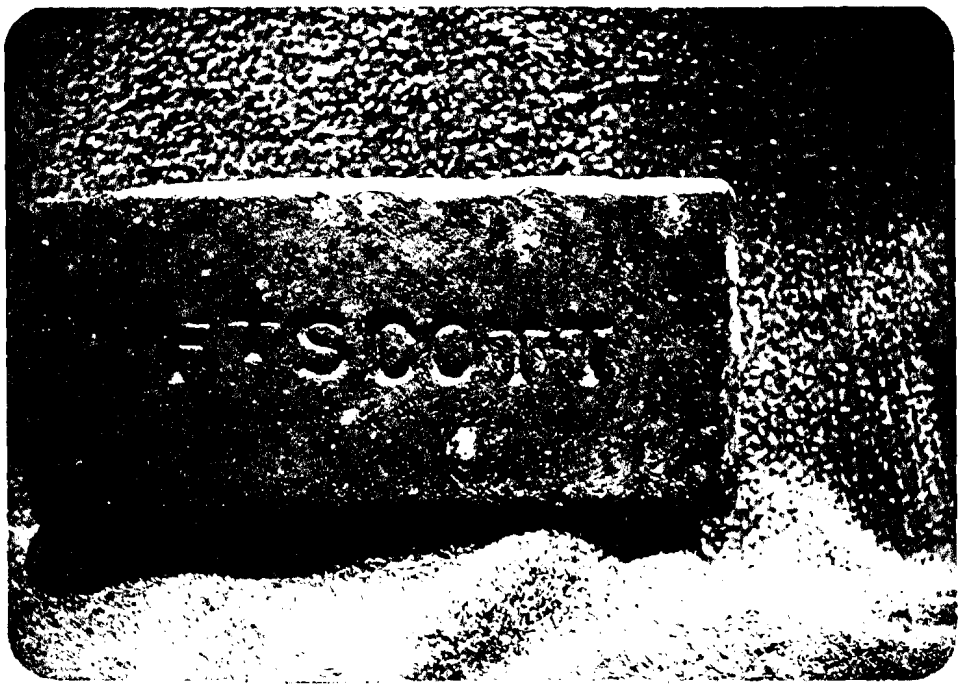
A few brickmen have been immortalized by imprints on brick produced in Kansas. Robert Nesch, the Pittsburg brick baron had his surname included on some paving blocks produced at that location. F. G. Lotterer, pioneer of the gas-fired brickmaking at Cherryvale, left his name impressed upon brick produced by his firm. This brick is shown on page 180.



Sidewalk brick produced by the F. G. Lotterer Brick Co. of Cherryvale.

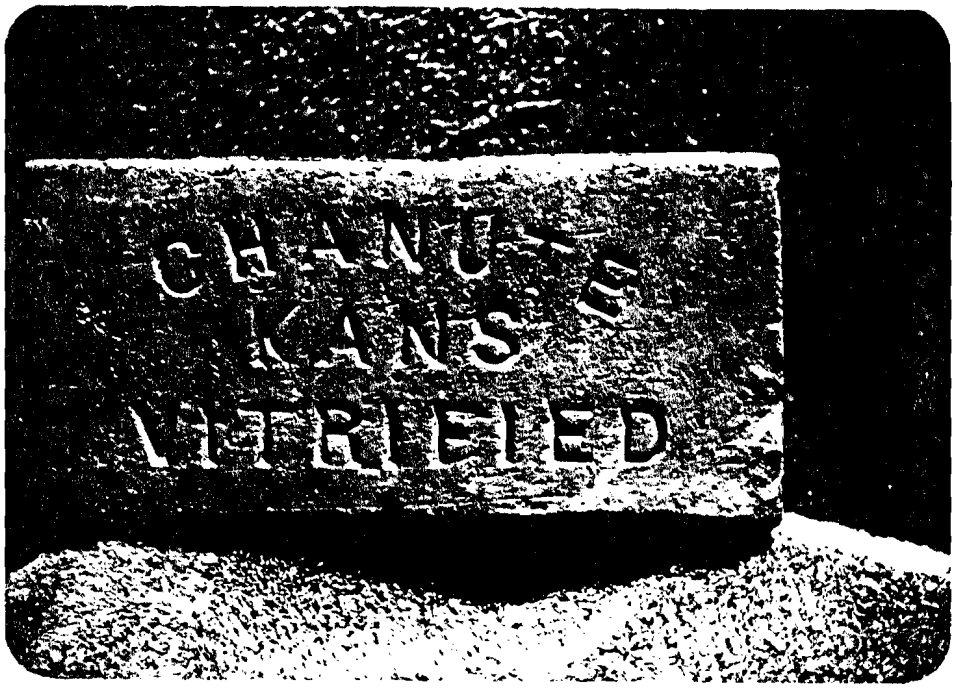


The brick pictured above was produced by the oldest company now operating in Kansas, the Humboldt Brick and Tile Company.

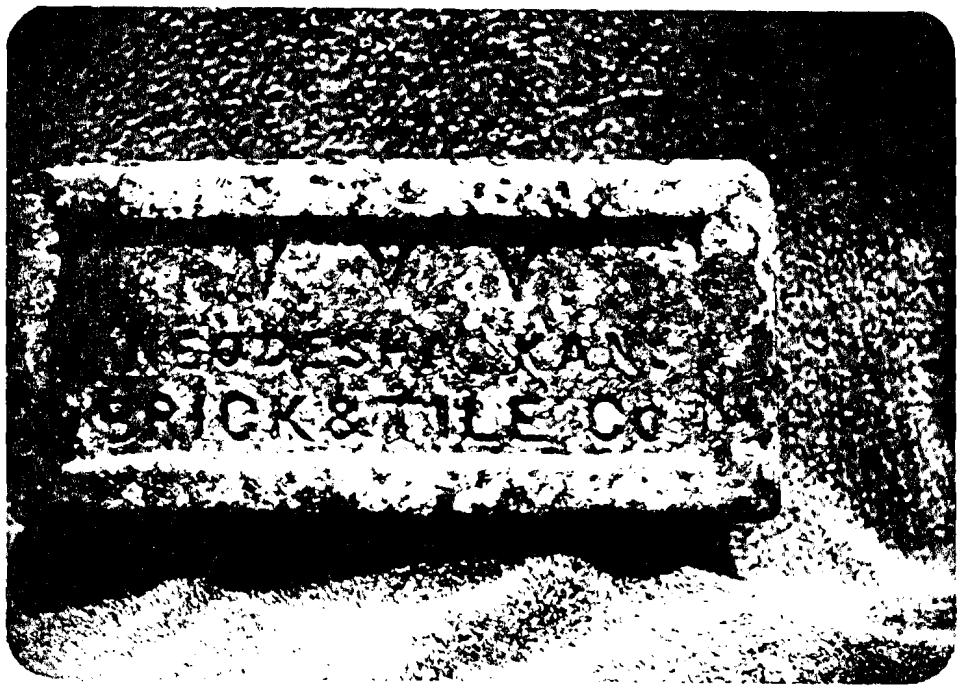


The Ft. Scott brick shown above probably was fired with coal at the Fort Scott Paving Brick Company.

