

Oxford Mill

Mill Town Kansas in the Age of Turkey Red

by Norman E. Saul

Some of the most stirring and romantic aspects of Kansas history relate to the great cattle drives to the railroads in Abilene, Wichita, Ellsworth, Dodge City, Caldwell, and other towns, and the conquest of the prairie and its natives for cattle and agriculture. They form an important part of the Kansas heritage. Cowboys and cattle, Wild Bill Hickok, buffalo hunts, the frontier struggles of ranchers and farmers dominate much of the popular lore of the early Central Plains. “Cowtown Kansas” is a major theme in the histories of the state and the subject of a number of scholarly, as well as not so scholarly, studies. Yet, that period of Kansas history lasted only a few years, brought to a quick close by the Homestead Act and the land grants to railroads that parceled out land to waves of settlers from states to the east and south and to many new immigrants from Europe, and by the construction of railroads closer to the great ranches in Texas. Railroads obviously were vital to the economic existence of the cowtowns, and then to the market centers for the new settlers, and finally for the development of a unique aspect of Kansas economic and urban history that has received little attention—“mill town” Kansas.

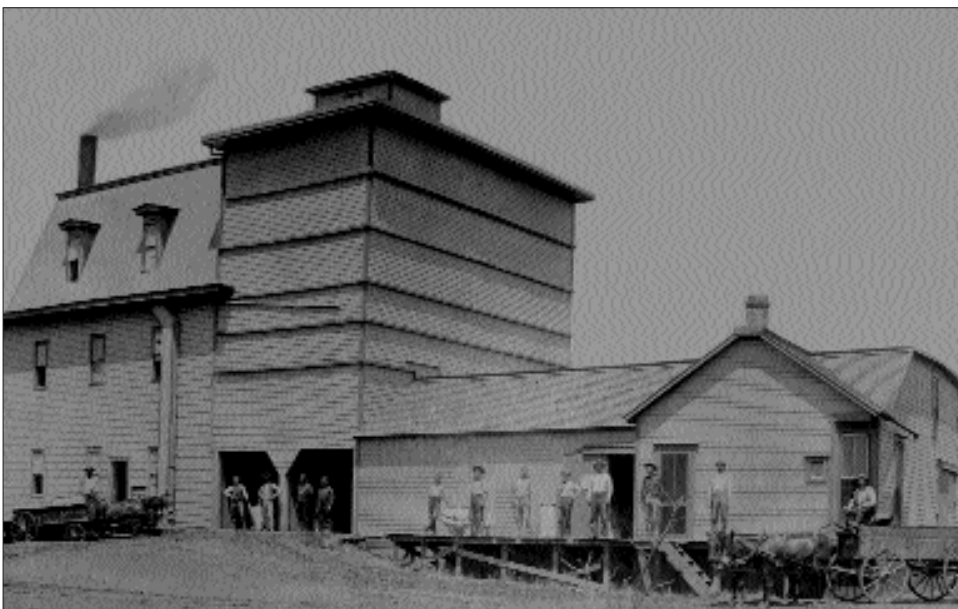
Mills to grind wheat, rye, corn, oats, barley, and millet were an important feature of early Kansas and most other states. They too involved a distortion of history by providing another romantic motif—“down by the old mill stream.” Almost every community in the 1850s–1870s had a mill of some sort to provide a valuable service in producing flour, cornmeal, feed for livestock, and basic staples for the households and communities. Powered by water or by wind, and sometimes by steam, the earliest mills used stone burrs as grinders. Many were located along streams where shade trees provided idyllic places for picnic grounds, on high ground (to utilize wind power), or along the new railroad lines reaching into Kansas. These mills had a tenacious survival capability. Because of the weight of the burrs, and to prevent washing away during periodic floods or being blown away during high winds, most were built of stone, at least on the lower levels. A number of these mills survived many years with free power and minimum labor (one miller), with several functioning well into the twentieth century.

Norman E. Saul received his Ph.D. from Columbia University and is a professor of history and Russian and East European studies at the University of Kansas. His research interests include Russian–American relations and the immigration of Volga Germans and Mennonites to the United States. His most recent publication is *Concord and Conflict: The United States and Russia, 1867–1914* (University Press of Kansas, 1996).



Early wind-powered mill, Lawrence

Moundridge Roller Mills



Their economic role, however, was limited mainly to the local community. Farmers would bring grain to be ground for household baking or livestock feed. The common early method of transaction was for “custom,” that is, the farmers’ grain was “milled” for their own use by this facility. The farmer would usually pay for the service by leaving some of the grain to the mill, which would sell this excess as flour locally or sometimes farther afield. As population increased and business grew, another more efficient method developed: “exchange,” whereby a farmer could trade grain for flour or meal already packaged, allowing a more regular schedule of operation for the mill and saving time for the farm customer. The miller also benefited from keeping the tailings and bran, usually to feed his own cattle. This method was all on a relatively small scale and had virtually no economic impact beyond the immediate area. The original millers nevertheless provided an important service to families and communities and deserve recognition as early urban–rural entrepreneurs. A number of millers would make a successful transition to modern milling.

The disadvantages of these early mills were the unreliability of both wind and water power, due to the vagaries of Kansas air and water supplies and irregular operation; the higher cost of steam power; limited storage facilities; and the ebb and flow of supply and demand.¹ These early “grist mills” also ground all grains: corn, oats, and soft wheat, usually the Early Red May, the variety best adapted for fall planting from 1874. Millers could not really cope with hard wheat, first introduced by French settlers and then by Mennonites from Ukraine in the 1870s.² Hard grains needed more milling and wore

1. Perhaps the best information on these early mills, although somewhat vague and romanticized, is in a series of articles by Gordon West, “Down by the Old Mill Stream,” *Kansas Farmer* 98 (January–April 1961). Even the leading journal of modern milling reveled in nostalgia. See, for example, Otto F. Schussler, “The Old-Time Grist Mill,” *Northwestern Miller* 129 (February 15, 1922): 702.

2. This apparently was a relatively new variety in the Mennonite colony in Russia and the United States. See Harley J. Stucky, *A Century of Russian Mennonite History in America: A Study of Cultural Interaction* (Newton, Kans.: Mennonite Press, 1973), 27–28; James L. Colwell, “American Wheat Varieties: Our History in Microcosm,” *Social Science Journal* 16 (October 1979): 68–69.

stones quickly, requiring more frequent “dressing,” a labor-intensive and expensive process, a definite handicap of this type of mill. Railroads to the cattle and market towns facilitated greater use of steam power for mills by making coal more plentiful and cheaper and providing a more reliable energy source. But hard wheat still posed special problems with its need for extra milling, its wear and tear on stones, and the consequent need for more milling time and labor.³ That is the main reason the new hard wheat, introduced from Russia and popularly dubbed Turkey Red, could not be commercially ground into flour for a broader market at this time, and only with difficulty for home use. It thus had a very limited planting range for a number of years. For the same reason hard wheat took a docking in the market in comparison with soft wheat. The short-lived, wind-powered Freisen Mill in the picturesque transplanted village from Crimea, Gnadenu, near Hillsboro, was probably one of the first to face the challenge of milling hard wheat, but only for the local Mennonite community. The Mennonite contribution, and their Russian wheat experience, to the transition to hard red winter wheat is a vital part of the Kansas mill-flour story.⁴

Another major limitation of early mills was that the volume of operations was severely restricted. The power source, whether water, wind, or steam, could run only a few sets of stones. Many of them had another disadvantage with the advent of railroads since they often were situated on low ground by streams or on high ground for maximum use of wind, not locations that would be selected by railroad surveyors. This gave the new steam-powered mills that emerged in the larger market towns in the 1870s along railroads a definite advantage, especially for

3. For a good description of early Kansas mills, including an impressive picture of the 1863 windmill in Lawrence, see Vernon D. Johns, “Development of the Flour Milling Industry in Kansas” (master’s thesis, University of Kansas, 1926); see also John M. Peterson, “The Lawrence Windmill,” *Kansas History: A Journal of the Central Plains* 3 (Autumn 1980): 147–64.

