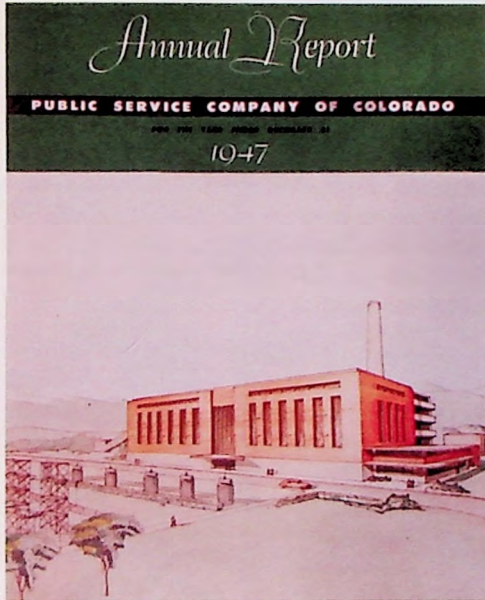




The DENVER WESTERNERS
ROUNDUP

January - February 2021



*Courtesy Denver Public Library, PSCo collection, WH1367
Arapahoe was the First New Power Plant
Built After World War II*

**Public Service Company of Colorado
An Illustrated History, Part Two 1938-2019**

By Roger Dudley

(presented November 20, 2019)



THE DENVER WESTERNERS ROUNDUP

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Roger Dudley started with Public Service Company of Colorado in 1979 to bring a video production capability to their Corporate Communications Department. In addition to video production, he worked on executive communications including presentations to the board of directors. After two mergers his position was eliminated, and a second position ended after fourteen months. He retired with twenty-four years of service. After going back to school for a master's degree in Library Science he landed his dream job at the Western History and Genealogy Department of the Denver Public Library where he has worked from 2006 until retiring in 2019.

Public Service Company of Colorado An Illustrated History, Part Two 1938-2019

By Roger Dudley

Public Service Company of Colorado (PSCo) became 150 years old on November 13, 2019. Still an operating company of Xcel Energy, it is often referred to as Xcel Energy-Colorado, and is one of the oldest continuously operating companies in the state. What began as the Denver Gas Company is now the result of nearly 100 different companies merged or consolidated, bought or acquired through stock purchases. This is a follow-up to the first part of the company history published in the July-August 2018 Denver Westerners *Roundup*.

Unlike the first part, this is not a chronological, nor a detailed history of the company. It is a look at a few notable efforts by PSCo and its employees.

Enormous growth in Colorado after World War II challenged PSCo to provide electricity and natural gas to the growing population. Environmental concerns led to millions of dollars spent on pollution control. Now the push is toward renewable energy sources resulting in the closing of several coal-fired power plants in the last decade. Mergers will close this history as PSCo is now a subsidiary of a company headquartered in Minnesota.

World War II

World War II came as no surprise. Even before Pearl Harbor there were restrictions, constructions and enlistments. While PSCo's efforts and commitment to World War II were certainly not unique, it is instructive to look at their efforts during that war. This is especially true when one compares how little the present decades-long wars that have been going on since the attacks on 9/11 have affected most of us. Except for those with a soldier in their family, we have felt no disruption in our daily lives, no rationing, no shortages, no direct impact.

The August 1940 issue of *Lines* magazine featured the first of hundreds of company employees who joined the army, navy, marines, and coast guard.¹ *Lines* was the company's internal publication that communicated with employees scattered all across Colorado. It carried the story of how the Hayden Ranch near 6th Avenue and what is today Simms was purchased for the construction of the Denver Ordnance Plant of Remington Arms Company. The \$35-million facility opened five months ahead of schedule on October 25, 1941.² As with most construction projects, electricity was one of the first needs. PSCo had an early presence to provide power lines to new projects. This need for utility workers meant that they were considered essential and many would not be subject to being drafted. However, in the days and weeks following the Japanese attack on Pearl Harbor, scores of company employees enlisted in military service. Three pages of individuals listed as "Serving Under the Stars and Stripes" were published in the January 1942 issue of *Lines*. The same issue also notified employees that the company's Mutual Aid program would be unable to carry insurance for members inducted into the armed forces.³

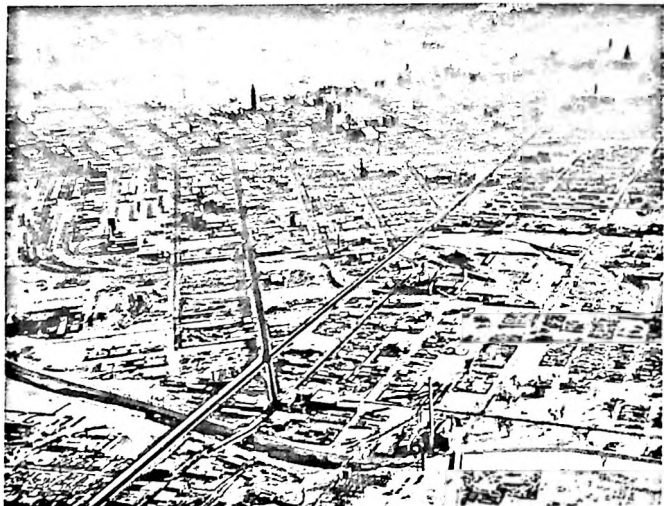
In anticipation of the need for blood transfusions for wounded soldiers, PSCo began to encourage employees to get their blood tested and typed;⁴ 100% of the Grand Junction employees had their blood processed by September 1940.⁵