The Union Brick Co. was one of the most successful companies that operated in the Iola area.

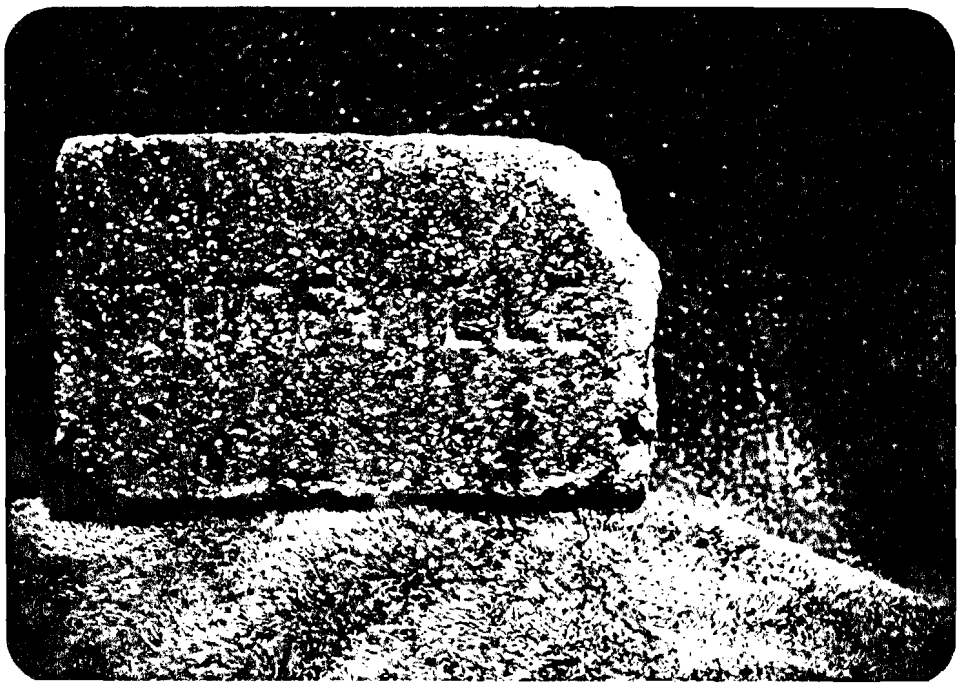


This brick was made by the Chanute Vitrified Brick and Tile Manufacturing Company. The brick may be comparatively rare, because the plant only operated about two years before being purchased by Coffeyville Vitrified.



The Verdigris Valley Vitrified brick shown above can be classified as a building brick. Apparently the recessed face was to provide a better mortar bond.

Many brick produced by Caney Vitrified Brick Co. can be seen in the sidewalks of Caney today.



Note the buff color in the brick that gained acclaim for the building brick produced at the Kansas Buff Brick Manufacturing Company at Buffville. For some reason this imprinted brick is rare.

The "collecting mania" that has struck Americans in recent years has not bypassed brick. There are a number of persons throughout this section of the United States who collect brick. Some of the brick collectors write stories for a magazine, Barbs and Snags, published in the Wichita area by a group of barbwire collectors.

Don Wigington, a brick collector at Quinter, Kansas, has taken great pains to draw the likeness of numerous brick that he has or has seen. He sells mimeographed copies of his drawings for a nominal fee.

With all of the brick collectors promoting interest in brick and the number of families in Eastern Kansas who treasure their brick sidewalks, the imprint that brick have made upon the History of Kansas should not soon be forgotten.

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Chapman, Leon. private interview, July, 1972. Manufacturing Foreman Acme Brick Co., Weir.

Clark, John. private interview, June, 1976. Vice-President of CMS Corporation, Pittsburg, Kansas, owners of Humboldt Brick and Til Co.

Coleman, C. V. private interview, June, 1975. Neodesha, Kansas.

Cooke, Richard. private interview, June, 1976. Manager of Cloud Cer Concordia, Kansas.

Dill, Harry Daniel. private interview, July, 1972. Chanute, Kansas.

Ellison, Elwyn, personal letter, June 4, 1976. Cherryvale, Kansas.

Hawkins, W. E. personal letter, May 27, 1976. Vice-President for Man facturing, General Shale Products Corporation, Johnson City, Ten

Lance, Jack. private interview, June, 1975. Kiln Foreman, Excelsior Brick Co., Fredonia, Kansas.

Kingsbury, Oliver. private interview, June, 1975. Fredonia, Kansas.

Matney, Chester. private interview, June, 1975. Mill Foreman, Excel Brick Co., Fredonia, Kansas.

Pfalser, I. L. personal letter, June 11, 1972. Caney, Kansas.

Smith, Larry. private interview, June, 1976. Manager of Kansas Brick and Tile Co., Hoisington, Kansas.

Strack, Earl. private interview, July, 1972. Superintendent, Humboldt Brick and Tile Co., Humboldt, Kansas.

White, Don. private interview, June, 1976. Loading and Shading Foreman, Acme Brick Co., Kanopolis, Kansas.

Wilson, Francis L. personal letter, Aug. 26, 1972. President of Ellsworth County Historical Society, Ellsworth, Kansas.

Wise, Harry. private interview, July, 1972. Neodesha, Kansas.

APPENDIX A

APPENDIX A

Kansas Corporations Chartered and Given Permission To Manufacture Bricks

The following Kansas chartered corporations included "brick" in their titles or expressed interest in manufacturing bricks. It is believed that a number of them never produced bricks. The corporations are listed in the following manner: (1) the corporation and location if not included in the title; (2) year incorporated; (3) capital stock; (4) Kansas Corporation Charter File numbers by which information may be found about the chartering in files at the Kansas State Historical Library at Topeka. The numerals preceding the colon in the Charter Files indicate the volume number. The numerals after the colon indicate the page number. Amendments to original charters can be found in numbered volumes preceded by an "A." For example, chartering information on Atchison Brick, Tile and Coal Company can be found in Charter File volume 77 on page 246. An amendment to the original charter can be found in the amendment volume designated A 15 and on page 450.

Agricola Valley Gas, Oil and Mining Company (Agricola)--1904--$500,000--65:243.

National Pressed Brick Company (Arkansas City)--1890--$100,000--40:153.

Calorific Brick and Tile Company of Arlington--1887--$6,000--28:408.

Atchison Brick and Tile Company--1884-$12,000--29:115.

Atchison Brick, Tile and Coal Company--1909--$200,000--77:246; A 15:450.

Atchison Paving Brick Company--1895--$11,000--41:272; 68:179.

Citizens Coal Mining Company (Atchison)--1906--$10,000--70:202.