4. The Russian name for Turkey Red variety was “krasnaia turetskaia” (red Turkish), since Russians in the region and experts in the 1890s understood that it originated from the Ottoman Empire and was first grown by Crimean Tatars (ethnically Turkish) in Russia, from where nearby Mennonite colonists obtained it by the mid-nineteenth century. The more technical Russian term for this class of hard wheat was “arnautka,” a word of Albanian origin that may signal its first cultivation in the Central Balkans, perhaps on the plains of Kosovo. The major Russian encyclopedia, under “wheat,” identified varieties of hard wheat grown in Russia: *beloturka* (white Turkey, but really red), *Kubanka* (Kuban, later durum), *krasnoturka* (red Turkey), *garnovka*, and *cherno-koloska* (black grain). See *Entsiklopedicheskii Slovar’* 24 (St. Petersburg: Brokgauz–Efron, 1898), 879–83; see also Norman E. Saul, “Myth and History: Turkey Red Wheat and the ‘Kansas Miracle,’” *Heritage of the Great Plains* 22 (Summer 1989): 1–13.

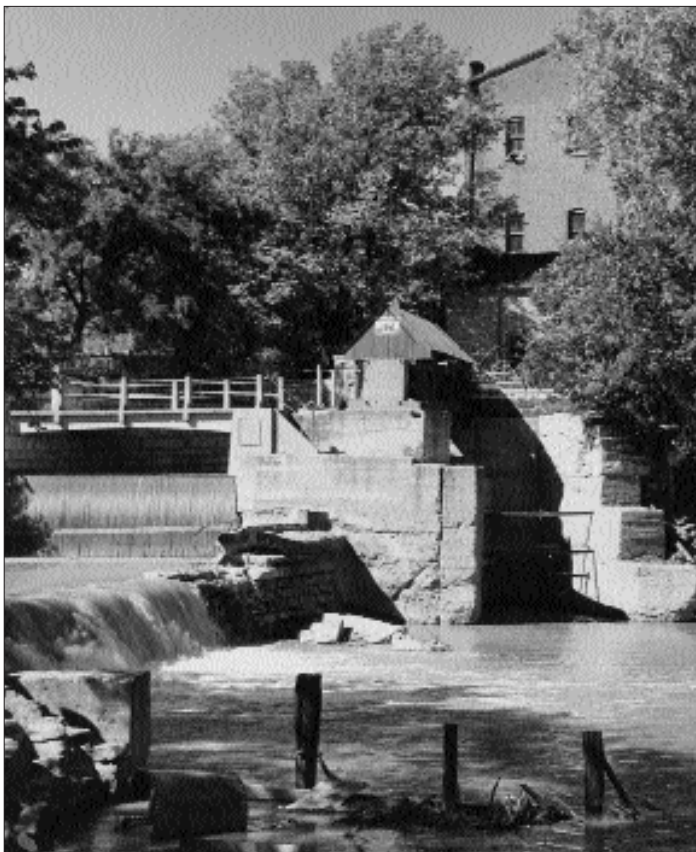
their reliable sources of energy and labor as well as better transport possibilities.⁵ So, the transition to modern milling was at first encouraged by the railroads and by the economic and political geography of Kansas that was determined by rail section construction heads, land offices, and political boundaries. The second stage of milling in Kansas was the erection of larger steam-powered mills along railroad tracks in towns, beginning around 1870, located in prime grain growing regions. In 1875 Kansas recorded eighty water mills and sixty steam mills, wind power having apparently left the scene, but by 1880 steam clearly dominated.⁶ These new mills had the advantage of greater commercial outreach through rail transport and ready access to urban labor, supply facilities, and consumers. How many immigrant groups and mining parties, line work crews, and cowhands bought staples in eastern and central Kansas for their jobs or treks farther west?

Soft wheat varieties, the most commonly grown in Kansas until the mid 1880s, had disadvantages of vulnerability to winter kill, if planted in the fall, and being victim to a variety of pests and diseases. In fact, farmers sometimes resisted growing them because they harbored insects that would then spread to other crops. Hard wheat survived the Kansas winters better (although planted as a spring wheat in the colder climate of Russia) and, harvested earlier in the summer, had fewer problems with insects and plant disease. The promotion and testing of hard wheat varieties was encouraged especially by Mennonite miller Bernhard Warkentin of Halstead and Newton in cooperation with cerealist Mark Carleton of Kansas State Agricultural College and the U.S. Department of Agriculture. They proved the adaptability of this “Russian” hard wheat to the Kansas habitat during the early 1880s. Writing in 1902, Carleton referred to the transition to hard wheat as occurring fifteen years before and cited the following varieties of Turkey Red then being tested: Kharkov, utka, torgova, and girka.⁷ But something essential was still missing from the milling picture.

5. *Milling in Kansas*, Industrial Study No. 1 (Topeka: National Youth Administration in Kansas, January 1, 1940), 20.

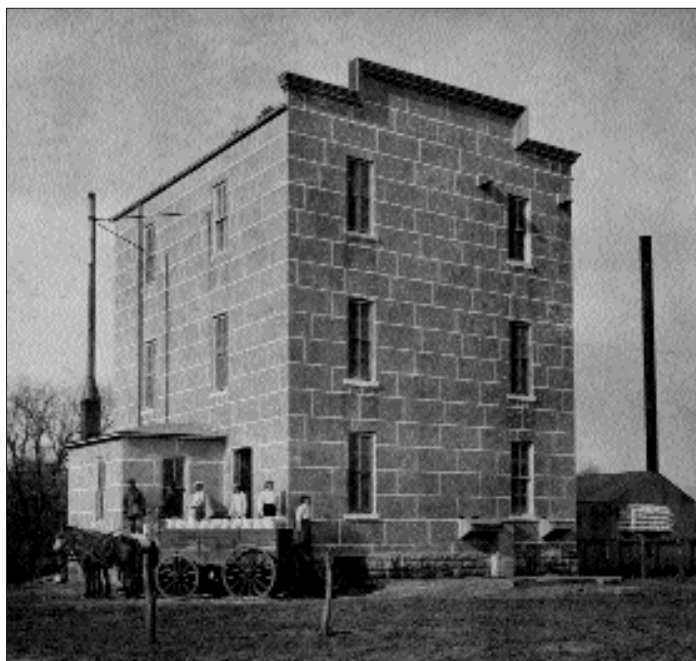
6. *Ibid.*, 8–9.

7. M. A. Carleton, “Wheat Improvement in Kansas,” in Kansas State Board of Agriculture, *Thirteenth Biennial Report, 1901–1902* (Topeka: Kansas Department of Agriculture, 1903), 514–15; James C. Malin, *Winter Wheat in the Golden Belt of Kansas: A Study in Adaption to Subhumid Geographical Environment* (Lawrence: University of Kansas Press, 1944), 177–81.



Smoky Valley Roller Mill, Lindsborg

Alta Mill



Facing a similar dilemma of making hard wheat flour a commercial reality, Minnesota millers introduced the new technology of roller mills, beginning with the Edward P. Allis and Company (later Allis–Chalmers) experiments. These tests involved installing marble rollers, then iron, and finally steel rollers in place of plain stone in the mills of A. G. Mowbray and Cadwaller Washburn in Minneapolis in the 1870s. This quickly proved the potential of commercial processing of hard wheat into flour.⁸ Melding that technology with an already known variety of wheat that was ideally adapted to the lower Great Plains was a dynamic boost for the Kansas economy. Climate, soil, grain, and technology merged. The result was that the state did not really become a wheat state but a *flour* state. This might be considered the “Kansas miracle”—the coincidental joining of new steel-roller mill technology, climate, a variety of wheat and settlers who knew how to grow it, and (one should certainly add the magic word) a *market* that was expanding rapidly due to the coincidentally large influx of immigrants from southern and eastern Europe. All of this definitely had a major impact upon the regional economy, transforming wild cowtowns into market and transport centers and industrial mill towns.