On the second anniversary of the bombing of Pearl Harbor, PSCo tallied its 1,000th blood donor,⁶ and by June 1944, more than 1,700 blood donations had been made by company personnel.⁷ Five months later, the 2,000th blood donation had been made by PSCo employees⁸ and several were honored for donating more than a gallon of their blood to the cause.⁹

The names and addresses of former employees then in the service were provided in *Lines* to encourage employees to correspond with them.¹⁰ Letters from servicemen and women were a regular part of *Lines* throughout the war. Many expressed how nice it was to keep in touch with the events and individuals in their former workplace. They also expressed their appreciation for the package and check that each one received from the company at Christmas.¹¹

Not only were employees urged to write to the men and women overseas, they were reminded to keep their letters upbeat, to share the good news and were cautioned not to complain about shortages and other inconveniences on the home front.¹² There were regular reminders of how many former PSCo employees were serving in the military with flags in *Lines* bearing ever-changing numbers. Service personnel were kept in mind by the people in the places they had worked. A display in the Denver Meter Shop at the Service Center on Lipan featured photos of soldiers along with trophies and a bazooka shell sent by Corporal Wilbur Harr.¹³

Even with Colorado's landlocked location, a War Emergency Manual appeared in *Lines* in March 1942.¹⁴ A similar program for protection against aerial bombs was featured the next month.¹⁵ A blackout program also created awareness—just in case.¹⁶ In September 1942, PSCo's plant guards were placed under the direct supervision of the internal security and were sworn into service by a Colonel Clements.¹⁷



Courtesy Denver Public Library, PSCo collection, WH1367

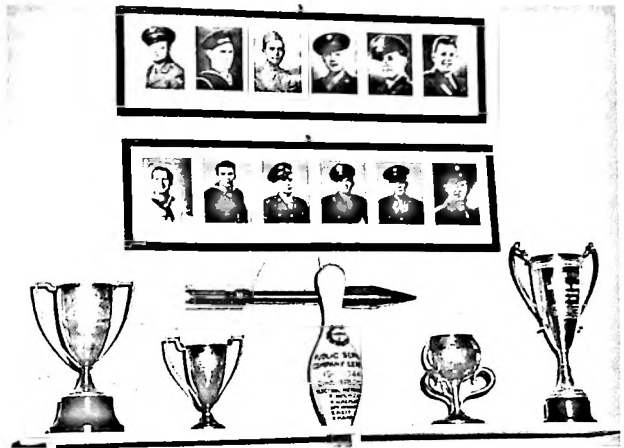
Wintery Denver, January 1942. In the foreground is the Lacombe Power Plant at 13th & Zuni, now called Zuni Station. The two streets that meet on the left of the image are the Colfax and the Larimer Street viaducts

One of the most urgent war needs was for money. Americans were encouraged to buy bonds in grocery stores, movie theaters and any place where people gathered. PSCo had a bond sales booth on the main floor of the Gas & Electric Building and focused great effort on getting every possible dollar from employees so the company could get credit for the money raised. The PSCo booth sold over \$300,000 in War Stamps and Bonds on April 4, 1944,¹⁸ and set a record of over \$1 million raised in three years ending August 1946.¹⁹ Employees were urged to spend at least 10% of their wages on war bonds.²⁰ Drives were continuous and the company was often cited for its leadership position. Employees were also urged to hold on to the war bonds until they reached maturity.²¹

As the company was gearing up for war early in 1942, many things that would become familiar throughout the war began to occur. Salvage efforts that would yield tons of material during the course of the war were initiated. A plant used to create Pintsch gas for lights in passenger trains, and unused since 1927, was dismantled in October 1942 for the metal it could provide.²²

West Station, where electric power began to be generated in Denver in 1881, was scrapped in June 1943.²³ On a smaller scale more than 2,300 keys were collected for their metal.²⁴ William Culp collected thirty-seven knives for use by soldiers, that included his son.²⁵ He also collected over 400 phonograph records to send overseas.²⁶ Along with scrap metals, waste paper, old rags and rubber were sought early and often throughout the war. Employees collected over 69,000 pounds of rubber in the first summer of the war.²⁷ The Idaho Springs district collected the most; as with sales and other services, a competition between offices and districts encouraged maximum efforts by everyone.²⁸

Most durable goods were not manufactured at all during the war and those that were made, were for the war effort, not John & Jane Public. In January 1942, tires were the first product rationed. Individuals were no longer allowed to purchase tires, they could only be patched or retreaded. Personal automobiles were not available for purchase after February 1942. PSCo ran articles in *Lines* on techniques for extending the life of tires with driving tips, proper inflation, tire rotation and other hints. Even bicycle purchases were restricted after the summer of 1942.²⁹ Despite the restriction on new purchases, bike riding became very popular since gasoline, tires and vehicles were hard to come by.