Atchison and Leavenworth Stone and Brick Company (Atchison)--1893--$50,000--39:310; A 1:413; A 1:414.

Drury Brick and Tile Co. (Atchison)--1888--$50,000--31:226.

Halsey Paving Brick Company (Atchison)--1891--$10,000--35:518.

Missouri Valley Brick Company (Atchison)--1895--$20,000--41:220.

Missouri Valley Paving Brick Company (Atchison)--1892--$50,000--46:208.

Phoenix Vitrified Brick Co. (Atchison)--1892--$50,000--39:110.

National Terra Cotta and Brick Company (Bethel)--1889--$250,000--34:294.

Kansas Buff Brick and Manufacturing Company (Buffville or Cherryvale)--1903--$150,000--63:130.

Burlingame Pottery--1875--$3,000--7:66.

American Vitrified Brick Company (Caney)--1908--$100,000--75:194; A 13:93; Dissolved 1914.

Caney Brick Company--1902--$40,000--60:339.

Home Brick Company (Caney)--1904--$42,000--66:187.

Kansas Brick and Gas Company (Caney)--1909--$350,000--77:194.

Lumbermen's Cement and Brick Company (Carlyle)--1911--$1,250,000--75B:352; A 6:541; A 7:208.

Chanute Brick and Tile Company--1907--$125,000--71:35.

Chanute Vitrified Brick and Clay Manufacturing Company--1900--$30,000--59:45. (Sold to Coffeyville Vitrified in 1902).

Kansas Vitrified Brick Company (Chanute)--1900--$50,000--59:178; A 15:271.

Cherryvale Brick Company--1901--$70,000--60:257; A 7:397; A 7:409; A 13:474; Dissolved 1921.

Cherryvale Pressed Brick Company--1902--$30,000--61:110.

W.H. Crowl Brick and Tile Company (Cherryvale)--1906--Unknown--69:98.

Federal Gas and Oil Company (Cherryvale)--1902--$100,000--61:44.

Southwestern Brick Company (Cherryvale)--1902--$25,000--61:400; A 2:164.

Union Brick Company (Cherryvale)--1910--$200,000--78:24; A 6:222.

Clay Center Brick Company--1903--$20,000--65:64; A 1:359.

Clay Center Pressed Brick Company--1901--$10,000--60:241; A 3:52.

Boswell Vitrified Brick Company (Coffeyville)--1901--$50,000--60:95.

Coffeyville Pottery and Clay Manufacturing Company--1899--$6,000--58:178.

Coffeyville Pressed and Paving Brick Company--1902--$25,000--61:315.

Coffeyville Shale Brick and Roofing Tile Company--1902--$25,000--61:398; A 3:463; A 9:277; 437:132; Dissolved in 1927 and sold to United Clay Products.

Coffeyville Vitrified Brick and Tile Company--1894--$20,000--50:250; 57:286; A 2:500; A 3:12; A 3:89; A 3:153; A 14B:266; Dissolved 1930; (Sold to United Clay Products).

McCallester Vitrified Brick and Tile Company (Coffeyville)--1900--$24,000--59:61.

Southwestern Pressed Brick and Terra Cotta Company (Coffeyville)--1888--$50,000--33:638.

Standard Vitrified Brick Company (Coffeyville)--1904--$70,000--66:343; A 5:85; A 5:583; A 13:310; Dissolved 1919.

United Clay Products (Coffeyville)--1926--$5,000--113 A:77; (To do business in Kansas as a foreign corporation).

Yoke Vitrified Brick Company (Coffeyville)--1906--$125,000--70:3; (Sold to Denison Clay Company, 1912).

Columbus Tile and Brick Company--1910--$20,000--79:26.

Columbus Vitrified Brick and Tile Company--1903--$30,000--63:117.

Concord Brick Company (Concord Township, Ottawa County)--1871--$2,000--3:285.

Concordia Hydraulic Stone and Brick Company--1904--$7,000--66:165.

Dexter Brick and Tile Company--1908--$15,000--75 A:122.

Dexter Vitrified Brick, Gas and Mining Company--1905--$25,000--67:254; 8:116; Dissolved 1912.

Clay Manufacturing Company (Edwardsville)--1908--$30,000--75 A:123; A 8:536; Dissolved 1913.

Elk City Brick Company--1905--$30,000--67:218.

Elk City Brick and Tile Company--1930--$100,000--127:5.

Emporia Brick and Tile Company (Saffordville)--1910--$50,000--78:243.

Durham Brick and Tile Company (Fredonia)--1905--$30,000--67:69.

Excelsior Brick Company (Fredonia)--1904--$30,000--66:265; A 30:502; A 37:245.

Florence Brick and Paint Manufacturing Company--1889--$10,000--38:58.

Fort Scott Brick and Tile Company--1910--$200,000--79:27; A 9:392; A 22:225; (Changed to Western Shale Products).

Fort Scott Brick Company--1902--$50,000--61:399; A 4:116.

Fort Scott Paving Brick Company--1906--$150,000--70:25.

Fredonia Brick Company--1902--$50,000--61:311.

Great Bend Press Brick Company--1893--$10,000--48:238.

Greenleaf Brick Company--1888--$5,000--31:165.

Girard Brick and Tile Company--1908--$10,000--75 A:310.

Hiawatha Composite Pressed Brick and Plaster Company--1906--$5,500--69:185.

Cleveland Vitrified Brick Company (Humboldt)--1906--$30,000--70:6.

Humboldt Brick Manufacturing Company (Now Humboldt Brick and Tile Co.)--1897--$15,000--56:126; A 2:259; A 3:303; A 8:538; AM:279; A 17:223; A 36: 107, 130; A 36:138.

Hugoton Brick and Terra Cotta Company--1928--$150,000--122:95.

Hutchinson Brick Company--1887--$4,000--26:36.

Independence Brick Company--1909--$125,000--77:272.

Kansas Paving Brick Company (Independence)--1909--$150,000--77:72.

Morgan Oil and Gas Company (Independence)--1903--$25,000--63:362.

Home Brick Company (Iola)--1902--$60,000--61:235.

Iola Brick Company--1912--$20,000--80:394; A 8:411.

Kansas City Brick Company (Iola)--1916--$50,000--88:220; A 22:15; A 23:332; A 12:68; A 14B:197; Dissolved 1928.

Kaw Valley Brick Company (Iola)--1917--$25,000--93:219; A 23:40; A 31:285; Dissolved 1923.

J.B. Kirk Clay Products Company (Iola)--1928--$50,000--123:210.

Junction City Press Brick Company--1888--$60,000--32:279.

Buckeye Brick and Pottery Company (Kanopolis)--1889--$50,000--31:392; A 1:9.

Babcock-Norris Brick Company (Kansas City)--1891--$200,000--38:270.

Gaffney Vitrified Brick Company (Kansas City)--1893--$80,000--39:403.