A transitional stage in implementing this technology was a new process that involved high grinding. In this process the old millstone burrs were set higher so grinding was only partial the first time through but was repeated through several lower grindings. This produced more flour from the same wheat and introduced a continuous regrinding operation and screening, middling, or in the language of the times, “sets of burrs.” This innovation was first used in central Europe—Germany, Switzerland, and Hungary—in the 1830s. Because of wear and tear problems of primitive grinders with these modifications, the industry soon adapted to “modern” steel rollers, shaped like old-style washing machine wringers, although usually larger in diameter. With corrugated grooves and enclosed in wooden boxes to control dust and with a carefully designed grain flow, the new mills would run hard wheat through several sets, or breaks, of rollers and purifiers to achieve a miracu-

8. According to Carleton, the first modern roller mill in Minnesota began operation in 1878. See Mark Carleton, “Hard Wheats Winning Their Way,” in U.S. Department of Agriculture, *Yearbook, 1914* (Washington, D.C.: Government Printing Office, 1915), 391. But another source claims an earlier date, around 1870. See Colwell, “American Wheat Varieties,” 69–72; John Storck and Walter Teague, *Flour for Man’s Bread: A History of Milling* (Minneapolis: University of Minnesota, 1952), 223–35.

lous result: the finest wheat flour yet produced in volume.⁹ Among the leaders in the transition were the Washburns of Minnesota (senator, governor, journalist) who dominated the milling industry there for several decades.¹⁰

This new technology was quite a contrast to stone grinding along the old mill stream. It depended first on a reliable source of energy (steam) and required a considerable capital input, an average of fifty thousand dollars in the 1890s, for a new or retooled mill. These roller mills were substantial buildings, usually of three or four stories. An elevator carried the grain to the top level, where it would be cleaned and dried and then passed to the steel roller boxes (usually now referred to as the mills) and middlers on the second level. After sifting and regrinding, it produced the final ground product that would be sorted into grades and packed and sacked on the first floor. The waste bran was ideal for quick disposal to cattle in a nearby feedlot.¹¹ Springing up across Kansas in the 1880s and 1890s, these mills were labor intensive and actually created a number of new towns, such as Moundridge, Inman, and Buhler. The advent of a post office usually coincided with the construction of the mill, and it boosted the populations of those market centers already established. All that was needed was available grain, machinery (capital investment), and transportation to market.

A prime example of one of these early mills that is substantially preserved with its original equipment is Smoky Valley Roller Mills in Lindsborg. Restored as a museum, it occasionally still runs.¹² This mill made a successful transi-

9. Herman Steen, *Flour Milling in America* (Westport, Conn.: Greenwood, 1973), 44. This study is devoted mainly to the Minnesota milling operations but acknowledges that the region's superiority was supplanted in the 1880s by mills in other states that responded better to supply and price conditions. The best work on the technical aspects of this new process is, ironically perhaps, by a Russian: Peter A. Kozmin, *Flour Milling*, trans. M. Falkner and Theodor Fjelstrup (London: George Routledge, 1921). Another classic history of milling is Charles Byron Kuhlmann, *The Development of the Flour-milling Industry in the United States, With Special Reference to the Industry in Minneapolis* (Boston: Houghton Mifflin, 1929).

10. Storck and Teague, *Flour for Man's Bread*, 235–38. In the next generation Stanley Washburn was intimately connected with Russia as a war correspondent in and out of that country during the Russo–Japanese War and World War I.

11. Many converted mills installed the new machinery on the first floor because of the weight, thus combining milling and packing or sacking on the same level. Although much literature exists on the milling industry, and especially in journals such as *Northwestern Miller* and *Southwestern Miller*, few good descriptions of the actual operation of early roller mills in Kansas exist.

12. One of the historic legacies of Kansas that has been almost lost is the sound of a flour mill—the belts, chains, and the flow of grain in wood

tion from water power to steam, and to modern steel rollers. Such newly equipped mills were substantial investments, usually the largest in the communities, as they required large buildings, usually of brick or stone. They were a beehive of activity, similar to the general stores and saloons nearby, joining urban and rural populations in an interesting but little appreciated or studied association. The old refrain “the farmer and the cowhand,” if it ever existed in reality, was now replaced for several decades by “the farmer and the miller”—not always, as the former suggested, a happy relationship. But the sociology of the mills and their urban–rural community bonding is yet to be thoroughly researched and written.

A major problem for the new flour mills was the danger of fire. Despite the use of dust collectors, the new mills generated a greater volume of highly combustible dust, especially with the increased storage of grain, flour, and sacks, and the many wooden boxes, shafts, and floors (stone or cement floors being ruled out because of condensation problems). This new wheat processing required considerable manpower for safety precautions and to keep complicated and delicate machinery running, usually day and night. The railroad symbol of an engineer with an oil can was transplanted to the flour mill. The much larger coal-fired steam engines to power the larger mills added to the danger, even though they usually were located in separate powerhouses with very tall smokestacks outside the mill. Canvas belts were used extensively in the mill to minimize the possibility of sparks. Electricity was an alternative cheap power source with the advent of the new dynamo technology, but considering the primitive wiring available at the turn of the century, it added an additional hazard in the mill. The usual lighting was by headlight oil in enclosed cases or lanterns. Nonetheless, quite a few disastrous fires have been recorded in the history of this burgeoning industry, and they certainly caused hesitations in making capital investment, especially since some of these fires were of suspicious origin. It was well known in the communities that a mill fire created quite an exciting event, for example, the Lindsborg mill fire of 1897.¹³

The transition to modern mills was not an easy one for this reason, and because of the substantial investments re-

in its different conditions—as well as the sight of a straw stack on farms. I highly recommend a visit to Smoky Valley Roller Mills in Lindsborg.

13. Chester C. Bruce and George Tesarek, “Smokey River Roller Mill, 1872–1974,” *Old Mill News* 2 (October 1974), 9. No wonder the *Sanborn Fire Insurance Maps* of Kansas towns, beginning in the 1880s, paid much attention to mills, their construction, lighting, power source, and machinery.



Newton Milling and Elevator Company

Lee–Warren Milling Company, Salina



quired, the poor crop years in the 1880s, economic depression, and competition from other regions, especially Minnesota. The bumper crop of 1884 of almost fifty million bushels fell to an average of ten to fifteen million in 1885–1889. And the old grist mills also remained as important local competitors, mainly because they could serve

the community with other, cheaper products (such as corn meal), and because of their low operating costs, especially for basic livestock feeds. And many of them continued to produce flour on the side. One of several that survived the transition was Alta Mill, southeast of Moundridge. It began operation in 1875 as a water-powered grist mill serving the new Swiss Mennonite community from Ukraine. It successfully competed with nearby modern roller mills until 1898, when it too converted by erecting a new three-story building and adding a steam engine for use when the water supply was low. Its business, however, was primarily to serve the local community as a cooperative and did so until

1949. Alma Roller Mills on Mill Creek survived without a railroad and with stone rollers but with gradually reduced production until about 1910.¹⁴ Historic Bowersock Mill in Lawrence is a good example of evolution from water power from its Kansas River dam, to steam engines, and finally to providing auxiliary electricity with water-powered generators. But it began and first thrived as a flour mill.