Courtesy Denver Public Library, PSCo collection, WH1367

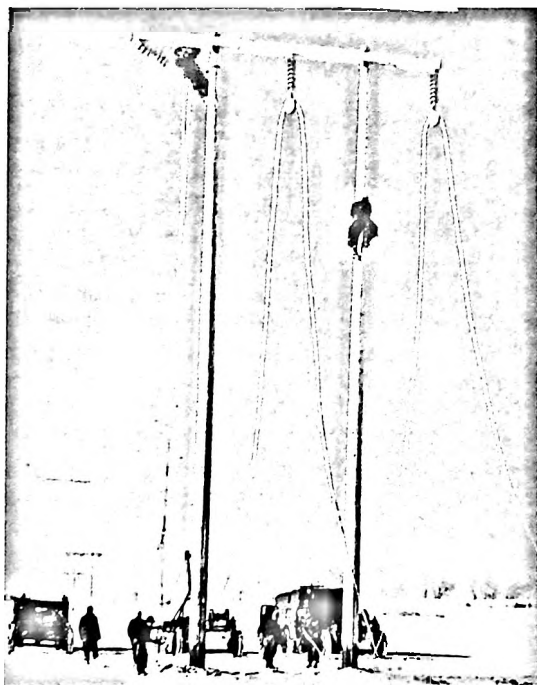
Work locations kept their co-workers in mind with displays like this one that featured not only pictures, but a German bazooka shell sent by one of the soldiers

Riding bikes to work and riding for pleasure became a fad for men and women.³⁰ A continuing emphasis was placed on getting the most mileage out of tires. A vehicle in Fort Collins managed to put 60,000 miles on a set of tires, and were still in good condition.³¹ Company efforts to reduce mileage paid off with a one-third reduction in miles traveled between July 1941 and July 1942.³²

Gasoline was rationed beginning in December 1942. Most families were allocated only three gallons of gasoline a week. PSCo replaced their underground gas storage tank in January 1942 with a larger one to serve their fleet of vehicles. After December 1942, new vehicles were not available with the entire manufacturing output of the country devoted to developing jeeps, tanks, trucks and other war materials. PSCo got its last new truck for the duration of the war in April 1942. In March 1943, meats, fats, canned fish, cheese and canned milk were added to the rationed items, and each purchase required a ration stamp.³³ Office supplies were also curtailed, and paper was greatly needed, resulting in paper drives. A share-the-ride committee was formed to encourage what a half-century later would be called car-pooling.³⁴

The inability to buy new appliances created a greater need for repairing them. Since many experienced employees had gone into the military, women were added to the Appliance Service Department to enhance service to customers.³⁵ Midway through the war the company solicited used gas and electric appliances to refurbish for customers and for resale.³⁶ The Appliance Service Department established a trading post for appliances on the main sales floor of the Gas & Electric Building to assist customers in filling their appliance needs when they couldn't go to a store and buy a new one. In May 1944, the Trading Post sold 108 appliances, including gas and electric ranges, electric irons, fans, toasters, sweepers and ironers.³⁷

Victory Gardens became important because rationing prevented many "normal" purchases of fruits and vegetables. Company facilities were made available for victory gardens in Fort Collins, Sterling, Boulder and Denver. The company even displayed the goods they had grown in county fairs. Employees and customers



*Courtesy Denver Public Library, PSCo collection, WH1367
Here the line for the Rocky Mountain Arsenal
is being strung in 1943*

were urged to plant victory gardens too.³⁸ PSCo home economists lent their expertise to the struggle of trying to feed a family while food rationing was in progress. They helped customers compensate for the limited availability of some ingredients by adjusting recipes and publishing them in the bill stuffers sent to customers.³⁹

Early in 1943, work began on a facility that would be a vital part of the defensive strategy of the U.S. for the rest of the twentieth century. A transmission line was constructed from Valmont Station outside of Boulder. It was one of the first signs of the creation of the Rocky Mountain Arsenal.⁴⁰ Providing vital electric service such as this, was one of the reasons many employees were exempted from military service.⁴¹

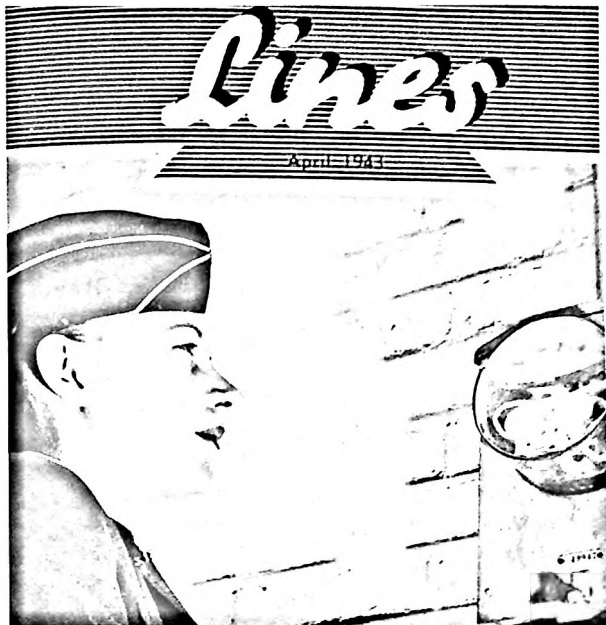
As important as electric power was for producing war materials, it was just as crucial for growing and processing food, whether potatoes in the San Luis Valley or sugar beets on the eastern plains.⁴² PSCo wired Denver's Civic Center Park for a week-long War Bond Show June 19-25, 1944 that featured tons of captured German equipment.⁴³

Women's changing roles

In just two years from December 1941 to December 1943, twenty percent of PSCo's male employees were in the military. The role of women in the company would change dramatically throughout the war; in the first year their number increased from 200 to over 300.⁴⁴