Muncie Brick Company (Kansas City)--1891--$200,000--35:533.

Rock Hill Stone Quarry (Kansas City)--1907--$20,000--71:315.

Trojan Pressed Brick Company (Kansas City)--1892--$50,000--46:97.

Valley View Brick and Tile Company (Kansas City)--1913--$60,000--81:105; A 8:607.

United Brick and Tile Company (Kansas City)--1928--$300,000--115 A:60; Authority to do business in Kansas as an outside corporation.

Whittaker Brick Company (Kansas City)--1888--$50,000--31:175.

LaHarpe Brick Company--1901--$25,000--60:177.

LaHarpe Shale Brick Company--1901--$25,000--60:295.

Larned Pottery, Brick and Tile Company--1882--$25,000--13:475.

Larned Pottery and Fire Brick Company--1888--$10,000--31:480.

Larned Pottery and Pressed Brick Company--1888--$20,000--31:475.

Larned Press Brick Company--1886--$6,000--23:49.

Pawnee Brick and Tile Manufacturing Company (Larned)--1917--$5,000--22: 452.

Lawrence Vitrified Brick and Tile Company--1899--$32,000--58:104.

Carr Coal Mining Company (Leavenworth)--1900--$50,000--59:118; A 53:101; Dissolved 1924.

Leavenworth Brick Company--1908--$25,000--75A:260.

Leavenworth Terra Cotta and Tile Company--1890--$100,000--35:152.

Fenn Brick Company (Leavenworth)--1889--$40,000--37:20.

Interstate Brick Company (Leavenworth)--1890--$40,000--35:343.

Midland Brick and Tile Company (Leavenworth)--1891--$50,000--46:49.

Leavenworth Vitrified Brick Company--1909--$50,000--77:33; A 13:86; Dissolved 1914.

Liberty Vitrified Brick and Gas Company--1906--$150,000--69:275.

Lyons Press Stone Company--1910--$5,000--78:68.

Millers Pottery and Firebrick Company (Lyons)--1888--$20,000--31:477.

Moline Brick Company--1906--$25,000--70:34; 2 AM:206; A 15:576. Dissolved 1916.

Moline Lime and Cement Company--1903--$20,000--65:10.

Mound City Brick Company--1906--$100,000--70:23.

Mound Valley Vitrified Brick Company--1904--$30,000--65:242.

North Mound Valley Brick Company (Mound Valley)--1910--$6,000--78:258; A 9:518.

Mound Valley Natural Gas and Mineral Company--1900--$35,000--59:72.

Nelson Vitrified Brick Company (Mound Valley)--1905--$50,000--68:193; A 4:437. (Sold to Parsons Vitrified Brick Co. in 1909).

Verdigris Valley Vitrified Brick and Tile Company (Neodesha)--1900--$20,000--59:67; A 4:552.

Alliance-New Albany Brick Company--1912--$50,000--80:86.

Empire Brick and Gas Company (New Albany)--1908--$50,000--64:629.

New Albany Brick Company--1909--$50,000--77:147; 2 AM:94; A 8:623; Dissolved 1913.

Ollmann Brick and Mining Company (New Albany)--1916--$50,000--88:292; A 22:52.

Niotaze Vitrified Brick and Gas Company--1905--$200,000--67:231; A 4:179; A 4:180.

Youngblood Mining and Manufacturing Company (Oswego)--1906--$50,000--70:151.

Franklin Vitrified Brick and Terra Cotta Company (Ottawa)--1890--$100,000--42:251.

Ottawa Brick and Tile Company--1903--$25,000--63:268; A 3:499.

Paola Brick and Tile Company--1904--$30,000--64:51; 96:127; 129:28; A 13:338; A 40:364; Dissolved 1930.

Parsons Pressed Brick Company--1903--$30,000--65:24; A 3:586; (Changed to Peru Brick Company, 1905).

Peru Brick Company--A 3:586.

Midland Brick Company (Peru)--1909--Unknown--77:9; 2AM:215.

Phillipsburg Brick Company--1906--$20,000--69:176.

Phillipsburg Fire Brick, Tile and Pottery Company--1894--$25,000--50:121.

Metropolis Paving Brick Company (Pittsburg)--1917--$200,000--93:92.

Pittsburg Brick and Pipe Company--1900--$25,000--59:139; A 2:450; A 3: 156; A 3:129. (Changed to Pittsburg Sewer Pipe and Conduit Company, later sold to Robert Nesch, later sold to W.S. Dickey).

Pittsburg Shale Brick Company--1906--$100,000--70:98.

Quinter Brick and Tile Company--1888--$3,000--32:116.

Richfield Brick Company--1887--$2,000--29:320.

Richmond Brick and Ochre Company--1873--$50,000--5:16.

Richmond and Princeton Gas Company (Richmond)--1905--$10,000--68:280; A 5:211; A 33:14-15; A 37:152; Dissolved 1927.

St. Francis Brick Manufacturing Company--1907--$1,500--71:223; A 9:15; Dissolved 1913.

Johnson Brick, Tile and Cement Company (St. Marys)--1904--$40,000--66:222.

Salina Brick and Tile Company--1919--$100,000--98:192; A 25:572.

Salina Hydraulic Stone and Brick Company--1903--$10,000--65:42; 1 AM:8; A 13:100; Dissolved 1915.

Salina Vitrified Brick Company--1899--$20,000--58:187; A 5:67.

Seneca Brick and Tile Company--1914--$15,000--82:337; A 42:46.

Seneca Shale Brick Company--1906--$10,000--69:158.

Sycamore Vitrified Brick Company--1900--$40,000--59:277; (Later sold to Robert Nesch).

Syracuse Pressed Brick Company--1906--$10,000--69:250.

Capital City Vitrified Brick and Paving Company (Topeka)--1889--$30,000--38:143; A 31:87.

Kaw Valley Brick and Tile Manufacturing Company (Topeka)--1906--$25,000--70:101.

Topeka Brick Company--1887--$25,000--30:479; 61:347; 93:283; A 23:343.

Topeka Pottery and Fire Brick Company--1874--$25,000--6:135.

Topeka Press Brick Company--1888--$25,000--32:99.

Topeka Vitrified Brick Company--1889--$50,000--38:59.

Topeka Vitrified Brick and Tile Company--1907--$15,000--71:301.

Tyro Shale Brick Company--1905--$50,000--68:258.

Tyro Vitrified Brick Company--1907--$60,000--64:515.

Wellsville Gas, Oil and Mineral Company--1904--$20,000--64:95.

Forest City Dry Pressed Brick Company (Wichita)--1887--$100,000--28:236.

Lusco Brick and Stone Company (Wichita)--1927--$250,000--121:38.

Noll Brick and Tile Company (Wichita)--1922--$75,000--110:100.

Pittsburg Brick and Tile Company--1937--$25,000--134A:328.

Valley Pressed Brick and Tile Company (Wichita)--1887--$36,000--26:441.