Smoky Valley Roller Mills on the outskirts of Lindsborg was a prime example of a successful transition to modern milling. It began with a typical stone-grinding, water-powered operation in 1872, and it was converted to rollers and steam

power in 1889 by Theo Teichgraber, who managed to compete with larger mills in nearby towns with the help of a rail spur. After a sensational fire on October 15, 1897, it was

14. Ida Plank Yoder, "The Story of a Mill," *Mennonite Life* 11 (January 1956): 21–24; *Sanborn Fire Insurance Maps*, Alma, Kansas (New York: Sanborn Map Co., 1885); *ibid.* (1893); *ibid.* (1900); *ibid.* (1908).

rebuilt with the support of the community. The new equipment installed in 1898 is what survives today.¹⁵ Another problem in conversions of this type was to separate a continuing market, mainly local, for soft wheat flour and corn meal from the new hard wheat market/technology arena. And at least some of the new mills had corn shellers and “crackers” in the basement that catered to local demand, as well as furnishing subsidiary income.

Another important example of mill conversion in what would become the heart of hard-wheat country was Monarch Mill in Newton (it still stands as a historic site but without its equipment). It was purchased in 1886 by Halstead Mennonite miller Bernhard Warkentin, whose father had been in the milling and flour shipping business in Ukraine. Renamed Newton Milling and Elevator Company, it was refitted with steel roller mills that year. By 1896 the company expanded to thirteen double sets of rollers, the largest in the area, with a capacity of four hundred barrels of flour a day.¹⁶ Warkentin was a major leader of this type of conversion but was only one of several innovators.

An indication of how dramatic the shift could be to a town is the example of Moundridge Roller Mills, not far from Newton. The *Moundridge Leader* announced in 1887 that this fifty-thousand-dollar construction project was nearing completion.¹⁷ The following week, the *Leader* devoted a full page to the mill, emphasizing that “no pains had been spared to give Moundridge a first-class mill.” The main building was four stories, thirty-six-by-forty feet, with an adjoining twenty-by-twenty-foot engine room containing a forty-horsepower boiler. The center of the operation was four double sets of roller mills on the second floor. Proudly, the paper proclaimed that their town’s new mill had 1,000 feet of spouts, 125 feet of shafts, and 800 feet of belting—a far cry from the old mill on a stream. One can imagine the degree of skilled work involved. The newspaper did not hesitate to admit that the miller, Peter Kostner, came from out of town, all the way from Salina. At the bottom of the page, as a kind of footnote, the editor noted that the town was about to be incorporated.¹⁸ Mill town Kansas had arrived.

15. Woman’s Kansas Day Club, comp., “Mills–Milling–Millers,” (January 1988), 309–10, Library and Archives Division, Kansas State Historical Society. This is a valuable collection of data about milling from communities around the state.

16. *Sanborn Fire Insurance Maps*, Newton, Kansas (1886); *ibid.* (1896).

17. *Moundridge Leader*, March 10, 1887.

18. *Ibid.*

This was not the end of the story, of course, as the local paper within two weeks announced the opening of a bookstore, a drugstore, and an elevator company to provide storage for the flour mill. The mill and elevator soon merged as Moundridge Milling Company and Krehbiel Elevating and Shipping Company. In September the *Leader* proudly recorded that a carload had been shipped all the way to El Dorado. The original mill with a capacity of fifty barrels of flour a day was soon increased to seventy-five as orders poured in from Wichita.¹⁹ D. J. Krehbiel, the new proprietor, it reported, was building a new, imposing residence in August. Mills obviously meant money. After the mill had operated for a year and a half the newspaper noted (while acknowledging the source of most of its business), “This is an enterprise that our people take a just pride in and right well they may for we doubt very much if our large manufacturing cities can boast of as fine a mill as this one.”²⁰

The Inman example is a minor variation. The town apparently came first but needed a mill to survive. The *Inman Independent* campaigned in 1892, almost desperately, for someone to start a mill. “There is no place for miles around for a good mill than right here in Inman. Capital could not be better invested than in milling in Inman.”²¹ The reward came. Three months later the newspaper reported, “The mill is putting in some very fine machinery.”²² The Inman mill also acknowledged a Mennonite heritage as it was managed by Cornelius Enns from 1894 through three generations, and at one time (1909) could claim the distinction of being the largest independent flour mill west of the Mississippi, operating as part of Buhler Mills and Elevator Company until as late as 1979. Under Nabisco and Archer Daniels Midland Company management it still functions—a rare survival, but of course with much more modern equipment than in the original.²³

Another groundbreaking example of the new roller processing flour mill, perhaps the earliest definitely recorded, is that of I. M. Yost Mill in Hays, completely renovated after a fire in September 1885. It was resurrected as a three-story stone building with a Mansard roof, equipped with

19. *Ibid.*, September 1, 1887, August 9, 1888.

20. *Ibid.*, August 9, 1888.

21. *Inman Independent*, March 17, 1891.

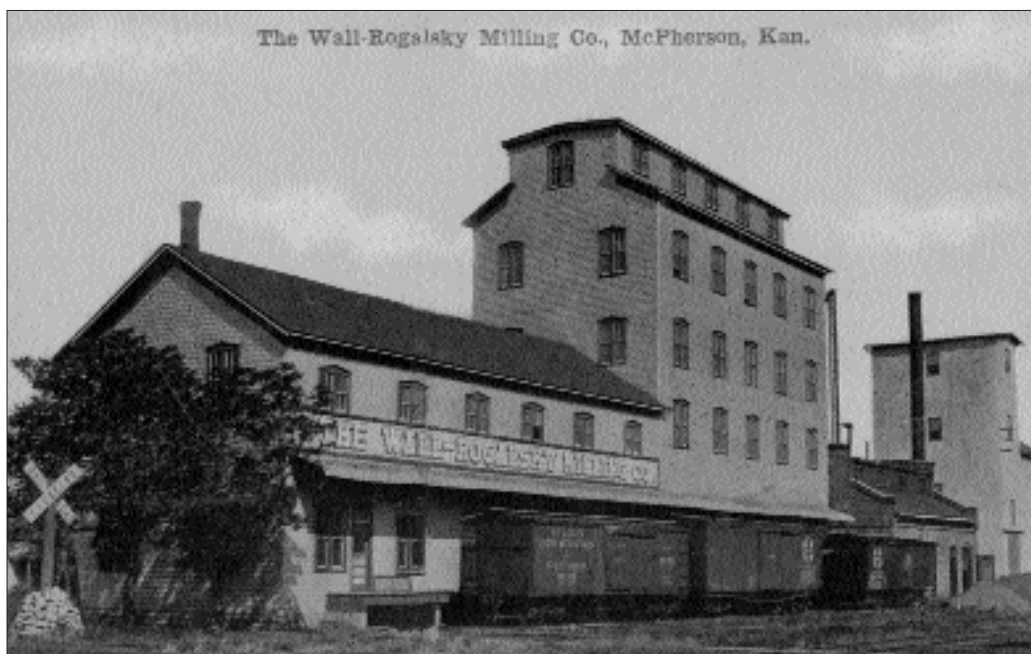
22. *Ibid.*, July 14, 1891.

23. Allen Pauls, “The History of the Milling Industry in Inman, Kansas,” in *A Centennial History of Inman, Kansas, 1887–1987* (no imprint), 168–71; also published in *Heritage of the Great Plains* 21 (Summer 1988): 32–37.