Women were called on to do jobs that only men had previously done, like being cashiers⁴⁵ and reading meters where they were called Meterettes.⁴⁶ In at least one case, a wife took the place of her husband as a meter reader following his enlistment.⁴⁷

By the end of the war, thirty-five Meterettes were reading PSCo's meters every month. The last one turned in her book in July 1946.⁴⁸ Some women completed a night course to become nurse's aides to lend their support to the war effort.⁴⁹ Other women signed up for military service in the WAVES (Navy), WACS (Army), or the coast guard SPARs.⁵⁰ Though not as frequently as men, they still received



Courtesy Denver Public Library, PSCo collection, WH1367

Meterettes were the PSCo version of Rosie the Riveter. Here Carolyn Chandler is reading an electric meter, just as her husband had before entering the military

recognition in *Lines* when they did sign up.⁵¹ Like Rosie the Riveter, when the men came back from the war they wanted their PSCo jobs back, and they got them and the "girls" went home.

Women held no management positions in Public Service Company of Colorado during or after the war. In 1975, Dr. Doris Drury, an economics professor at Denver University, became the first woman elected to PSCo's Board of Directors. Drury was also a founding director of the Women's Bank, in Denver, in 1978, which gave women access to credit without the co-signature of their father or husband.⁵²

At a meeting of over 300 managers in 1980, there were only two women in the company auditorium, Marilyn Pollard, the assistant to the president and Ann Block a special projects analyst. PSCo hired its first woman vice president in 1987, naming Marilyn Taylor as VP of Human Resources.⁵³



*Courtesy Denver Public Library, PSCo collection, WH1367
Dr. Doris Drury was the first woman elected to the
PSCo Board of Directors, in 1975. She was one of the
founding directors of Women's Bank, Denver in 1978*

War's End Is Near

Prices climbed for many consumer items during the war, but declined for gas and electricity. A cost of living chart was in the first PSCo annual report issued for 1943, published in 1944, for the shareholder meeting. Costs for food, home furnishings, clothing and rent were up, while gas and electricity had declined by eleven and thirty-three percent respectively.⁵⁴

As the eventual outcome of the war was becoming apparent, the utility industry began to focus on post-war programs that would promote and provide for more power use. Adequate Wiring was a nationwide program to encourage customers to get their homes rewired to be able to take advantage of new electrical appliances that would become available.⁵⁵

The Denver Ordnance Plant stopped making thirty caliber ammunition at the end of July 1944, as the war was winding down.⁵⁶ Another sign the war was almost over came when the thousands of lights on the G&E building were turned on again.⁵⁷ In October

1945, fuel restrictions were lifted in the US, but tires were still not available. Even when the war ended shortages did not.⁵⁸ It would be years before the production of materials would catch up with the needs of a booming economy.⁵⁹

The final PSCo tally showed over 550 employees served in the military during World War II with nine of them killed in action. As employees were returning to work, they were welcomed back in the pages of *Lines* along with new employees just hired. What had been pages of pictures earlier were now simply lists of names, and their assigned department.⁶⁰

Post War Electric & Gas Hunger

Thousands of GIs had been assigned to military facilities in Colorado including Camp Hale, Lowry Field, The Denver Ordnance Plant, Fitzsimons General Hospital, Fort Logan, Rocky Flats, Rocky Mountain Arsenal, Camp Carson, Buckley Field and the Colorado Springs Tent Camp. While serving, many decided that Colorado was a good place to live and raise their families and moved here after the war. The post-war boom was trying to happen, but the shortages of building materials, meters, and furnaces meant that homes could not be built fast enough to fill the need.

Quonset huts were a temporary answer while manufacturers were shifting from wartime to peacetime materials.⁶¹ PSCo added 40,162 new electric customers and 37,935 gas customers between 1945 and 1949.⁶²

PSCo used an innovative approach, approved by the Public Utilities Commission, when new gas meters were not available. Existing gas customers were charged the same amount for the gas used the previous year, and their meter was removed to be installed in a new home or business to measure their use.

Power Plants

Beginning in 1948, and continuing for more than two decades, there was continuous construction of power plants by PSCo. Most of them were coal-fired. The dedication of Cherokee Unit 3 was combined with groundbreaking at Valmont for an additional unit in September 1962. Buses transported the dignitaries from Denver to Boulder with a box lunch provided in between.⁶³

Denver's Last Gas-Lighted Home Fades Into History Arapahoe Street Residence Converted to Electricity

Denver's last illuminating gas customer this month converted her 60-year-old home to electric lights. Mrs. Edna Ellsberg, who resides at 2524 Arapahoe Street, in one of the city's early aristocratic sections, has depended on the lamps to light the interior of her house for a half-century. "I always believed gas lamps were easier on the eyes," Mrs. Ellsberg told electricians who installed her new lighting fixtures. "That's why I depended upon them so long." She added, however, that she was "surprised and pleased" with her new electric lights.