Wichita Terra Cotta Lumber Company--1887--$20,000--27:217.

Wichita Brick Company--1885--$6,000--21:16.

Wichita Brick and Tile Company--1922--$100,000--108:230.

Wichita Cement, Brick and Supply Company--1910--$25,000--78:266; A 8:335; Dissolved 1912.

Wichita and Colwich Calorific Brick Company--1887--$30,000--27:36.

Wichita Hydraulic Stone and Brick Company--1902--$10,000--63:43.

Wichita Pressed Brick Company--1887--$50,000--27:247.

Wichita Silex Brick Company--1903--$45,000--65:90.

Wichita Vitrified Brick Company--1890--$20,000--38:230.

Winfield Construction Company--1907--$2,000--73:34.

U.S. Portland Cement Company of Yocemento (Ellis County)--1907--$900,000--71:231.

APPENDIX B

APPENDIX B

Brickmaking Individuals, Partners, and Companies Through the Years

The author has found evidence that the individuals, partners, and companies were engaged in brickmaking in Kansas during at least a portion of the decade under which they are listed. The dates are inclusive, covering the entire decade. This is by no means a complete list of those making brick in Kansas during the indicated decades. Undoubtedly there were numerous brickmakers of which I found no evidence.

1850-1859

Allen County--John Record

Atchison--Hobert Davis; T.W. Lavin; Eldredge Nickerson

Auburn--Barney Williams

Fort Riley--U.S. Army

Humboldt--William Lassman

Lawrence--R.W. Sparr

Leroy--John Cottingham

Topeka--Guilford G. Gage

1860-1869

Atchison--Holbert Davis; Hugh Dougherty; T.W. Lavin; Eldredge Nickerson

Humboldt--William Lassman

Lawrence--John W. McFarlane; R.W. Sparr

Leavenworth--A.A. Fenn

Marysville--Thomas Cooper

1870-1879

Atchison--Michael McLaughlin; Owens & Scip; John Wolters, Wolters & Bliss

Council Grove-- J. W. Simcock

Edwards County-- W. C. Edwards

El Dorado--J. V. Gordy

Ft. Scott-- Fort Scott Brick Manufactory, Goodlander & Johnson

Girard--G. T. Cadwell

Humboldt--William Lassman

Independence (Rural)--Benton Smith

Lawrence--John McFarlane

Leavenworth--A. A. Feen; John McCormick

Marysville--Thomas Cooper

Osage City--Osage Brick Company

Parsons--Robert Whitaker

Pittsburg--Steinmetz Brickyard

Troy--Cyrus Leland

Wyandotte--Jamerson & Servis

1880-1889

Abilene--Joseph Brown; Nickles & Versteeg & Co.

Arlington--Calorific Brick and Tile Company of Arlington

Armstrong--Charles Mulby; W. H. Ryus

Atchison--Atchison Brick and Tile Co.; Atchison Pressed Brick and Stone Co.; Drury Brick & Tile Co.; J. W. Kirkham; Jacob Nass; John Thompson; John Wolters

Belle Plaine--Harmon & Son

Belle Meade--J. W. Behney

Bennington--Bennington Brickyard

Burlingame--A. O. Morgan

Burrton--J. P. Nolan

Chanute--Jacob Lent; S. Z. Roth

Cherokee--J. M. Baird

Cherryvale-- _____ Doty

Clay Center--Frank Bebee; E. C. Wilson; B. W. Powers

Clearwater--E. Aspey

Clifton--Gilbert Forgue

Coffeyville--David Davies

Columbus--C. G. Metzler

Concordia--F. L. Marcotte; J. A. Rigby

Cottonwood Falls--J. D. Minick

Council Grove--C. A. Towler

Douglass--Charles Bride

El Dorado--W. J. Gault; J. V. Gordy; L. Hunting

Ellsworth--J. Brown

Elk City--Price & Woodring

Emporia--Josiah Rosenberry; Sprague & Guerrier

Englewood--Strother & Reed

Fort Scott--Fort Scott Steam Brick Works; F. G. Lotterer; J. S. Johns

Frankfort--H. E. Hine

Great Bend--W. J. Pickering

Hackberry--Van Smith

Hanover--Joseph Wolf & Son

Harper--Albert Scholes

Hazelton--A. M. Clawson; E. E. White; J. M. White

Holton--R. E. Smithers

Humboldt--William Lassman

Huron--Moak Bros.

Independence--Michael Naut

Iola--Anderson Bros.

Kansas City--M. Behney

Kanopolis--Buckeye Brick and Pottery Co.

Larned--Clark Gray; John Schrack

Lawrence--John McFarlane

Leavenworth--A. A. Fenn; E. Jameson; Thomas Jones; John McCormick; John J. McLarkey; William Sargent, Jr.; Chris Schrey; Gottlob Wahle

Lebo--E. Daily

Leroy--John Cottingham

Lindsborg--John Swanson; A. J. Swenson

Marysville--Thomas Cooper

Medicine Lodge--J. Bothwell, Hanson & Welch

Miltonvale--J. B. Wicklin

Mound City--M. E. Smith

Nortonville--Pontius & Wilson

Oberlin--G. Reynolds

Olathe--James Kirkpatrick

Osage City--Osage Press Brick Co.

Osawatomie--William Johnson

Osborne--Hubbard & Son

Oswego--H. C. Draper

Ottawa--Baldwin & Pollock

Oxford--W. C. Wood

Paola-- S. A. Bumgarner

Parsons--Robert Whitaker

Pittsburg--Massman & Vogel

Quinter--Quinter Brick and Tile Co.

Richfield--Richfield Brick Co.

Rossville--Charles Mowers

St. John--Thomas & Perry

Salina--Peter Olson

Scandia--James Kinneard

Seneca--H. Belshaw

Shawneetown--Charles Mowers

Solomon City--J. W. Haddock

Stockton--J. F. Hankins

Thayer--E. G. Beckley

Topeka--J. S. Earnest; J. S. Morse; Kansas Brick Company; Topeka Brick Co.; Topeka Press Brick Co.; Topeka Vitrified Brick Co.

Troy--Cyrus Leland

Walnut--Stephen Avery

Waterville--C. F. Scouten

Wathena--H. Pullo

Wichita--Wichita Brick Co.; Forest City Dry Pressed Brick Co.

Williamsburg--Johnson Bros.

Wyandotte--Frederick Paul, Jamerson & Ryus; Kansas City and Wyandotte Pressed Brick Co.

Yates Center--C. C. Mills; Robert Seivert

1890-1899

Abilene--Hallan & Parker; N. Verstag & Sons

Aliceville--Gillespie & Co.

Allison--D. Goodrich

Arcadia--Arcadia Manfg. Co.