Hoffman Mill, Enterprise

Wall–Rogalsky Milling Company, McPherson



sixteen sets of steel rollers (made in New York), “a countless array of pulleys and bits,” and a powerhouse that “has no equal” of two 125 HP boilers. Probably one of the largest mills at the time, it employed 125 men on double shifts running day and night, which was usual for most flour mills

with modern equipment, especially after it was updated with new Allis–Chalmers machinery in 1902. Yost Mill expanded rapidly from a 150-barrel capacity in 1891 to 240 in 1899, 700 in 1905, and as Hays City Flour Mills in 1918, 1,100 barrels capacity with sixteen double stands of steel rollers.²⁴

Another cowtown that found survival in grinding hard wheat was Abilene. In 1884 Jountz and Rice Mill Company operated mainly on runs of stone, producing 200 barrels of flour each day. By 1887 it was using eleven sets of double steel rollers to produce 250 barrels a day, and by 1905 (redesignated Security Milling Company) it had eighteen double roller stands turning out 600 barrels a day. Its only local competitor, Abilene Mills and Elevator, was producing 330 barrels a day in 1905. By 1926 Security was up to 900 barrels a day, and Abilene Mills was ahead with more than 1,000 barrels a day.²⁵

One of the largest milling centers of central Kansas, however, was Salina, starting strong with Salina Mill and Elevator Company that produced five hundred barrels of flour a day from stone burrs in 1884, adding steel rollers by 1887 with the same capacity. Its rival, Western Star Mills with fifteen double sets of steel rollers, was up to three hundred barrels by 1892. Just outside of town to the

24. “Rebuilding Yost’s Mill in 1885,” *Hays Daily News*, October 9, 1955, in “Ellis County Clippings,” vol. 4, 25–26, Library and Archives Division; *Sanborn Fire Insurance Maps*, Hays, Kansas (1891); *ibid.* (1899); *ibid.* (1905); *ibid.* (1918).

25. *Sanborn Fire Insurance Maps*, Abilene, Kansas (1884); *ibid.* (1887); *ibid.* (1892); *ibid.* (1905); *ibid.* (1917); *ibid.* (1926).

southeast, Smoky Hill Mills continued to run mainly on water power and with stone into the 1890s when it disappeared from the maps. By 1899 Lee–Warren Milling Company entered the picture with twelve double sets of rolls and a 345-barrel capacity. The new and impressively large Shellabarger Milling and Elevator Company by 1905 was producing 1,150 barrels a day with twenty-nine sets of rollers. All of these companies continued to expand and flourish. By 1926 the Salina mills ranked as follows: Shellabarger, 2,000 barrels a day; Lee–Warren, 1,800; Weber Flour Mills, 1,700; Robinson Milling, 1,300; and Western Star, 900.²⁶ The town certainly was one of the largest milling centers in Kansas at that time.

Many new mills started from humble origins. Christian Hoffman, an immigrant from Switzerland, settled in Enterprise in 1868, and with Jacob Ehrsam, erected a water-powered mill. It gradually gained size with the addition of steam engines, a railroad connection, and, most important, steel rollers. Finally a one-hundred-thousand-bushel grain elevator was added in 1891. Whether it really had the distinction, according to a local historian, of being the first to mill hard wheat is debatable: “The Hoffman mill had the proud distinction of being the first mill in Kansas to demonstrate the superiority of hard wheat over soft wheat, and to advocate the growing of hard wheat among farmers.”²⁷ But it certainly marked the trend. It was one of the largest early roller mills with thirty-one stands of double rollers on the second floor of a four-story mill by 1905 and a capacity of one thousand barrels of flour per day, larger than any mill in nearby Abilene, which it sustained through the 1920s. Also unique was that it switched to electricity from the original water power source with sets of turbines as early as 1905. This provided surplus energy for the town and for a separate corn and rye mill with a 150-barrel capacity.²⁸

Charting the steel roller system conversion and expansion is elusive, as mill records are almost nonexistent. Some roller mills are dated from the time of the commencement of operation with stone grinders, hazily converting to the new technology at some

point along the way. The numbers of stands of steel rollers arriving in mill towns in the 1880s and 1890s cannot be precisely known. Growth often was slow. Since mills were a major fire concern, the *Sanborn Fire Insurance Maps*, documenting fire protection, provide many essential details. For example, Keystone Roller Mills commenced in Larned in 1887 with six double sets of rollers powered by a fifty-two-horsepower engine. It expanded to seven sets with a sixty-seven-horsepower engine by 1892. By 1911 production increased from 100 to 150 barrels of flour per day. Keystone apparently had abandoned other farm services, since Anderson and Shallenberger Grist Mill was built in 1909 with corn shellers and corn cribs.²⁹

Similarly, Queen Bee Mill in McPherson operated with “four run of stone” in 1884. But by August 1887, under the new management of Colburn and Hamilton and renamed Queen Bee Roller Mills, it had six double sets of steel rollers. Production expanded from a maximum of 125 barrels a day in 1892 to 325 in 1902. By 1908 it had eleven double stands of rolls, a 225-horsepower steam engine, and a capacity of 400 barrels of flour a day. Queen Bee, however, was challenged as the leader by the new Wall-Rogalsky Milling Company, built in 1906, with nine double stands of rolls and a 450-barrel capacity.³⁰ The latter represents a trend to new construction of larger and consolidated mills that appeared in the early part of the century, another leading example being the new Eagle Milling Company in Newton that in 1919 had eighteen stands of rolls with a 700-barrel capacity, outstripping the Warkentin mills. Rebuilt in 1918 as Goertz Flour Mills Company, this modern plant could pack 1,250 barrels of hard wheat flour daily.³¹

The following partial list of this remarkable expansion of mill development, with dates (and known recorded founders) and in alphabetical order, is adapted from the best and most complete surveys, especially one conducted by the Woman’s Kansas Day Club in 1987, with added information from other sources.³²

29. *Ibid.*, Larned, Kansas (1887); *ibid.* (1892); *ibid.* (1905); *ibid.* (1911).

30. *Ibid.*, McPherson, Kansas (1884); *ibid.* (1887); *ibid.* (1892); *ibid.* (1902); *ibid.* (1908); *ibid.* (1914). In 1927 Queen Bee and Wall–Rogalsky were still major operating mills with capacities of five hundred and eight hundred barrels a day, respectively. *See ibid.* (1927).

31. *Ibid.*, Newton, Kansas (1909); *ibid.* (1915); *ibid.* (1926).

32. Woman’s Kansas Day Club, “Mills–Milling–Millers”; *Sanborn Fire Insurance Maps*, selected towns and dates. Some dates are adapted to the time of installation of rollers. Monarch Mill in Newton, for example, began operation as a stone burr mill in 1879. *See Steen, Flour Milling in America*, 210–42.

26. *Ibid.*, Salina, Kansas (1884); *ibid.* (1887); *ibid.* (1892); *ibid.* (1899); *ibid.* (1905); *ibid.* (1911); *ibid.* (1926).

27. Ellen Welander Petersen, *A Kansan’s Enterprise (The Story of Enterprise, Kansas)* (Enterprise, Kans.: Enterprise Baptist Church, 1957), 29–30. Hoffman is also known in Kansas history for his promotion of socialist ideas, while being one of Kansas’s most successful capitalists.

28. *Sanborn Fire Insurance Maps*, Enterprise, Kansas (1905).

KANSAS FLOUR MILLS, 1870–1920

Includes year of establishment and/or conversion to rollers. Name of founder, if known, is in parentheses.

