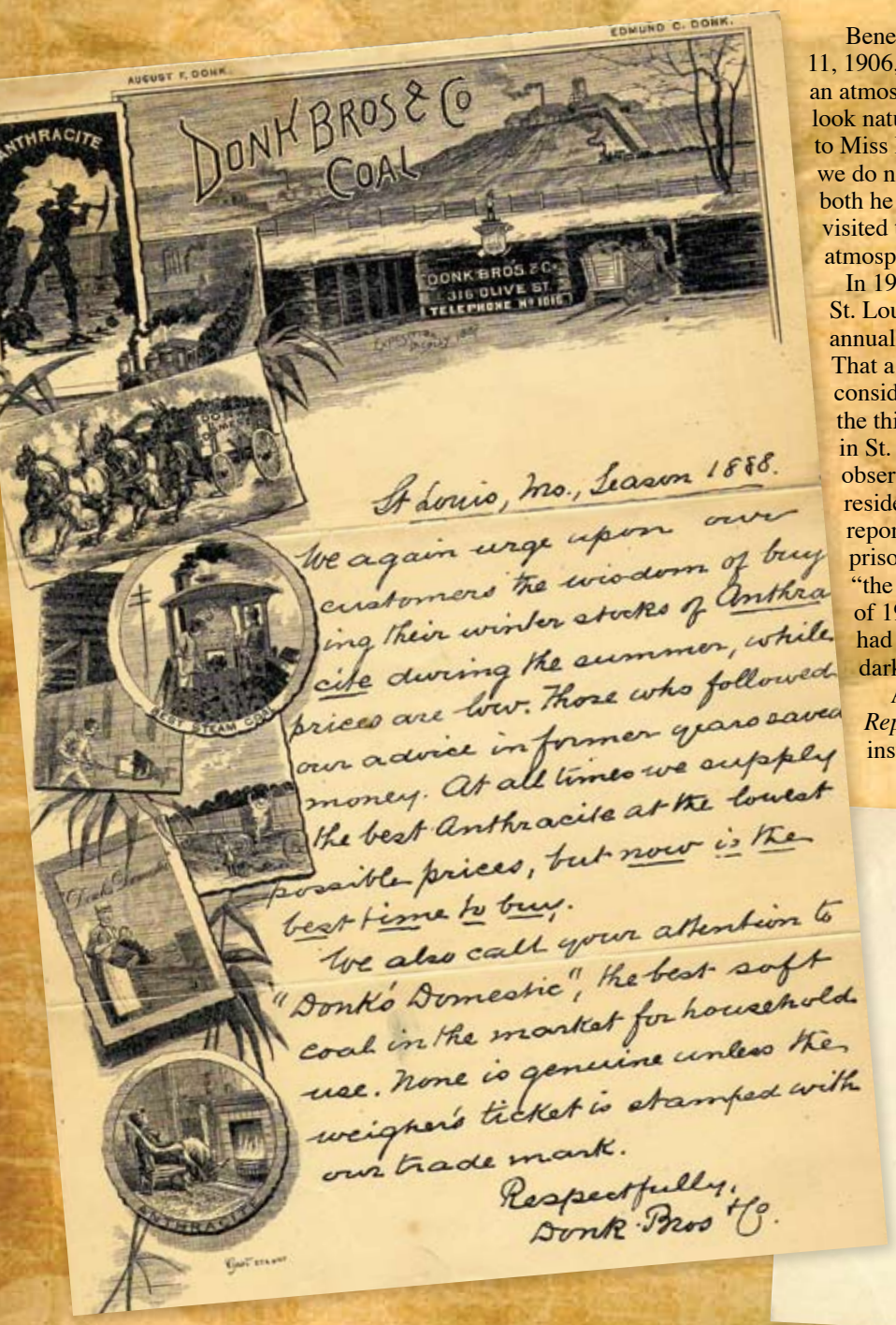
"It don't look natural": St. Louis Smoke Abatement in 1906

BY DAVID STRAIGHT



Beneath a view of the St. Louis skyline on February 11, 1906, Curt penned, "Did you ever see St. Louis with an atmosphere as clear as shown on this picture? It don't look natural." He mailed the postcard with his question to Miss Bess N. Morgan at Fort Riley, Kansas. While we do not know her reply, Curt's question suggests that both he and Bess were St. Louis residents, or at least visited the city frequently enough to be familiar with its atmosphere.