Arkansas City--P. P. Endicott, Endicott & Lenox; Hatfield & Apple

Arlington--Calorific Brick and Tile Co. of Arlington; Beaman & Cecil; Wiley & Smith

Atchison--Atchison Pressed Brick and Stone Co.; Atchison Vitrified Paving Brick Company; Beattie & Benning; Nass Bros. Brick Yards; Jacob Nass; Drury & Barrett; John Wolters, John Wolters & Sons, Wolter Bros.; Woodhouse & Schauer

Avery--A. Hefner

Belleville--John Neville

Beloit--A. Donahoo

Burlingame--James Ramskill

Burr Oak--G. N. Wolfe

Burrton- M. J. Nolan

Chanute--S. Z. Roth

Cherryvale--Coffeyville Vitrified Brick and Tile Co.; F. G. Lotterer

Cherokee--J. M. Baird; Richard Davis; W. H. Longston

Chetopa--Charles Cranwell

Clay Center--B. C. Wilson

Clearwater--E. Aspey

Clyde--Stephen Beschel

Coffeyville--Coffeyville Vitrified Brick and Tile Company

Colby--T. C. Shanklin

Columbus--C. G. Metzler

Concordia--F. W. Dougherty; J. A. Rigby

Downs--C. J. Ray

Ellinwood--John Dick, William Ettling

Ellsworth--Gordiner [sic]

Elmont--Trumble Bros.

Emporia--T. F. McCutcheon; James Mechtley; Josiah Rosenberry; E. F. Sprague

Eureka--James Murphy

Florence--Florence Brick and Paint Co.

Fort Scott--O. D. Couch, Couch & Myers; Fort Scott Steam Vitrified Brick Works; F. G. Lotterer; J. S. Johnson

Garnett--Peter Brandt

Geneseo--W. M. Shenkle

Girard--G. T. Cadwell; Parker & Anderson

Goodland--Wheatley & Whitaker

Great Bend--Kelley Bros.

Hays--George Tipp; J. H. Waldorf

Herington--Herington Steam Brick Works

Hiawatha--J. E. Mooris

Holton--George Bacon; John Flanders; R. E. Smithers

Horton--William H. Whitead [sic]

Humboldt--William Lassman; Humboldt Brick Manufacturing Co.

Independence--Independence Vitrified Brick Co.; Coffeyville Vitrified Brick and Tile Co.; Michael Naut

Iola--Iola Brick Co.

Ivanhoe--Short Bros. & Co.

Junction City--John O'Berg; Junction City Pressed Brick Co.

Kanopolis--Buckeye Brick and Pottery Co.; George Caswell; John Schneider

Kansas City--Abbott & Ela, Abbott & Morse; Kansas City and Wyandotte Pressed Brick Co.; Kansas Tripp Hammer Brick Works; Trojan Pressed Brick Co.; Whittaker Brick Co.

Kingsley--V. D. Billings

Kiowa--Joseph Cheap

LaCrosse--W. T. Heaps; Delbert & Ream

LaCygne--E. E. Seniff

Lansing--Kansas State Penitentiary

Larned--Clark Gray

Lawrence--Bruce Lumber Co.; John McFarlane-Lawrence Vitrified Brick and Tile Co.

Leavenworth--A. A. Fenn, Fenn's Steam Brick Yard; M. H. Insley; Thomas Jones; Mathew Ludwig & G. F. Weller; John McCormick; Midland Brick & Tile Co.; Nesch & Carr; William Sargent, Jr.; Chris Schrey; Leavenworth Paving Brick Co.

Leroy--Peter Lang; J. W. Mickens

Lindsborg--A. J. Swenson

Louisville--G. W. Allen, Jehu Allen

Lyons--James Henderson

Macksville--John Busch

Manhattan--J. M. Drown

Marquette--Stromquist & Broman

Marysville--Thomas Cooper; H. M. & J. H. Wakefield

Mt. Hope--G. C. Robbins & Co.

Neodesha--J. C. Stephens

Newton--Leopold Fessler; H. R. Myers

Norton--J. M. McIrvin

Olathe--James Kirkpatrick

Osage City--D. M. Clemmer; Marshall, Stickhouse & Slasser; Osage Brick Tile and Terra Cotta Mnfg. Co.

Osawatomie--T. Taylor & Bro.

Oswego--C. C. Richart

Ottawa--Baldwin & Pollock

Paola--S. A. Bumgarner; G. C. Smith

Parsons--Hays & Bro.; Robert Whitaker

Phillipsburg--Jacob Close

Pittsburg--John Bradley; W. C. Green; Massman & Miller, Fred Massman; Pittsburg Vitrified Paving Brick Co.

Quenemo--J. C. Murphy, Patrick Murphy

Quinter--Quinter Brick and Tile Co.; Samuel Long

Russell Springs--W. J. Pavey

St. John--Thomas & Shepherd

St. Marys--Nelson & Tulien

Salina--Salina Vitrified Brick Co.

Seneca--H. Belshaw

Sharon Springs--Ericson & Ferlen

Solomon City--J. W. Haddock

Sterling--Frank Lawhead

Summunduwot--Calorific Brick Co.; VanCook & Smith

Topeka--Capital City Vitrified Brick and Paving Co.; J. S. Earnest & Bro., J. S. Earnest & Co.; J. S. Morse; Topeka Press Brick Co.

Udall--Hollister Bros.

Valley Falls--J. T. B. Gephart; A. J. Gunn

Vance--Whittaker Brick Co.

Washington--Frank Wolf

Wathena--I. Zeiser

Webber--J. Noble

Weir (City)--Dennehey Bros.

Wellington--W. R. Spicknal, Spicknal & Wilson

Wichita--J. N. Campbell; Forest City Dry Pressed Brick Co.; E. H. Harvey; Hermes & Rybolt; DOE Smith; Wichita Hydraulic Stone & Brick Co.; Wichita Vitrified Brick Co.

Williamsburg --Johnson Bros.; Williamsburg Mining and Brick Mnfg. Co.

Winfield--J. E. Conklin & Co.

1900-1910

Altoona--Altoona Vitrified Brick Co.

Arcadia--Arcadia Mnfg. Co.; Diamond Brick and Tile Co.

Angelus--Benjamin Albers

Atchison--Atchison Paving Brick Co.; Nass Bros. Brickyard; Wolters & Sons; Kansas City Gray Brick Co.; Woodhouse & Schauer

Avery--A. Hefner

Belleville--John Neville

Buffalo--Buffalo Brick Co.

Buffville--Kansas Buff Brick and Manufacturing Co.

Burlingame--Burlingame Brick and Tile Plant; James Ramskill

Burlington--Burlington Brick and Tile Works; Long & Sanford

Burr Oak--Terrill Brick-Yard; J. F. Williamson

Caney--American Vitrified Brick Co., Caney Brick Co.