Mrs. Ellsberg installed gaslighting in her house when she moved in, shortly after 1900. She said she noticed no change in the quality of her lighting when the Company began furnishing her natural instead of manufactured



Last Gas-Lighted House

Courtesy Denver Public Library, PSCo collection, WH1367

Denver's last gas-lighted home, at 2524 Arapahoe, was converted to electricity in May 1951

Cabin Creek was one of the most innovative steps taken by PSCo in the early 1960s. It revolved around one of the oldest forms of electric power, hydroelectric generation. The aspect that set it apart from other hydroelectric plants was its pumped storage capability. It had two reservoirs and the ability to pump water from the lower one during off-peak times, usually at night, into the upper one. During daytime peak hours, when the electric demand was highest, the water would be released



*Courtesy Denver Public Library, PSCo collection, WH1367
Late in 1955, Cherokee Station, near 64th and Washington,
was begun and it went online in September 1957*

from the upper reservoir to flow down through penstocks, turn the generators to create over 300 megawatts of electricity, and return to the lower reservoir.⁶⁴ A secondary aspect of the plant was that if power was knocked out throughout the PSCo system, the water could be released from the upper reservoir and the plant would generate enough electricity to jump-start the entire PSCo grid. The plant received the highest honor accorded by the Edison Electric Institute, the Edison Award, for 1967.⁶⁵

Nuclear Power—Fort St. Vrain

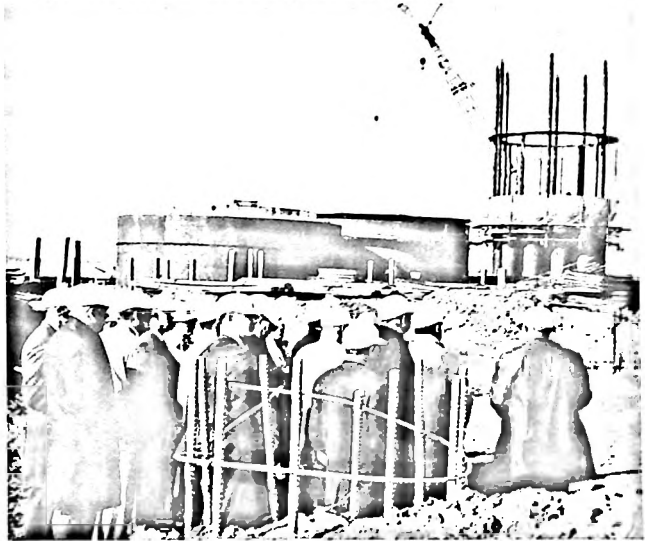
Prior to 1954, atomic power was only available for Federal purposes. President Eisenhower signed the Atomic Energy Act on August 30, 1954, which allowed private companies to gain restricted technical information about nuclear energy.⁶⁶ That act made private nuclear power feasible and nine companies formed the nonprofit Rocky Mountain Nuclear Power Study Group. Some, including PSCo, were power companies and others were service or construction companies affiliated with the utility industry. Each contributed \$5,000, and a dedicated employee, to begin research into this new technology.⁶⁷ PSCo devised a stage show called *The Fabulous Atom*, which proved to be very popular. It explained some of the basics of nuclear energy and was offered to other utility companies in 1957.⁶⁸ The study group examined the options of different designs and eventually selected a unique design called a high-temperature gas-cooled reactor.

PSCo's annual report for the year 1965 noted that, "Although the investment required for a nuclear plant was more than the cost of a fossil fuel plant of similar size, substantial savings in fuel costs were anticipated to more than offset the original investment."⁶⁹

It wasn't until 1966 that the PSCo nuclear plant got a name, Fort St. Vrain (FSV). Its proximity to the location of the 1830s fur trading post operated by Ceran St. Vrain resulted in a unique information center design in addition to the unique moniker.⁷⁰

The Colorado Public Utilities Commission (PUC) authorized construction of the plant.⁷¹ Safety concerns were raised by some, including the United Mine Workers Union, but they were more concerned with the retention of their jobs mining coal than the risks associated with nuclear power. The PUC decision was appealed to District Court, but it allowed the construction to begin and the Atomic Energy Commission gave its approval.⁷² As part of the company's public relations push, they conducted a VIP tour of the Fort St. Vrain site.⁷³ Several months later the bottom of the reactor vessel was put into place and the pedestal was poured for the turbine-generator.⁷⁴

In 1969, close to the time Apollo XI was landing on the moon, the generator assembly of FSV was nearing completion and the pre-stressed concrete reactor vessel (PCRV) was begun.⁷⁵ The FSV information center was constructed well in advance of the plant to provide a place for exhibits, displays and even meetings to showcase the concept of the high-temperature gas-cooled reactor (HTGR). The center's design closely resembled a drawing of the original fur trading fort.⁷⁶



Courtesy Denver Public Library, PSCo collection, WH1367

In November, dozens rode a train to Platteville and saw the beginnings of the Fort St. Vrain site

Nuclear fuel began to be loaded at FSV in 1971 as the environmental movement began to grow. Late in 1973, fueling was completed.⁷⁷ There were two amendments on the ballot in Colorado in 1976. One of them would have required "approval by two-thirds of each house of the General Assembly prior to any construction or modification of a nuclear power plant or related facility." Both measures were defeated by a margin of more than two to one.⁷⁸

It would be December 1976 before Fort St. Vrain would produce electricity for the first time.⁷⁹ Even though FSV started to generate electricity, and began operating commercially, it did not operate at the 330 MW capacity it was designed for. A myriad of problems prevented it from functioning at 100%: circulator seals, water pump problems, helium circulators, etc. In July 1979, General Atomic paid PSCo \$97 million toward the construction of a new power plant, and an additional \$8 million for the shipment, storage and handling of spent nuclear fuel and additional fuel to be used through 1984 to compensate for the lost revenue.⁸⁰