- Abilene, JOHNTZ AND RICE MILL COMPANY: ca. 1883; renamed SECURITY FLOUR MILLS 1905
ABILENE MILLING COMPANY: 1879
ALMA ROLLER MILLS: 1880; conversion 1899
Atchison, BLAIR MILLING COMPANY: 1868; conversion 1920
BUHLER MILL AND ELEVATING COMPANY: 1892 with rollers (Wiens and Wall)
COLDWATER MILLING COMPANY: 1890 with rollers
COLBY ROLLER MILLS: 1899 with rollers (Chelf)
CONCORDIA ROLLER MILLS: conversion 1892
Cottonwood Falls, SHIPMAN MILL: conversion ca. 1888
ELLINWOOD WOLF MILLING COMPANY: 1877; conversion 1908
ELLSWORTH FLOURING MILLS: 1889 with rollers (Janzen)
Enterprise, CHRISTIAN HOFFMAN AND SON FLOUR MILL: 1867; conversion ca. 1885; renamed KANSAS FLOUR MILLS COMPANY ca. 1910
GARDEN CITY ROLLER MILLS: 1890 (Dodds)
Great Bend, BARTON COUNTY FLOUR MILLS: 1890s with rollers
GREAT BEND MILLING COMPANY: 1889?
HALSTEAD MILLING AND ELEVATOR COMPANY: 1875 (Warkentin)
Hays, I. M. YOST MILL: 1872; conversion 1885; renamed HAYS CITY FLOUR MILLS ca. 1910
Hays, SAN FRANCISCO MILL: 1877 (Andreas Meier)
Hutchinson, FIRST WATER MILLS: 1883; renamed HUTCHINSON MILL COMPANY 1899
Hutchinson, WILLIAM KELLY MILLING COMPANY: 1883; conversion 1896
Hutchinson, RENO FLOUR MILLS: 1918
INDEPENDENCE FLOUR MILLS COMPANY: 1883 with rollers (Bowen)
Inman, ENNS MILLING COMPANY: 1892
Kansas City (including Missouri), FLOUR MILLS OF AMERICA: 1926
Kansas City, ISMERT–HINCKE MILLING COMPANY: 1905
KANSAS CITY MILLING COMPANY: 1919 (Kaul)
Kansas City, KANSAS FLOUR MILLS CORPORATION: 1914
Kansas City, LARABEE FLOUR MILLS COMPANY: 1919 (Larabee consolidation)
Kansas City, MIDLAND FLOUR MILLING COMPANY: 1919 (Warkentin)
Larned, BURNETT BROTHERS MILL: 1883?
LARNED CITY MILLS: 1885 (Van Horn Bros); renamed FARMERS MILLS AND ELEVATOR COMPANY
Larned, GRANT MILL: 1905; renamed WESTERN FLOUR AND MILLS COMPANY ca. 1905
Larned, KEYSTONE ROLLER MILLS: 1887 (Creed, Holloway, and Jost)
Lawrence, BOWERSOCK MILLS: 1880
Leavenworth, J. C. LYSLE MILLING COMPANY: 1882; conversion 1898
Lindsborg, SMOKEY VALLEY ROLLER MILLS: 1872; conversion 1888; reconstructed 1898
LOGAN MILL: ca. 1890 (Hansen)
Lyons, CENTRAL KANSAS MILLING COMPANY: 1904
LYONS FLOUR MILLING COMPANY: 1874 (Holst and Eisenmayer); conversion 1907
MAGRUDER MILL: 1887
Manhattan/Milford, STREETER MILL: 1883; conversion 1894
McPherson, EAGLE ROLLER MILLS: 1883; conversion by 1887
McPherson, PEARL MILLING COMPANY: 1894
McPherson, QUEEN BEE ROLLER MILLS: 1880?; conversion 1887
McPherson, WALL–ROGALSKY MILLING COMPANY: 1906
Medicine Lodge, ELM CREEK ROLLER MILLS: 1883 (Dexter)
Newton, CLAASSEN FLOUR MILLS: 1885; conversion 1898
Newton, MONARCH MILL: 1879; conversion 1886; renamed NEWTON MILLING AND ELEVATOR COMPANY
NEWTON CITY MILLS: 1893 (N.M. and E. Company)
Newton, EAGLE MILLING COMPANY: ca. 1900; renamed GOERTZ FLOUR MILLS COMPANY 1918
OXFORD MILL: 1874; conversion date unknown; still operating with modern machinery
Salina, H. D. LEE FLOUR MILLS; conversion 1899
SALINA MILL AND ELEVATOR COMPANY: 1882
Salina, SHELLABARGER MILLS: 1883; conversion 1910
Salina, UNDERWOOD MILL: 1898
Salina, LEE–WARNER MILL: 1899
Salina, WEBER FLOUR MILLS: 1917
STAFFORD FLOUR MILL: 1892 (Labaree)
STAFFORD COUNTY FLOUR MILLS: 1904 (Krug); still operating with modern machinery
Sterling, ARNOLD–MADAUS MILLING COMPANY: 1883; conversion 1916?
ST. JOHN FLOUR MILL: 1898
Topeka, KAW MILLING COMPANY: 1886 (Nicolson)
Topeka, WILLIS NORTON COMPANY: 1875; conversion 1892
TOPEKA FLOUR MILLS: 1882
Wellington, HUNTER MILLING COMPANY: 1877; conversion 1889
WELLINGTON MILLING COMPANY: 1903 (Moodie)
Wichita, CONSOLIDATED FOUR MILLS: 1918
Wichita, KANSAS MILLING COMPANY: 1906 (Lassen)
WICHITA FLOUR MILLS: 1914 (Kinney)
Wichita, RED STAR MILLING COMPANY: 1908 (Hurd)

The breakthrough period for the introduction of modern roller mills technology was 1883–1887 with the concentration in Newton, Salina, and Hays and the diagonal area across the central part of the state in between. Others quickly followed in what was rapidly becoming *the* hard wheat belt of central Kansas. Roller mills exceeded the number of older burr mills for the first time in 1889, according to one report, but this may not have included a number of small grist mills, which continued to run, mainly for corn. The new mills were larger and built for sustained day and night operation.³³ The year 1892 is about the average date for conversion, coinciding with major rises in wheat acreage. But these were still rough times for the new mills, even with modern machinery. A number of bad crop years, economic depression, and general uncertainty retarded growth and threatened the promising milling developments in the 1890s. What really made the difference was a substantial new rural and urban mill town population that settled in Kansas in the 1870s and 1880s and came for the long haul. They were adaptable to change and modern innovations, and, most important, welcomed more.

Certainly, credit is due to the millers who saw opportunities and invested capital in building and equipment. Some were of Mennonite Russian background, such as Warkentin; some came from eastern American origins as were the Colburns from Pennsylvania; still others were from various European backgrounds. Most settled in as permanent and substantial fixtures in their communities. A few were known for their eccentricities. Christian Hoffman of Enterprise came from Switzerland, where his family had been in the milling business, to manage one of the most productive and enduring of the small-town mills in Enterprise. He may already have known about the roller process from Switzerland, but he also was impressed by an exhibit of new equipment in Cincinnati in 1880. His first mill in Enterprise was one of the largest in Kansas in 1881, with eight sets of stone burrs and a three-hundred-barrel capacity a day. The first replacement of steel rollers occurred in 1883, followed by a substantial renovation in 1890.³⁴ In Kansas he also was known as an advocate of radical socialist ideas.

33. Johns, "Development of the Flour Milling Industry in Kansas," 75. These years also coincide with especially good yields: 1889, thirty-five million bushels; 1891, fifty-nine million; 1892, seventy-five million. The last figure would not be surpassed until 1900. See Margaret Scofield, "Why Kansas Grows Wheat" (master's thesis, University of Kansas, 1924), table 2, appendix on wheat production compiled from Kansas State Board of Agriculture reports.

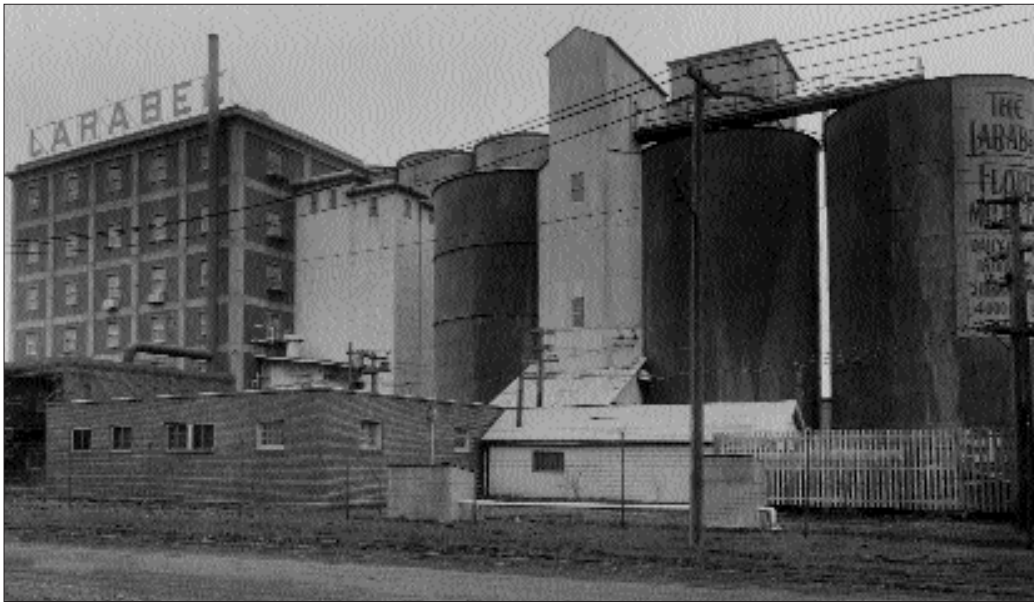
34. Reed C. Hoffman, "A Brief Life Sketch of Christian Hoffman," in "Dickinson County Biographical Sketches," vol. 3, Library and Archives Division.