Chanute--Chanute Brick and Tile Company; Chanute Vitrified Brick and Clay Manufacturing Company-Coffeyville Vitrified Brick and Tile Co.; Hydraulic Pressed Brick Co., Kansas City Hydraulic Press Brick Co.; Kansas Vitrified Brick Company

Cherryvale--Cherryvale Brick Co.; Cherryvale Brick and Tile Co.; Cherryvale Pressed Brick Co.; Cherryvale Vitrified Brick Co.; Cherryvale Vitrified Brick and Tile Co.; Federal Betterment Co.; F. G. Lotterer; Coffeyville Vitrified Brick and Tile Co.; Southwestern Brick Co.; Union Brick Co.; W. H. Crowl Brick and Tile Co.

Chester--Cuthbertson & Thompson

Clay Center--Clay Center Brick Co.; Clay Center Pressed Brick Co.; B. C. Wilson

Colby--Colby Brick Co.

Coffeyville Pressed and Paving Brick Co.; Coffeyville Shale Brick & Roofing Tile Co.; Standard Vitrified Brick Co.; Coffeyville Vitrified Brick and Tile Co.; Yoke Vitrified Brick Co.

Columbus--P. C. Metzler; Columbus Vitrified Brick and Tile Co.

Concordia--Concordia Hydraulic Stone & Brick Co.; Concordia Brick Co.; F. W. Dougherty; N. Neitzer; John Scoffield

Cuba--Baird & Wiruth

Edwardsville--Edwardsville Clay Mnfg. Co.

Elk City--Elk City Brick Co.

Ellinwood--John Dick

Emporia--E. C. Ballweg; T. F. McCutcheon; James Mechtley

Eureka--James Murphy

Fort Scott--Ft. Scott Brick Co.; Fort Scott Brick & Tile Co.-Western Shale Products Co.

Fredonia--Durham Brick and Tile Co.; Excelsior Brick Co.; Fredonia Brick Co.

Girard--Parker & Anderson; Girard Brick & Tile

Hiawatha--Hiawatha Composite Pressed Brick and Plaster Company; William Taboe

Havensville--Alexander Lumber Co.

Holton--R. E. Smithers; Wylie Bros' Brick-Yard

Horton--George Bacon

Humboldt--Cleveland Brick Co.; Humboldt Brick Manufacturing Co.

Hutchinson--H. C. Barrett; J. K. Boyles; Hutchinson Concrete Co.

Independence--Independence Vitrified Brick Company-Coffeyville Vitrified Brick and Tile Company; Independence Paving Brick Co.; Security Oil, Gas, Brick and Mnfg. Co.

Inman--J. J. Klassen

Iola--Bush-Wadsworth Brick Co.; Iola Brick Co.; Star Brick Co.; Union Brick Co.

Kanopolis--G. J. Ollmann & J. J. Kuntz

Kansas City--Acme Brick & Tile Co.; Dwyer Brick Co.; Kansas City Gray Brick Co.; Kansas City Hydraulic-Press Brick Co.; Kansas City Terra-Cotta Works

LaHarpe--LaHarpe Shale Brick Co.; LaHarpe Brick Co.

Lansing--Kansas State Penitentiary

Lawrence--Lawrence Vitrified Brick and Tile Co.

Leavenworth--Fenn's Steam Brickyard; Peter Ludwig; Leavenworth Paving Bric Co.; Nesch & Carr; Pittsburg Vitrified Paving and Bldg. Brick Co.

Leroy--Leroy Vitrified Brick Co.

Lindsborg--A. J. Swenson

Lousiville--John Allen

Manhattan--J. M. Drown

Marysville--Blue Valley Brick-Yards; Flo & Con Claey; Thomas Cooper

Moline--Moline Brick Company; Moline Lime, Stone and Cement Co.

Mound City--Mound City Brick and Tile Co.

Mound Valley--Mound Valley Brick Co.; Mound Valley Vitrified Brick Co.; Nelson Vitrified Brick Co.

Neodesha--Verdigris Valley Vitrified Brick and Tile Co.

New Albany--Empire Brick and Gas Company

Newton--H. R. Myers

Norton--M. F. Broderick; John Clark; Norton Pressed Brick Co.

Oakley--Warren Baker Construction Co.

Oberlin--Frank Broderick; C. E. Guy

Osage City--Osage City Brick, Tile and Terra Cotta Mnfg. Co.

Osawatomie--T. Taylor & Bros.

Ottawa--Ottawa Brick and Tile Company

Paola--Paola Brick and Tile Works; William A. Schwartz

Parsons--J. S. Vance; Parsons Pressed Brick Co.

Peru--Peru Brick Company

Phillipsburg--Francis & Whitney; Phillipsburg Brick Co.

Pittsburg--Admantine Brick Co.; Pittsburg Brick & Pipe; Pittsburg Clay Company; Pittsburg Vitrified Paving and Building Brick Co.; E. E. Seniff

Quenemo--Patrick Murphy

Quinter--Frank Kanode

Ray--Ray Grain Co.

Rosedale--Dwyer Brick Company

Saffordville--Emporia Brick and Tile Company

St Marys--Johnson Brick, Tile and Cement Company; Nelson & Tulien

St. Francis--St. Francis Brick Mfg. Co.

Salina--Salina Hydraulic Brick and Stone Co.; Salina Vitrified Brick and Tile Co.

Seneca--H. C. Wilson; Seneca Shale Brick Co.

Smith Center--A. E. Eply

Somerset--G. C. Smith

Sterling--Frank Lawhead, Jr.

Sycamore--Sycamore Vitrified Brick Co.-Pittsburg Vitrified Paving and Building Brick Company

Topeka--L. Blackman; Capital City Vitrified Brick and Paving Company; Ernest Brick Plant; W. M. Ryerson; Topeka Brick Co.; Topeka Vitrified Brick and Tile Co.

Towanda--J. H. Huston; W. M. Pond & Co.

Tyro--Tyro Shale Brick Co.; Tyro Vitrified Brick Co.

Vance--E. J. Gump

Washington--Franklin Wolf

Weir (City)--Weir City Brick Co.

Wichita--Wichita Hydraulic Stone and Brick Co.; Wichita Silex Brick Co.; Youngers Brick-Yard

Willard--Topeka Brick Co.

Williamsburg--Johnson Bros.

1910-1919

Altoona--Altoona Vitrified Brick Co.

Angelus--Benjamin Albers

Arcadia--Diamond Brick and Tile Co.

Atchison--Atchison Brick, Tile and Coal Mining Co.; Atchison Paving Brick Co.; Nass Bros. Brick Yards; Wolter Bros. Brickyard

Buffalo--Buffalo Brick Co.

Buffville--Kansas Buff Brick and Manufacturing Co.

Caney--American Vitrified Brick Co.; Caney Brick Co.

Carlyle--Lumbermen's Cement and Brick Co.

Chanute--Chanute Brick & Tile Co.; Hydraulic Pressed Brick Co.