Compounding Fort St. Vrain's problems was the fact that its design was unique. Every problem had to be solved with a specific technical fix that only applied to the Fort. But when an accident occurred with the water-cooled system at Three Mile Island, the Nuclear Regulatory Commission's cautionary measures applied to FSV even though it was a different and widely held to be a much safer design.⁸¹

FSV limped along until the fall of 1989 when the decision was made to terminate nuclear operations before the fuel that had been loaded was used up.⁸² The first step in the decommissioning of the nuclear plant was defueling. FSV was to be the first commercial plant in the country to be decommissioned. In late 1990, the decision was made to build a spent fuel storage facility. The acronym was ISFSI, an Independent Spent Fuel Storage Installation. In reality it stood for "Instead of Shipping the Frickin' Stuff to Idaho." When Fort St. Vrain was first built a contract was signed with the state of Idaho to store spent fuel and other materials from FSV there. The facility was constructed, but a change in governors created a change in philosophy. The Idaho facility constructed by the Department of Energy (DOE) received only two shipments of radioactive materials from FSV. The DOE built and controls the ISFSI about a quarter of a mile from the plant.⁸³

Decommissioning was new to everyone and the company signed a contract to have the actual work performed. Removing the fuel was completed ahead of schedule in mid-1992.⁸⁴ In 1993, PSCo submitted a plan to the Colorado Public Utilities Commission to repower FSV using natural gas turbines.⁸⁵ In 1993, the heavy work of decommissioning got under way with diamond encrusted wire saws cutting the reactor top-head into chunks that could be lifted by the cranes built into the reactor room during its construction.^{86, 87} Removal of the core support floor was a major achievement. Pie-shaped chunks of concrete cut through the heavy "tendons" in the prestressed concrete reactor vessel for removal.⁸⁸ In mid-1995, ground was formally broken for the repowering effort at FSV.⁸⁹

The nuclear era at FSV ended in October 1996 when the final work on the reactor was completed. What had once been a nuclear reactor was now a hole about thirty feet across and six stories deep.⁹⁰ Ted Borst celebrated the



*Courtesy Denver Public Library, PSCo collection, WH1367
The prestressed concrete reactor vessel was cut up and removed leaving a large hole*

end of the final monitoring at FSV by shipping the final boxes of reports to the Nuclear Regulatory Commission, on October 30, 1996, which resulted in the termination of FSV's nuclear operating license.

The irony of ironies surrounding FSV is that about the only thing that went as planned there was the decommissioning of it. It went so well that PSCo again received the highest honor that can be accorded to an electric utility, the Edison Award, by the Edison Electrical Institute, in 1997. It was the second time PSCo had won the coveted medal.⁹¹

Denver didn't have smog – it was “smaze”

Some of us recall when there was no air pollution in Denver, it was just “smaze,” a combination of smog and haze. It was actually the inevitable result of the bowl-shaped location of the City and County of Denver at the confluence of the South Platte River and Cherry Creek. Wintertime inversions exacerbated these occurrences.⁹²

And it was not just Denver that created the problem; roads and businesses in the entire metropolitan area contributed to the “smaze.”⁹³ Engineers from the Colorado Society of Safety Engineers started to work on the problem in 1954, but it would take decades to make a dent.⁹⁴

The Denver Tramway Company, in a 109-page 1955 report, with research done in multiple other cities, claimed that bus exhaust was “a minor contributor to air pollution,” saying cars were the biggest component. It also noted that the proposed vertical exhaust stacks on trucks and buses would not minimize air pollution in Denver.⁹⁵

A two-year test was announced for June 1954 and the Colorado Society of Safety Engineers predicted it would take money and work to rid Denver of the pollution hanging over it, pointing to auto exhaust and back-yard incinerators.⁹⁶ There was no mention of the time it would take. During this time Denverites were burning trash in their backyards, without limitations of any kind, whenever they wanted to, as often as they desired. It wasn't until 1968 that some suburban communities banned backyard burning. Denver and the rest of the state ended backyard incinerators on January 1, 1970,⁹⁷ a year before cigarette ads were banned on television.

Coal was vital to PSCo's generation capabilities. Valmont was purposely located in the middle of coal fields north of Denver when it was built in the early 1920s, but lots of Wyoming coal has also been burned in company boilers. At times coal provided over 90% of the fuel costs for PSCo, and it was widely perceived as a major source of air pollution in the metropolitan Denver area.⁹⁸ Water vapor coming off cooling towers was assumed by many to be pollution, but the only pollution from a power plant came from the stacks.⁹⁹

The use of coal in PSCo power plants led to the need for many forms of what were first called pollution controls, before the euphemistic term emission controls was adopted. Regardless of the term the purpose was the same—to reduce, because elimination was impossible—the amount of residue from the burning of the coal that was released into the air, the mythical “Clean Coal” answer.

Electrostatic precipitators were the first devices introduced to reduce air pollution.¹⁰⁰ They were used between 1964 and 1981 at nearly every power plant on the PSCo system. The second generation of pollution control devices were called scrubbers.¹⁰¹

They were designed using about a million plastic balls, about the size of ping-pong balls, in each scrubber. The fly ash would cling to the balls instead of going up the stack and they were washed to collect the residue.¹⁰² They were part of a two-phased program announced around the same time the first Earth Day was being observed.