Another stage in the economic shift of Kansas from corn to wheat and from wheat to flour occurred around the turn of the century in two different ways. First, the newly formed Kansas Millers Association committed itself, and the state, to the kind of hard wheat known as Turkey Red, which was a generic term that included a number of sub-varieties introduced from Russia, mainly from the southern regions of Ukraine, including Crimea, Kharkov (1900), and Kanred (1917). More new strains were developed: Blackhull (1917), Kanvale, and Pawnee, by a process of selection through mutant stalks, pioneered by Kansas State Agricultural College and agronomist Edward Shelton.³⁵ A major commitment to this particular Turkey hard wheat was the purchase in 1900 of a shipload of original stock by Warkentin from Crimea that was quickly distributed around the state; this was most likely the truest Turkey Red, a hard red winter wheat resistant to winter kill and common spring insects and diseases, which produced high-gluten, protein-rich bread flour, and, most important, could be efficiently processed by the new steel roller mills. The result was another jump in wheat production to yields of nearly one hundred million bushels in 1901 and 1903, not to be surpassed until 1914.³⁶ To do business with Kansas millers this was the grain a farmer must sow. The transition from remaining soft varieties to hard wheat followed with soft wheat relegated to small fields in the eastern part of the state.

A major impediment for marketing flour produced in Kansas had been higher rail rates. Minnesota with its Great Lakes shipping routes and terminals had a distinct advantage over the Central Plains in the eastern American and trans-Atlantic markets. Again, the Kansas Millers Association came to the rescue, although railroads also realized the potential gain in compromising in the large-scale handling of flour. The negotiated result by the 1890s was a new continuous transport charge, milling in transit, that allowed wheat to be hauled from its source on the farm to the nearest rail pickup and on to a mill down the track, where it

35. For the development of Blackhull, an offspring of Turkey Red, which often had a bluish color just before harvesting and was hardier and more productive, see L. E. Call and John H. Parker, "Blackhull Wheat," in Kansas State Board of Agriculture, *Twenty-third Biennial Report, 1921–1922* (Topeka: Kansas State Printing Plant, 1923), 185; John H. Parker, "Wheat Improvement in Kansas, 1874–1934," in *ibid.*, *Twenty-ninth Biennial Report, 1933–1934* (Topeka: Kansas State Printing Plant, 1935), 145–47; Homer Socolofsky, "History of Wheat," in *Wheat-Field to Market: The Story of the Golden Crop*, 2d ed. (Hutchinson: Kansas Wheat Commission, 1969), 16; Saul, "Myth and History," 1–13.

36. Scofield, "Why Kansas Grows Wheat," table 2.



Larabee Mills, Hutchinson

Ismert-Hincke Milling Company, Topeka



was ground into flour and then sent to its destination at one long-haul rate. This, along with the development of a barge transportation system on the Mississippi and Missouri Rivers, made Kansas flour as competitive in price and quality in eastern and European markets as any other grown.³⁷

37. Johns, "Development of the Flour Milling Industry in Kansas," 89–95.

cereal producers. Industrialization and urban growth in America had created a concentrated market of people, many of them from central, eastern, and southern Europe. These populations, accustomed to hard wheat flour, now

38. *Milling in Kansas*, 20.

The number and size of mills and the flour output continued to grow. In 1910 the largest number of mills in the state's history was recorded: 533.³⁸ Subsequently, many older style grist mills closed, while the new mills consolidated and expanded in size. Expansion of the mill/wheat development in Kansas was perfectly poised for the extraordinary demand for flour that was created by World War I, when America's chief competitor on the world market, Russia, was completely cut off from its main outlets in the Black and Baltic Seas, while war demand from Britain, France, and other countries soared. The acreage devoted to wheat in Kansas also soared, as rewards were reaped by farmers, exploiters, and, of course, millers, to meet the new European and rising American demands. Two other developments were beginning to shape the industry before World War I: large-scale processing into consumer products and enterprise consolidation.

In the early years of this century more and more flour was being sold by Kansas millers, not directly or indirectly by the sack to consumers but in large sacks by the carload to large-scale bakers and

found it inconvenient to bake their own bread and instead bought inexpensive ready-to-eat products ranging from basic breads to cereals, pastries, pasta, and biscuits. Businesses involved in this processing emerged into giant international service companies: for example, Holsum Bread Company, National Biscuit Company (Nabisco), C. W. Post, Kellogg, General Mills, and others in the early twentieth century. This development was naturally of major importance to millers, and they quickly responded to the opportunities and demands of this new market.³⁹ Some would succeed while others failed in facing this new large-scale, competitive market with its capital requirements and need for marketing skills.

Shipping in volume to expanding customers was a major factor that drove the consolidation of milling into larger and larger units that had easy access to a transportation system geared to their needs. To compete, flour mills now required a nationwide advertising and marketing organization and an ability to fill large orders quickly. Some of the first successful consolidations occurred in Kansas and were of two forms: individual, and cooperate or associational. The Larabee brothers, Frank and Frederic, started with a comparatively small but quite successful mill in Stafford. By 1916 they had expanded by buying or erecting mills in Hutchinson, Clinton, Wellington, Marysville, and outside Kansas in St. Joseph and Sioux Falls. In 1919 their headquarters moved to a new milling center in Kansas City. Similarly, Kansas Flour Mills Corporation started from a background in the mill founded by Christian Hoffman in Enterprise. In 1912 a corporation was founded by joining to it other mills in Pratt, Kingman, Anthony, Great Bend, and Arkansas City, with headquarters in Wichita, until it also moved to Kansas City in 1916.⁴⁰ Larabee Flour Mills and Kansas Flour Mills Corporation were among the leaders in the industry at the advent of World War I.

The war marked an important turning point because of the exclusion of Russian grain from the world market and the increased demand for grain-flour products by the war's participants. The acreage devoted to wheat production grew enormously, partly due to speculators. In 1915

for the first time United States wheat yields surpassed those of Russia: 1,025,901,000 bushels versus 830 million, but none of the Russian grain could reach the world market because of the war. By 1920 American production advanced, while Russian yields, reduced by revolution and civil war, dropped precipitously to only 450 million bushels. Meeting this market challenge and expanding further, Kansas grew 15 percent of the total world's supply of wheat in the 1920s, and most of it left the state as flour. This climax stage featured the big mills, some of them expanded survivors of the original roller mills, especially Wall-Rogalsky Milling Company in McPherson, Larabee Mills, Goertz Flour Mills in Newton, and Enns Mills in Inman. But the sign of the future was more consolidation: Ismert-Hincke Milling Company of Topeka, Bonner Springs, and Kansas City; Blair Milling Company of Atchison; Red Star Milling Company in Wichita; and Sawyer Milling Company in Hutchinson. Finally, and another sign of these "bigger is better" times, Pillsbury of Minneapolis purchased Atchison Milling Company in 1922, linking the two major centers of American flour milling.⁴¹

