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Labor and Health in the Tri-State Mining Area at the Turn of the 20th Century

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From the late 1800's continuing through the middle of the 20th century, the tri-state area was a hotbed for the mining industries of materials such as lead, zinc, and quartz. Mining camps and boomtowns seemed to pop up over night, and the rush to strike it big seemed to spread faster than wildfire. Through all of this it seemed one of the concerns that least weighed on anyone's minds was concern over the health and general well being of the miners themselves. Diseases such as silicosis and tuberculosis were seen frequently in the miners and often spread to their families. After discovering that this was a rampant problem, I began researching the topic of healthcare around the turn of the 20th century in the tri-state mining camps because I wanted to find out what was being done to protect the miners health and improve their conditions so I could help others understand how the disease was being treated and how future occurrences were being prevented.

In the late 1800's the tri-state region of Kansas, Oklahoma and Missouri was extensively mined for minerals such as lead, zinc, and ore.¹ Methods of obtaining these metals included: drilling, air blasting, and shoveling - all of which produced large amounts of rock dust containing silica.² Silica is the most commonly occurring mineral in the earth's crust and is commonly found in the forms of quartz or sandstone. Silica is extremely harmful to the lungs when breathed in and causes silicosis - a disease found in the lungs that causes them to harden and makes breathing difficult because the lung loses its elasticity.³ Miners often worked long days using a piece rate system- getting paid based on the number of items they sent top-side.⁴ The piece-rate system

¹ Gibson, A.M. "Early Mining Camps in Northeastern Oklahoma." *The Chronicle* 34, No. 2 (1956): 193.

² Gibson, A.M. *Wilderness Bonanza: The Tri-State District of Missouri, Kansas, and Oklahoma* University of Oklahoma Press. Norman, OK.1972. 185.

³ *Ibid.*

⁴ Markowits, Gerald, David Rosner. "The Street of Walking Death: Silicosis, Health, and Labor in

required them to work faster to get paid more, which in turn meant opening their mouths for heavy breathing, allowing more and more of the dangerous siliceous dust into their lungs.⁵ This boiled down to surrendering their lives for a paycheck. Due to the way the silica dust binds in the lungs, constricting them over the years, silicosis can take up to 15 years or more before it begins showing outward physical symptoms or becomes debilitating.⁶ This is proven through statistical evidence that was taken from the tri-state district in 1926. When doctors examined 7,722 patients and found that while 84% of the patients were between the ages of 20 and 49, the majority of silicosis victims were found in patients who were in the other 16% aged 50 and over. They stated this was most likely related to the fact the older miners had spent more time in the mines. Of these same men, 28% had spent ten plus years in the mines, and roughly 44% of them had silicosis.⁷

Silicosis is separated into three stages: the first stage shows some scarring due to dust exposure; the second shows more pronounced physical signs of damage to the lungs, and the ability to work is somewhat impaired; finally, the third stage results in a complete inability to work with permanent scarring of the lungs.⁸ While the silica dust alone is deadly, it has been shown to weaken the lungs resistance to pulmonary diseases such as pneumonia or tuberculosis - a bacterial disease that attacks the lungs creating lesions. Studies have shown that prior cases of tuberculosis

the Tri-State region, 1900-1950." *The Journal of American History* 72, No 2. (Sept. 1990): 529.

⁵Derickson, Alan. "On the Dump Heap: Employee Medical Screening in the Tri-State Zinc-Lead Industry 1924-1932." *The Business History Review* 62, No. 4 (winter, 1988):661.

⁶ Crombie, D.W., J.L. Blaisdell, G. MacPherson. "The Treatment of Silicosis by Aluminum Powder." *The Canadian Medical Association Journal*. Reprint. (April 1944). Box 61, Picher Collection, Axe Library, Pittsburg State University, Pittsburg, KS: 3.

⁷ Gibson, Wilderness Bonanza, 186; Derickson, 670.

⁸ Bureau of Mines, Department of Commerce. *Silicosis Among Miners*, by R.R. Sayers. Washington, D.C. [1925]. Box 61, Picher Collection, Axe Library, Pittsburg, State University, Pittsburg, KS. 22.

as old as 200 or 400 days have been re-animated due to breathing in siliceous dusts.⁹

After seeing what silicosis can do, one might ask what was done to protect the miners from the contaminant? The answer to this question is not simple. The concept of miners becoming sick from dust has been known since the mid fifteenth and sixteenth centuries, but the cause was never completely discerned - it was simply described as a “dust-induced respiratory infection.”¹⁰ Prior to 1900, no state or federal reports listed silicosis as a prevalent disease in the mines.¹¹ However, after men like Clarence Wright, and A.J. Lanza inspected the mines, they made the public more aware. Thanks to these men, the miners began to see changes for the better.¹²