In 1906, coal was the most commonly used fuel in St. Louis. Of the approximately 7,250,455 tons burned annually, almost 95 percent was bituminous coal.[1] That a clear sky during the winter of 1906 would be considered unnatural gives testimony to the severity of the thick, black smoke produced by burning soft coal in St. Louis homes, offices, and factories. Curt's smoke observation no doubt echoed the experiences of many residents. For example, the *St. Louis Post-Dispatch* reported in March 1905 that thick smoke prevented prisoners from being put to work in the quarry due to "the risk that many of them would escape"; in the fall of 1906, the *Globe-Democrat* noted that coal smoke had closed many public schools "on account of the darkness."[2]

As early as January 1823, the *Missouri Republican* reported that "smoke has been in some instances so dense as to render it necessary to use

candles at midday."[3] When the great hardwood forests surrounding St. Louis and in the American Bottom across the Mississippi River were exhausted in the 1820s, St. Louis began burning soft bituminous coal, readily available from Illinois mines. Coal smoke plagued St. Louis for more than a century until burning soft coal was banned in 1940. Smoke abatement crusades ebbed and flowed with periods of activity disrupting long stretches of resigned acceptance that coal smoke was a necessary by-product of progress as well as an emblem of growth. The year of Curt's post card, 1906, was one of public debate in St. Louis about the best tactics for controlling coal smoke.

The first St. Louis smoke ordinance, passed in 1867, required that smoke stacks be at least twenty feet higher than the adjacent structures. Most likely, this was prompted by a successful lawsuit which awarded a Mr. Whalen $50 in damages from his neighbor, a Mr. Keith, for a stovepipe pouring smoke onto his property.[4] By the 1880s, the Engineers' Club of St. Louis had taken up the smoke question and concluded that the obvious solution—banning the burning of soft coal—was impractical, as it would be too costly to St. Louis industry and risked destroying the growth and prosperity of the city. They advanced two solutions: educating boiler operators in the proper methods of combustion to burn soft coal without smoke, and inventing a device that would capture or eliminate coal smoke. This engineering approach to smoke abatement framed the debate until the late 1930s.

In 1893, St. Louis enacted its first ordinance prohibiting "the emission into the open air of dense black or thick gray smoke." However, language drafted by the Engineers' Club exempted most firms because none of the anti-smoke devices market actually worked as well as their exaggerated claims. Furthermore, the Missouri Supreme Court overturned the ordinance as unconstitutional because the city had exceeded its authority.[5] After the Missouri legislature declared smoke a nuisance in cities over 100,000 people, St. Louis passed a series of smoke ordinances between 1901 and 1904 that declared the "emission or discharge into the open air of dense smoke" to be a misdemeanor, carrying a fine of $25 to $100 each day that smoke was discharged. The city created a Smoke Abatement Department consisting of the Chief Smoke Inspector, paid $150 per month, and five Deputy Smoke Inspectors, each paid $100 per month. Again, the ordinance contained a crippling loophole exempting those who could show "that there is no known practicable device, appliance, means or method" that could have prevented their discharge of smoke.[6]

As St. Louis prepared for the World's Fair, there was considerable emphasis on making the whole city a modern urban showcase for the millions who would visit. Speaking to the Engineers' Club in 1901, William H. Bryan concluded, "I am in hopes that the World's Fair authorities will handle this problem [smoke] in an effective manner. What could be more interesting and valuable than to show an immense power plant developing thousands upon thousands of horse power burning our own smoky fuels with perfectly clear stacks? We can do this successfully, and with a wide choice of apparatus. In so doing we would give an object lesson to the world."[7] With the World's Fair located a few miles west of the industrial parts of the city and mostly during summer months when heating was not required, smoke was not a notable problem on the Fairgrounds.