Scrubbers were used between 1971 and 1984 as part of the "clear stack" program with a goal of removing the visible pollution coming out of the stacks at coal-powered plants.¹⁰³ It was an important step, but the visible pollution was not the only harmful part of the emissions from power plants. Scrubbers were added to units at three power plants: Arapahoe 4; Cherokee 1, 3 & 4; Valmont 5 before the next emission control devices were introduced. The newest pollution control method was the Fabric Filter Dust Collector. A more descriptive term "bag house" explains how they work. They act like huge vacuum cleaner bags removing 99% of the fly ash.

Pollution controls began in 1965 and devices were added to power plants, or included in the design as the electrostatic precipitator was at Pawnee. Regardless of when they were installed, they were costly, and took a good deal of power to operate. The costs for the various pollution controls were enormous. The cost of these installations for air pollution amounted to over \$193 million between 1965 and the end of 1984, and another \$65 million for protecting water.¹⁰⁴

Brown Cloud Study 1987-1988

From the days of "smaze" through the precipitators, scrubbers, and baghouses, the assumption by the public was that PSCo was largely responsible for the Brown Cloud, often confusing the water vapor coming off the cooling towers for pollution.¹⁰⁵ From 1987 to 1988, a Brown Cloud study was conducted and the sources identified surprised many. Time-lapse film was shot from several locations and multiple sites measured the air quality.¹⁰⁶

The largest source of the Brown Cloud was wood burning at 24%. This led to wood burning bans when weather conditions were not favorable. Even before wood burning bans went into effect clean-burning natural gas fireplaces were marketed by PSCo. Fireplaces were not an effective way to heat a room or a home, but the gas logs with a glass screen allowed the beauty of a fire without the loss of room heat.¹⁰⁷



*Courtesy Denver Public Library, PSCo collection, WH1367
In the 1950s, Denverites burned trash in backyards, sand was used on streets to improve traction during snowstorms and coal was used for most electric generation*

Motor vehicle emissions were the second largest contributor at 22%. That finding eventually led to car-pooling and increased rapid transit options. The third largest source was dust and dirt. This led to no longer sanding the streets after a snowstorm. Some of this could also be traced to power plant emissions, so PSCo agreed to test-burn natural gas in place of coal at Denver power plants.¹⁰⁸

A Clean Air Campaign was initiated to raise public awareness of the role they could play in reducing the Brown Cloud by using ride-sharing programs. PSCo provided vans for employee carpooling. They also held public events to highlight the company's efforts with tree planting programs for several years.¹⁰⁹ PSCo also began using vehicles powered by compressed natural gas in an effort to reduce the pollution.¹¹⁰

Aluminum nitrate contributed 13% with a dust that was irritating to eyes, nose and throat and harmful if inhaled. Nitrogen dioxide was 12% and is part of a group of gaseous air pollutants produced as a result of road traffic and other fossil fuel combustion processes.

Normally occurring haze added 8% of the brown cloud and ammonium sulfate that forms when nitrogen oxides produced by vehicles, furnaces, and industrial equipment combine with ammonia, which typically wafts from farms that use ammonia-based liquid fertilizers or produce heaps of animal manure. The final 1% of the brown cloud was traced to dusty particulate emissions from power plants.¹¹¹ PSCo agreed to spend \$30 million over a three-year period to combat the Brown Cloud by supporting additional research, reducing sulphur dioxide emissions from power plants, installing boiler modifications, continuing to develop technology to reduce air pollution and pursuing joint programs to pursue clean coal technology research.¹¹²



*Courtesy U.S. Department of Energy (Flickr), 298 047 001
Denver Pollution during a Temperature Inversion*

Gas Storage

The first manufactured gas by the Denver Gas Company was stored in above-ground tanks to provide enough product to serve the customers.¹¹³ The same gas holders were used after 1928 for storing natural gas, and several were added as the population and need for gas grew. Storage tanks were scattered across Boulder, Fort Collins, Pueblo and Denver because of the limited capacities of the pipelines. By the end of World War II, gas holders in Denver were able to store three million cubic feet of gas.¹¹⁴

But with the growth of Denver and other communities in Colorado more storage was needed. A firm of geologists was hired by PSCo to evaluate potential sites. They identified the abandoned Leyden coal mine fifteen miles northwest of downtown Denver as the best option of the sixteen sites they examined.¹¹⁵ Leyden Coal mine opened in 1902 and took more than six million cubic feet of coal until it was abandoned on February 28, 1950 when the Denver Tramway Company stopped generating electricity at 14th and Platte and began buying electricity from PSCo.¹¹⁶ Today's a REI store is located in that building.

PSCo began testing Leyden in 1958. Sealing and water tests followed and proved satisfactory. Development of the storage facility began in 1959.¹¹⁷ A model made of the Leyden storage site by student engineer Richard Umstattd received an award from the American Gas Association.¹¹⁸ Leyden's capacity was increased periodically to the point that three billion



Courtesy Denver Public Library, PSCo collection, WH1367

The use of the abandoned Leyden Coal Mine to store huge amounts of natural gas earned accolades from the American Gas Association

cubic feet of natural gas could be stored. Its efficiency improved each year, setting new records for both injection and withdrawal.¹¹⁹ Leyden was often called the company's "Ace in the Hole" and was an underground insurance policy that paid huge dividends and saved millions of dollars over its forty-year life.¹²⁰ In 1964, there were reports of gas seeping through a bore hole on the north part of the Leyden site.