Suggestion and recommendations were made by many individuals, but ultimately they boiled down to these things: inspection of the mines for dust, inspection of the men for disease, removal of dust, and education. When it was suggested that the mine owners improve dust control they had several options. The first was the simplest solution; to do the blasting which created the most dust, at a time when few if any men were in the mines and create a standard period of time the miners had to wait before they could re-enter after a blast.¹³ The second simplest way to remove the silicosis from the mines, was to circulate more clean air to the miners. William R. Jones noted that most miners already had clean air pumped down to them for their pneumatic drills. He specifically stated that respirators were a thing of the past because they were too bulky and highly

⁹ US Treasury Department. *Will the Inhalation of Siliceous Dusts Activate a Partially Healed Focus of Tuberculosis Infection?* By Leroy U. Gardner. Public Health Services. Washington D.C. 1930. Box 61, Picher Collection, Axe Library, Pittsburg State University, Pittsburg, KS. 3.

¹⁰ Gibson, Wilderness Bonanza, 182.

¹¹ *Ibid.*, 183.

¹² *Ibid.*, 181, 184.

¹³ Halley, Paul D., Alfredo Salazar. *Control of Industrial Dust Exposure. McIntyre Research Foundation Conference on Silicosis and Aluminum Therapy.* (Jan. 1949): 11-13. Box 61, Picher Collection, Axe Library, Pittsburg State University, Pittsburg, KS. 12.

non-realistic. However, his suggestion was to use a “light cover over the nostrils and mouth” where fresh air from the pneumatic tubing that was already in place could be distributed directly to the miners. Jones explains this would be an incredibly simple solution and would only use 5% of the air that they were already sending down for the drilling.¹⁴

A frequent inspection of the mines to determine exactly how much dust was being inhaled was the next solution to be suggested. Measurement of siliceous particles to deem if they are below the acceptable size and quantity allowable was one of the points of contention for most mines. One study noted that the measurement of the dust was extremely important because realistically you would never be able to remove all the dust particles from the air, so making sure they were too small to do damage was vital:

“...for example, assume the safe limit of dust... to be 1 mg per cubic meter or 0.0000013 grain per cubic foot and also assume a dust loading of 30 grains per cubic foot. Under these conditions, which are not abnormal, the efficiency of dust ‘collection’ must be 99.9987%!”¹⁵

Education of workers and owners about the problems and solutions of silicosis were some of the minor solutions that were under-utilized. D. Harrington and Sara Davenport believed that there were people in connection with the mines that were trying to keep the extent of the problem out of public knowledge, and they suggested that it was the responsibility of the doctors, miners, mine owners, and newspapermen to assist the community in preventing the disease, not in covering it up.¹⁶

¹⁴ Jones, William R. *Silicosis*. The Institution of Mining and Metallurgy. London, England. 1934. Box 61, Picher Collection, Axe Library, Pittsburg State University, Pittsburg, KS. 37.

¹⁵ Bureau of Mines. *Review of Literature on Effects of Breathing Dusts with Special Reference to Silicosis*, by D. Harrington, Sara J. Davenport. Washington, D.C. [1937]. Box 61, Picher Collection, Axe Library, Pittsburg, State University, Pittsburg, KS. 101.

¹⁶ *Ibid.*, 102.

Medical exams were the major focus in keeping sick miners from going into the mines. The Picher clinic gathered extensive information from each of the miners they examined and included medical history, a work history including the number of years they worked in this mine or any other, and the type of minerals they mined, and family history, as well as an x-ray as part of each physical exam. From these statistics, they gleaned information that silicosis generally comes with age, men who had previously had malaria were more prone to develop silicosis, and those with bronchitis or asthma were among the highest percentages of those with silicosis.¹⁷ While most doctors found that miners who were older were more likely to be the ones that had contracted silicosis, they stipulated that the rate of development depended on the kind of dust, the amount that was breathed in, the length of exposure, any prior illnesses including malaria or tuberculosis, and finally, the physical fitness of the man in question.¹⁸

During these exams, doctors and nurses were looking for typical signs of silicosis or tuberculosis. Emphasis was placed upon comparing current x-rays to previous ones to see if they had changed, as well as comparing how far the chest expanded when breathing in to see if the lungs were becoming restricted or not.¹⁹ These physicals with x-rays were often the only way to tell if a patient had silicosis because in the first and sometimes second stages, the miners rarely if ever felt sick and often the only physical manifestation would be rapid breathing.²⁰

These physicals were often used pro-actively by the mine owners to weed out those that would be unsuitable for mining. If they were deemed too old, already had tuberculosis, malaria,

¹⁷ Derickson, 667; Harrington, Davenport, 45-46.