A late addition to the World's Fair exhibits included the nation's first coal testing plant operated by the U.S. Geological Survey (USGS). As the Fair was opening, Congress appropriated $60,000 for testing "the coals and lignites of the United States, in order to determine their fuel values and the most economical method for their utilization," but required that all the machinery used and coal samples tested be donated. With this restriction,

Born in Germany, August and Edmund Donk immigrated to Peoria, Illinois, as boys. In 1863, August, the older, began his own coal company in St. Louis. His younger brother joined the firm five years later; together they became one of the largest coal merchants in St. Louis. This 1888 advertisement was printed on the inside of a post office letter sheet. *(Author's Collection)*

The traveling link grate, one of the "wide choice of apparatus" to prevent smoke that William H. Bryan discussed in his 1901 report to the St. Louis Engineers' Club. *(Journal of the Association of Engineering Societies, December 1901, p. 228.)*

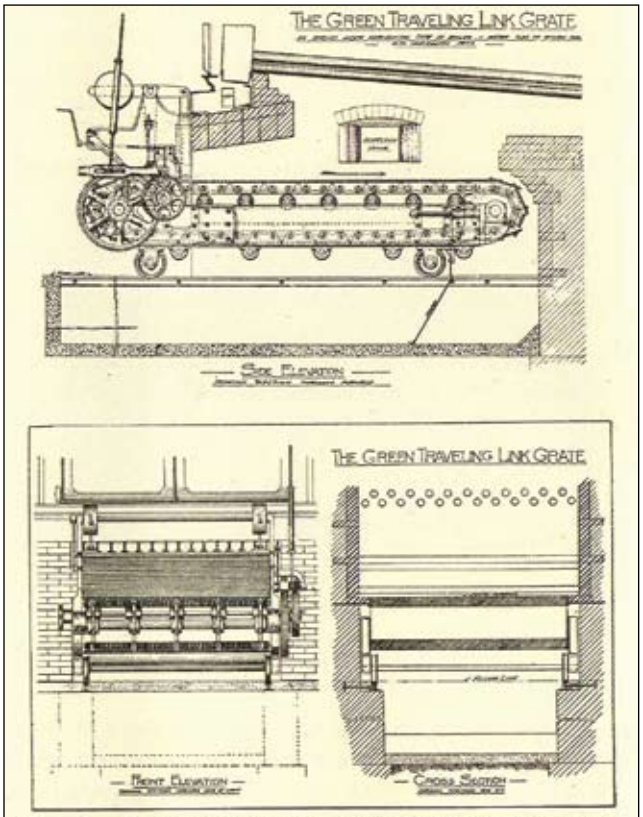
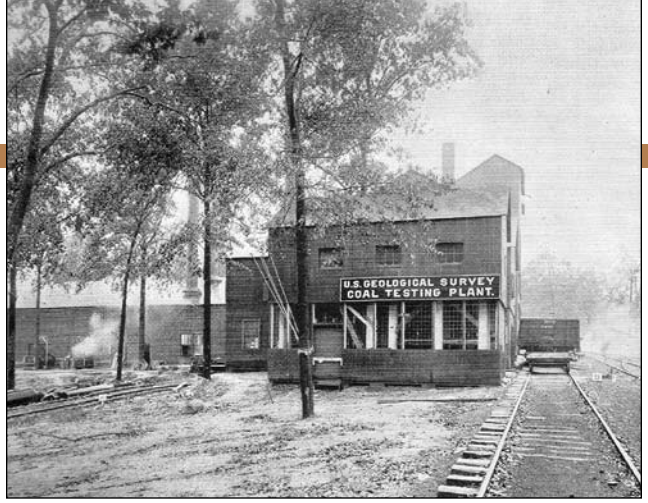


FIG. 6. THE GREEN TRAVELING LINK OR CHAIN GRATE.



The U.S. Geological Survey Coal Testing Plant was built in the back part of the World's Fair Grounds. *(Plate from Report on the Operations of the Coal-Testing Plant on the United States Geological Survey at the Louisiana Purchase Exposition, St. Louis, Mo., 1904.)*

testing did not begin until September 1904 when the World's Fair was half over. The initial USGS report, published in 1906, concluded that coal gasification was more energy efficient than simply burning bituminous and lignite coals under steam boilers.[8] Although smoke abatement was not discussed directly, engineers understood that fuel economy and smoke abatement were two sides of the same coin. Another report, *The Burning of Coal without Smoke in Boiler Plants,* was published in 1908. Washington University mechanical engineering faculty members were active in the USGS research and the department became a leader in smoke abatement and coal combustion research.[9]

Reading the Chief Smoke Inspector's May 1906 annual report, one could easily conclude that St. Louis would soon have clear skies. It listed 983 "manufacturing concerns and other plants" that had installed "smoke consuming devices" since 1901. It is interesting to note that only about ten percent of that number had switched to smokeless fuel or electric power; the balance were still burning soft bituminous coal. Additionally, there were 228 heating plants, that had reduced their smoke output by following instructions for the proper firing of a coal furnace supplied by the department. C. H. Jones estimated "that there has been a decrease of 80 to 85 percent in the emission of dense smoke from boiler plants in this city."[10] These findings seem incongruous when contrasted with Curt's observation.