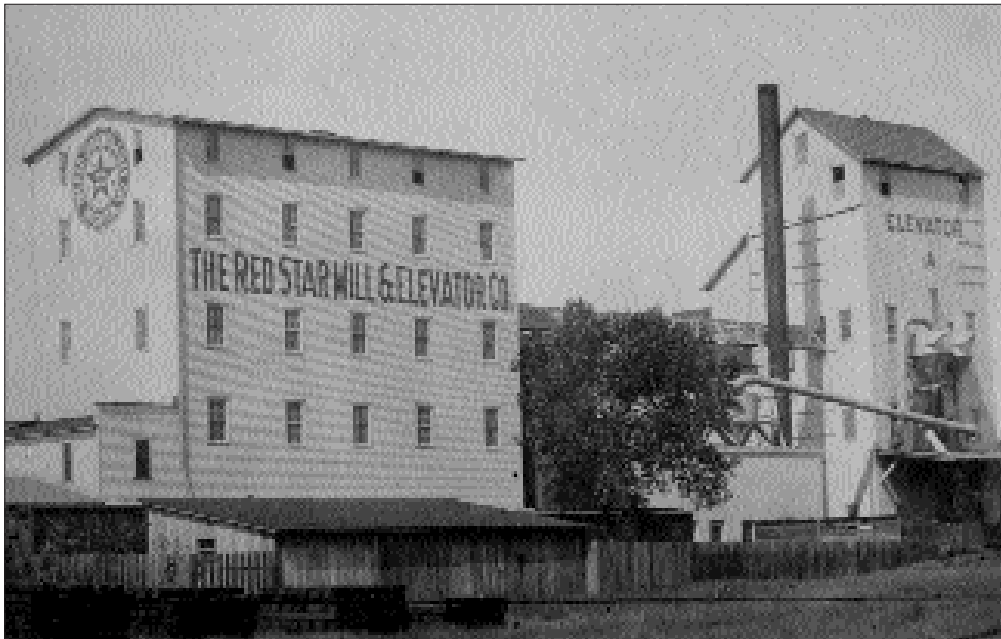
Consolidation, while virtually eliminating the typical free-standing, family-owned mill, clearly symbolized the triumph of Kansas hard wheat flour at home and abroad by 1920. By that date, Kansas City, including both the Missouri and Kansas sides (but each using Kansas hard red wheat) surpassed Minneapolis-St. Paul and was second only to Buffalo in flour production. By this time milling in Kansas was concentrated in Abilene, Salina, McPherson, Topeka, and Wichita, in addition to Kansas City but still with a number of important mills in small towns. In 1928, as a sign of the times, Red Star mills in Wichita merged into General Mills, the largest flour producing corporation in America. Through World War II, largely thanks to the foundation development of Turkey Red wheat, the well-developed roller mills technology, and the enterprise of the rural-urban cooperation of the people of the state, Kansas led all others in flour production by a wide margin, double that of the next largest state, New York.

After the fact of these hard wheat and milling technology triumphs, the *Northwestern Miller* recalled a piece of a skit, entitled "Milling Revolution," first performed at its 1890 convention in Minneapolis:

39. The pages of *Northwestern Miller* in the 1920s devoted as much space to baking and bread and cereal marketing as to milling.

40. Steen, *Flour Milling in America*, 310-15.

41. See *Northwestern Miller*, 1920-1922.



Red Star Milling Company, Wichita

Pillsbury Mills, Atchison



Out go the stones!
 Out go the stones!
 How the Dare Thought of it
 Rattles our Bones!
 Tear her upside down;
 Yank her inside out;
 Make the old mill new again,
 Everybody shout!
 Throw away the old;
 Put in the new;
 And that's the only proper way,
 For millers now to do.⁴²

This American creed of positive pragmatism ushered the Great Plains into the twentieth century and to being the major supplier of “the Bread of Life.”

The southwestern wheat region, mainly Kansas, rose rapidly in importance in the early twentieth century. In 1899 it produced only around nine million barrels of flour in contrast to the northwest’s (Minnesota’s) twenty-seven million. By 1919 the two regions were nearly even: twenty-eight to thirty-two million barrels, and in 1925 the hard winter wheat of the southwest had clearly won out with a margin of twenty-nine to twenty-six million barrels of flour.⁴³ During this period, hard red winter wheat (Turkey Red varieties) gradually grew from three hundred million bushels in 1900 to more than five hundred million, about 60 percent of the total U.S. wheat production in 1930. By 1923 Kansas City had outstripped Minneapolis in the production of flour, and as a result two-fifths of the

42. “A Souvenir of the Past,” *ibid.*, October 11, 1922.


43. Victor G. Pickell and Roland S. Vaile, *The Decline of Northwestern Flour Milling* (Minneapolis: University of Minnesota Press, 1933), table 4, 71.

American yield of wheat was Turkey Red. The zone of planting now expanded to include nearly all of Kansas, most of Oklahoma, an extension into the Texas Panhandle, Nebraska, and western Iowa. Exports counted for less than might be expected: 16 million barrels out of a total American marketing of 113 million in 1923, domestic baking accounting for most of the consumption.⁴⁴

As is clear from the pages of the milling journals, a major part of the grain-flour revolution was due to another area of new technology: large-scale baking operations, beginning around 1900. By the 1920s much of the flour from Kansas was sold, not directly to consumers, but at home and abroad, by the carload, to large baking companies such as Craig and Grant in Scotland, Holsum, Reger, and National Biscuit. The grain was another incalculable factor as hard wheat flour was much preferred by these enterprises. Could all of this have occurred without the introduction of Turkey Red, which dominated wheat planting in central Kansas during the first half of the twentieth century? Even the new hybrids owed much to Turkey Red origins, beginning with Tenmarq (1920) through Pawnee (1949–1954), Triumph (1950s), Wichita (1960s), Scout (1969–1974), Centurk (1970s), and Newton (1980s), all of which continued to meet the world competition with the best yields and the most nutritious flour.⁴⁵

Climate and soil conditions, fortuitous land policies (railroad land grants and homesteading), accidents of immigration, market and transport accommodations, scien-

tific research and experimental plant development, and milling industry advances dictated a concentration of the hard wheat-flour industry in the region from Cheyenne County in the far northwest corner of the state to Sumner County in the south-central, with bordering areas in southwest Nebraska and north-central Oklahoma, forming the miracle tract across most of the state: the Turkey Red belt, which expanded in the 1920s to include much of Nebraska and western Iowa and extended into the Texas Panhandle. In the middle of this belt mill town Kansas grew and prospered. All that was needed for it to prosper further was a secure, stable environment and an expanding market, which was conveniently provided by a great influx of immigrants in these years from eastern and southern Europe—Jews, Poles, Ukrainians, Greeks, Armenians, Serbs and Croats, Italians, and of course local Mennonites and Volga Germans. All craved rich hard wheat flour for crusty rolls and good bread and an array of pasta products. Settling in immigrant ghettos in large cities such as New York, Chicago, Cleveland, Boston, Detroit, St. Louis, Kansas City, and even Topeka and Lincoln with their Volga German influx in the 1890s, they were largely dependent on ready-made products. Turkey Red wheat, steel roller mills, efficient and inexpensive rail and barge transportation, and mass production bakeries came to the rescue.

But, lamentably, as with so many major economic transformations, there is also another side of the picture: the impact on Plains Indian culture, water supplies, and soil erosion. Human endeavor and ambition, technology, government policy, and immigration triumphed over nature. Subsequent overcultivation led to the Dust Bowl that darkened those wonderful blue skies of Kansas. The future of wheat cultivation and flour milling in the state remains an open question. 

44. Storck and Teague, *Flour for Man's Bread*, 275; *ibid.*, 27, 70.

45. Dana G. Dalrymple, "Changes in Wheat Varieties and Yields in the United States, 1919–1984," *Agriculture History* 62 (Fall 1988): 24–28.