¹⁸ Sayers, 22.

¹⁹ Harrington, Davenport, 46.

²⁰ Boisliniere, Louis C. "Silicosis and Silicotuberculosis." *The Journal of the Missouri State Medical Association* 30, No. 8 (August 1933): 311. Box 61, Picher Collection, Axe Library, Pittsburg State University, Pittsburg, KS.

asthma, or had poor chest x-rays that already showed signs of silicosis, miners were denied jobs.²¹ This fact caused many miners to hide physical symptoms or to refuse the physicals altogether for fear of losing their jobs which often supported not only themselves but dependent families, widowed mothers, and sometimes disabled fathers who previously worked in the mines.²² In some cases however, miners that were diagnosed with silicosis were simply moved to other less strenuous parts of the mine where they would come into less contact with the dust particles but still be allowed to work and support themselves.²³

While no cure was ever found for silicosis, aluminum therapy was often used as a prophylactic. Several studies were conducted and all showed favorable outcomes for those involved. One study produced results showing a man who was on complete disability returning to work after six months of treatment.²⁴ Another showed that if one large dose was taken, the aluminum could stay in their system for up to a year providing continual prevention.²⁵ Further studies showed that those who did not receive treatment were more likely to contract silicosis.²⁶ However, as positive as the signs were from these studies, two very important stipulations were made: first, aluminum therapy should be used with discretion. Those persons who have silicosis

²¹ Harrington, Davenport 56; Jones, 34; Derickson, 664.

²² Harrington, Davenport 103; Derickson, 669.

²³ Derickson, 669.

²⁴ Perry, David L. *Discussion of Medical Aspects of Aluminum Powder and Treatment for the Prevention of Silicosis*. (Jan. 1949): 16. Box 61, Picher Collection, Axe Library, Pittsburg State University, Pittsburg, KS. 16.

²⁵ Alabama Department of Public Health. *The Use of Aluminum in Silicosis Control*, by Irving Tabershaw and Bernard Tebbens. [September 1945]. Box 61, Picher Collection, Axe Library, Pittsburg State University, Pittsburg, KS.

²⁶ Hannon, J.W.G. and Paul G. Bovard. *Further Observations on Silicosis and Aluminum Therapy*. (Jan. 1949): 45. Box 61, Picher Collection, Axe Library, Pittsburg State University, Pittsburg, KS. 45.

complicated with tuberculosis are not eligible for the treatment because the aluminum could alter the body's defenses against the tuberculosis unfavorably. In a few cases, if a large dosage of aluminum was given, two scenarios could occur; a new tuberculosis infection was possible, or the dose was so massive that the spleen atrophied.²⁷ The second stipulation is that aluminum therapy could not be used as a treatment for an already existing condition as it had no effect on it. It did not cure, it only prevented.²⁸

In conclusion, silicosis was a growing problem for the mines of the tri-state area. Health and wellbeing fell through the cracks and became secondary to profit. The issue originally received no attention from the government, mine owners, and seemingly very little attention from the miners themselves. However after the public knowledge of the problem became more widespread, many changes were made to improve the lives of the miners and by extension their families. Clean air was circulated through the mines to help relieve the quantity of dust particles and inspections of the mines became more frequent. Safe practices such as blasting at hours where the fewest men would be harmed and measuring the size of the particles in the air began happening on a semi-regular basis. Workers and owners were educated why these practices were important and began to better understand the problem they had been living with all along. The practice of physical exams of the miners both before and during their employment was put into place. While this part of the program seemed very brutal to the miners who were denied jobs, it was a necessary evil that kept men from dying of a disease solely for profit. Finally, the miners were treated for their silicosis using aluminum therapy.

²⁷ Tabershaw; Peterson, Carl and Autsin Smith. "Aluminum in the Prevention and Treatment of Silicosis." *The Journal of the American Medical Association*. Reprint (April 1946). Box 61, Picher Collection, Axe Library, Pittsburg State University, Pittsburg, KS

²⁸ Crombie, D.W., J.L. Blaisdell, G. MacPherson. "The Treatment of Silicosis by Aluminum Powder." *The Canadian Medical Association Journal*. Reprint. (April 1944). Box 61, Picher Collection, Axe Library, Pittsburg State University, Pittsburg, KS. 3.

These changes altered the futures of untold thousands of miners, and family members who could have easily died of contracting diseases such as tuberculosis, which complimented the primary disease of silicosis. Methods that were found to be the most beneficial to the miners in the tri-state district were shared in conferences throughout the world and put into effect saving countless more lives.

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