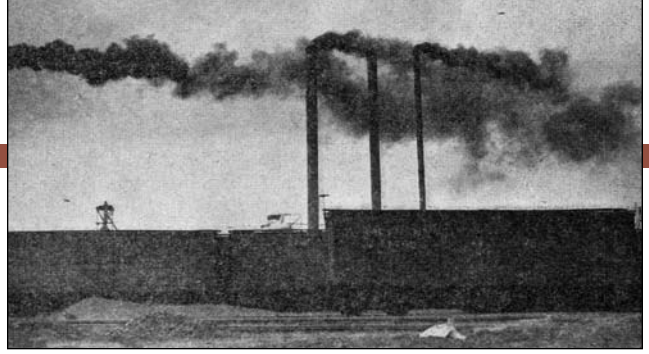
Knowing that the Civic League had spent the summer studying smoke, Jones published a preemptive rebuttal in October 1906 asserting that "a large majority of plants in the city are complying with the law." He claimed that the diary kept by his department showed only four smoky days since the first of the year, and two of these had east winds. Jones identified four sources for the remaining smoke in St. Louis: railroads, brick kilns, and blast furnaces, which have "no known smoke device that can be used"; furnaces in private residences whose smoke is "sufficient to cover the entire city"; remaining smoke from manufacturing plants due to "improper use of devices and careless stoking"; and smoke from East St. Louis, which "is sufficient to cover the downtown district as far west as Twelfth Street" when the wind is blowing from the east. He viewed prosecution as a last resort to be used only when violators refused to cooperate and were making no efforts to remedy the situation. Jones recommended new ordinances to license and regulate stationary firemen so that coal fires would be properly stoked and to regulate boilers to ensure that they were not overcrowded, poorly ventilated, or insufficient to their task.[11]

The Smoke Nuisance, published by the Smoke Abatement Committee of the Civic League in November 1906, began with a quote on the front cover—"The way to abate smoke is not to make it"—and offered a highly critical view of the St. Louis Smoke Abatement Department:

> It does not require the testimony of an expert to convince the people of St. Louis that the smoke nuisance has by no means been satisfactorily abated. The dense clouds of smoke that daily hang over the city, the layers of soot that filter into office, parlor and sleeping rooms, the throat irritation due directly to the sulfur fumes in the smoke-laden air, the injured trees and plants, the soiled linen and damaged merchandise are all good and sufficient evidence of the continued prevalence of this exasperating nuisance.[12]

Despite the aggressive tone and their condemnation of Jones for being too lenient in his prosecution of offenders, the recommendations of the Smoke Abatement Committee did not differ significantly from the solutions proposed by the Chief Smoke Inspector. After acknowledging the vast coal supplies within 100 miles of St. Louis and the substantially higher cost of anthracite coal, the committee concluded, "It is obvious that soft coal is and must continue to be the chief fuel of this city."[13]

Their report differed primarily in rejecting Jones' arguments that residential furnaces and East St. Louis were significant sources of smoke in St. Louis. "The amount of smoke received from East St. Louis, even when the winds are favorable, does not exceed ten per cent of the total amount produced on this side of the river."[14] Having interviewed coal dealers, the committee found that only ten percent the soft coal sold in the city was consumed in "domestic plants, open grates, stoves, ranges and furnaces."[15] Like Jones, the committee placed considerable emphasis on proper combustion. "Smoke is nothing more nor less than 'carbon in the wrong place.' The secret to smoke prevention is to secure complete combustion of the fuel so that there will be no smoke to consume."[16] In addition to the ordinances proposed by Jones, they added one governing proper chimney height for boiler capacity and draft. The committee also suggested that railroads should be required to use smokeless fuel or electric power if devices could not be found to control locomotive smoke, and that if brick kilns could not be abated, they should be driven from the residential parts of the city. The real