Cherryvale--Cherryvale Brick Co.; Coffeyville Vitrified Brick and Tile Co.; Federal Betterment Co.; Union Brick Company

Coffeyville--Coffeyville Shale Brick Co.; Coffeyville Vitrified Brick and Tile Co.; Standard Vitrified Brick Co.; Yoke Vitrified Brick Co.

Columbus--Columbus Vitrified Brick and Tile Co.

Fort Scott--Fort Scott Brick and Tile Co.; Western Shale Products Company

Fredonia--Excelsior Brick Co.; Fredonia Brick Co.

Humboldt--Cleveland Brick Co.; Humboldt Brick Mfg. Co.

Independence--Coffeyville Vitrified Brick and Tile Co.; Independence Paving Brick Co.

Inman--J. J. Klassen

Iola--Iola Brick Co.; Union Brick Co.

Kansas City--Acme Brick Co.; Hydraulic Press Brick Co.; A. R. James & Sons; Kaw Brick Co.

Lawrence--Lawrence Vitrified Brick and Tile Co.

Leavenworth--Leavenworth Vitrified Brick Co.

Leroy--Leroy Vitrified Brick Co.

Lindsborg--Alfred Swenson

Moline--Moline Brick Co.

Mound Valley--North Mound Valley Brick Co.; Nelson Vitrified Brick Co.-Parsons Vitrified Brick Co. of Mound Valley

Neodesha--Verdigris Valley Vitrified Brick Co.

Ottawa--Ottawa Brick and Tile Co.

Paola--M. L. Lee Brick & Tile Co.

Parsons--Parsons Vitrified Brick Co.

Peru--Midland Brick Co.

Pittsburg--Metropolitan Paving Brick Co.; Pittsburg Vitrified Paving & Building Brick Co.

Ray--Ray Grain Co.

St. Marys--Johnson Brick, Tile and Cement Company

Salina--Salina Brick and Tile Co.; Salina Vitrified Brick Co.

Seneca--Seneca Shale Brick Co.

Topeka--Capital City Vitrified Brick and Paving Company; Topeka Vitrified Brick & Tile Co.

Tyro--Tyro Shale Brick Co.; Tyro Vitrified Brick Co.

Weir--Weir City Brick Co.

Wichita--Wichita Silex Brick Co.

1920-1929

Buffalo--Buffalo Brick Co.

Buffville--Kansas Buff Brick and Manufacturing Co. (Sold to United Clay Products in 1926)

Cherryvale--Coffeyville Vitrified Brick and Tile Co. (Sold to United Clay Products in 1926)

Coffeyville--Coffeyville Vitrified Brick and Tile Co.; Coffeyville Shale Products Company; (Both companies sold to United Clay Products in 1926)

Fort Scott--Western Shale Products

Independence--Independence Paving Brick Co. (Sold to United Clay Products in 1926)

Iola--J. B. Kirk Clay Products; Union Brick Co. (Sold to United Clay Products in 1926)

Kansas City--Godfrey Stimson (Sold to United Clay Products in 1926)

Leavenworth--Home Brickyard

Neodesha--Verdigris Valley Vitrified Brick and Tile Co.

Paola--Paola Brick & Tile Co.

Pittsburg--Metropolis Paving Brick Co.; Pittsburg Paving Brick Co. (Sold to United Clay Products in 1926)

Salina--Salina Brick & Tile Company

Topeka--Capital City Brick and Coal Company (Sold to United Clay Products in 1926)

Weir--Western Clay Company (Sold to United Clay Products in 1926)

Wichita--Noll Brick and Tile Company (Sold to United Clay Products in 1926)

1930-1939

Buffalo--Buffalo Brick & Tile Co.

Buffville--United Brick & Tile Company

Coffeyville--United Brick & Tile Company

Elk City--Elk City Brick & Tile Company

Fort Scott--Western Shale Products Co.

Fredonia--Excelsior Brick Company

Humboldt--Humboldt Brick & Tile Co.

Iola--United Brick & Tile Co.

Leavenworth--Home Brickyard

Neodesha--Verdigris Valley Vitrified Brick Co.

Pittsburg--Pittsburg Brick Co.; United Brick & Tile Co.

Salina--Salina Brick & Tile Co.

Weir--United Brick & Tile Co.

Wichita--United Brick & Tile Co.

1940-1949

Buffalo--Buffalo Brick & Tile Co.

Buffville--United Brick & Tile Co.

Coffeyville--United Brick & Tile Co.

Concordia--Cloud Ceramics

El Dorado--O. E. Hurlburt

Fort Scott--Western Shale Products Co.

Fredonia--Excelsior Brick Company

Garden City--Sunflower Masonry Products

Great Bend--Great Bend Brick & Tile Co., Inc.

Humboldt--Humboldt Brick & Tile Co.

Iola--United Brick & Tile Company

Neodesha--Verdigris Valley Vitrified Brick Co.

Pittsburg--United Brick & Tile Co.

Salina--Salina Brick & Tile Co.

Weir--United Brick & Tile Co.

Wichita--United Brick & Tile Co.

1950-1959

Buffalo--Buffalo Brick & Tile Co.

Coffeyville--United Brick & Tile Co.

Concordia--Cloud Ceramics

El Dorado--O. E. Hurlburt

Fort Scott--Western Shale Products Co.

Fredonia--Excelsior Brick Co.

Garden City--Sunflower Masonry Products

Great Bend--Great Bend Brick & Tile Co., Inc.

Hoisington--Kansas Brick and Tile, Inc.

Humboldt--Humboldt Brick and Tile Company

Iola--Union Brick Co.; United Brick & Tile Co.

Kanopolis--Great Bend Brick & Tile Co., Inc.

Neodesha--Verdigris Valley Vitrified Brick Co.

Pittsburg--United Brick & Tile Co.

Salina--Salina Brick & Tile Co.

Weir--United Brick & Tile Co.

Wichita--United Brick & Tile Co.

1960-1969

Buffalo--Acme Brick Co. (formerly Buffalo Brick & Tile Co.)

Coffeyville--Acme Brick Co. (formerly United Brick & Tile)

Concordia--Cloud Ceramics

Fredonia--Excelsior Brick Co.

Hoisington--Kansas Brick and Tile, Inc.

Humboldt--Humboldt Brick and Tile Company

Kanopolis--Acme Brick Co. (formerly Great Bend Brick & Tile)

Weir--Acme Brick Co. (formerly United Brick & Tile)

Unidentified Brickmaking Establishments

The author has found evidence that unidentified brickmaking establishments were operated at or near the following towns during the indicated decades.

1870-1879--Americus; Clyde; Larned; Neodesha; Waterville

1880-1889--Kinsley; Marion; Neosho Falls; Oswego; Parsons, 2; Phillipsburg

1900-1909--Cottonwood Falls; Neosho Falls; Oswego

1910-1919--Bonner Springs; Burlington; Chetopa; Concordia; Emporia; Garden City; Kinsley; New Albany; Norton; Osborne; Williamsburg