Photos such as this were used to strengthen the call for smoke-abatement laws to be enacted in "Annual Report of the Smoke Abatement Department for the Fiscal Year 1905-1906," included in Mayor Rolla Wells' annual message in 1906. (Photo: State Historical Society of Missouri Photo Collection)

complaint against the Smoke Abatement Department was that, unlike the Smoke Abatement Committee, it was not "filled with men who are qualified, by training or experience, in the field of engineering."[17]

Stung by the criticism of his office, Jones replied with his own pamphlet in December, directing his counterattack towards the two-faced behavior of selected members of the Smoke Abatement Committee and the Civic League. He pointed out that the same engineers who had recently acknowledged his progress and praised the Smoke Abatement Department now attacked him. Regarding Washington University, he noted that the professors on the committee had made no effort to persuade their own institution to abate its smoke and that he had twice taken the university to court. Moreover, a Civic League officer was among the major violators of the smoke ordinance. "He, while condemning us for not being more aggressive in the prosecution of other people, not only did not think we should bring him into court, but even resented the fact that an inspector had the temerity to go into his office and tell him he was violating the law."[18]

Enforcement of anti-smoke ordinances by prosecution continued to be a political issue until burning soft coal was banned, because the civic leaders were indeed also the business owners who created jobs and brought prosperity to the city. After urging by the Civic League, the offices of smoke inspector and inspector of boilers and elevators were merged in 1910, and a mechanical engineer was appointed to lead the new agency. Smoke inspectors (engineers employed by the city to instruct owners in the proper installation and operation of their coal-fired equipment) embodied the Progressive Era values of efficiency and education. They also signaled a growing role for engineers and other technical experts in American public life. Three visionary ideas in the 1906 Civic League report accurately foreshadowed developments during the next forty years that would provide viable alternatives to burning soft coal. Centralized generation and distribution of electricity provided an alternative to individual coal-fired boilers. Central steam loops, replacing individual heating plants, still operate in the St. Louis central business district. While the report suggested large scale coal-gasification plants, the completion of a natural gas pipeline to St. Louis in 1949 accomplished the residential switch from coal to gas.[19]

NOTES

1 *Report of the Merchants' Exchange* quoted in *The Smoke Nuisance: A Report of the Smoke Abatement Committee of the Civic League* (St. Louis: Civic League, 1906), 9.

2 Quoted in Frank Uekoetter, "Divergent Responses to Identical Problems: Businessmen and the Smoke Nuisance in Germany and the United States, 1880-1917," *Business History Review* 73 (Winter 1999): 655.

3 Quoted in "Smoke Gets in Your Eyes," *Missouri Historical Society Bulletin* 26 (April 1970): 180.

4 Lucius H. Cannon, "Smoke Abatement: A Study of the Police Power Embodied in Laws, Ordinances and Court Decisions," *St. Louis Public Library Monthly Bulletin,* 1924: 210.

5 *Ibid.*, 211-212.

6 *Ibid.*, 216-217; *Smoke Abatement in St. Louis: Report to the Mayor* (St. Louis: Smoke Abatement Department, 1909), see the last three pages [unnumbered] of this pamphlet.

7 William H. Bryan, "Smoke Abatement in St. Louis," *Journal of the Association of Engineering Societies* 27 (December 1901): 228. His talk reviewed the merits of various boiler designs and anti-smoke devices.

8 *Report on the Operations of the Coal-Testing Plant on the United States Geological Survey at the Louisiana Purchase Exposition, St. Louis, Mo., 1904* (Washington, Government Printing Office, 1906) pp. 23-30.

9 Uekoetter, 645; David Stradling, *Smokestacks and Progressives: Environmentalists, Engineers, and Air Quality in America, 1881-1951* (Baltimore: Johns Hopkins, 1999), 96-98.

10 "Annual Report of the Smoke Abatement Department for the Fiscal Year 1905-1906," *Mayor's Message with Accompanying Documents, to the City Council* (St. Louis, 1906) pp. 187-188.

11 C. H. Jones, *Smoke Abatement Department* (St. Louis, 1906).

12 *Smoke Nuisance,* 4.

13 *Ibid.,* 9.

14 *Ibid.,* 7.

15 *Ibid.,* 24.

16 *Ibid.,* 10.

17 *Ibid.,* 25.

18 C. H. Jones, *A Reply to the Civic League Report on the Smoke Nuisance* (St. Louis: Smoke Abatement Department, 1906), 8.

19 *Smoke Nuisance,* 28-32.