When Leyden was first identified and storage of natural gas began it was far out of town with no housing developments nearby. But evidence of escaping gas was reported in 1979, and natural gas was detected at a monitoring well in 1993. Five years later jurors found PSCo liable for gas leaking from the facility. This led to discussion of closing the leased facility. In March 2000, PSCo proposed closing the facility.¹²¹ By 2005, water, stored for use by Arvada, had replaced natural gas in the former coal mine.¹²²

In the first year without their "Ace in the Hole," a gas shortage during the heating season resulted in pleas from the company for customers to reduce their use of natural gas and rolling electric blackouts. Company President Dick Kelly was quoted in the *Rocky Mountain News* at the 2006 Xcel Energy Shareholder's meeting that the company needed more storage for natural gas in Denver to prevent wild swings in prices, especially during winter peak months.¹²³

Steam

Steam heat has been provided to Downtown Denver since 1879.¹²⁴ The original Steam Heat Plant at 17th and Wewatta was used as a Red Cross Canteen during the Second World War, where soldiers enjoyed treats. The steam system didn't grow geographically, but many buildings and customers were added along the pre-established route of the pipeline over the years.

In 1964, PSCo leased the State's steam plant at 1341 Sherman to augment its steam capabilities by boosting the capacity of the facility.¹²⁵ Service was extended to Larimer Square, the new Auraria campus and the new bus center over a period of years.¹²⁶

In 1987, Zuni was retired as an electric generating plant, but continues to provide a third leg to the steam system with the steam plant at 17th and Wewatta and the State Steam Plant on Sherman the other two legs.¹²⁷

Chiller

The antithesis of a steam heat system was introduced in 1997 to provide cooling to downtown office buildings without adding to the peak load during summer heat. A dedicated Chilled Water Center was built in the heart of downtown Denver, on the original site of the Ghost Building and 'disguised' to look like an eight-story office building. The Chilled Water Center incorporates two ice tanks with storage capacity of 75,000 ton-hours of cooling. Ice is made at night and melted during the day to provide cold-water service to buildings, while reducing the electrical requirements on the downtown grid during the peak daytime hours. The first cooling customer was served in August 1998.¹²⁸

Changing times

John Loiseau came to Denver in 1923 as secretary of Denver Gas & Electric Company and was named the first president of Public Service Company of Colorado in 1943.¹²⁹ He was succeeded by Robert T. Person who joined Pueblo Gas & Fuel Co. in 1946, and became president of PSCo in 1959 and would serve longer than any other company president.¹³⁰ Richard F. Walker started with PSCo in 1949 and became president in 1976.¹³¹ Walker was succeeded by Del Hock in 1988, who had joined the company in 1962 as director of accounting and worked his way up.¹³² Mergers and deregulation started to change the equation.



*Courtesy Denver Public Library, PSCo collection, WH1367
After a half century in the iconic Gas & Electric Building at 15th & Champa, PSCo prepared to move to a new building at 550 15th Street, opening in 1962*

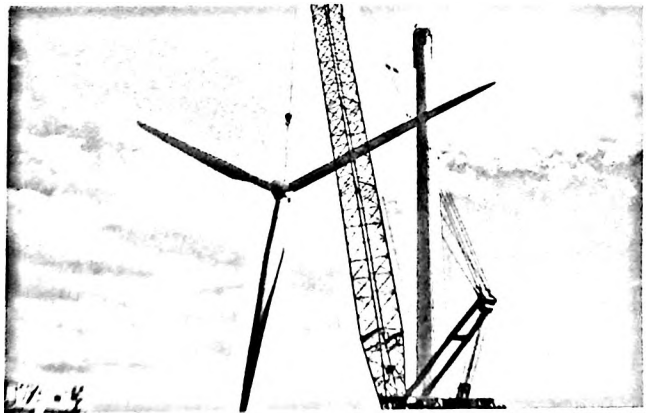
Wayne Brunetti came to the company in 1994 as President and Chief Operating Officer, the first officer who had not spent years in various parts of the company. He had worked for Florida Power & Light before starting his own consulting company, so he had little investment with PSCo or Colorado.¹³³ He became a pivotal person when, in 1995, PSCo began merger talks with a company headquartered in Amarillo, Texas, Southwestern Public Service (SPS).¹³⁴ With the merger with SPS in the works, Brunetti was made CEO in 1996 with Del Hock remaining the chairman and in 1997 New Century Energy's CEO was removed.¹³⁵

"So what? Bigger is better" is the goal as a protection against being taken over by a larger company. Xcel was not big enough. The ink was barely dry on the merger agreement when New Century Energy management began talks with Northern States Power Company about a merger. They determined Xcel Energy as the name for the holding company to use in 1999. That would result in the creation of the new company which traded in the New York Stock Exchange on August 21, 2000.¹³⁶ When the merger formed Xcel Energy, Wayne Brunetti became the CEO and Minneapolis was given the headquarters; whenever company got the CEO slot the other company got the headquarters was the story I heard.¹³⁷

Solar and Wind Arrive and Thrive

After starting to collect solar data in 1976, the viability of the technology was not there until the collectors became more sophisticated and effective.¹³⁸ In 1996, Colorado's largest solar collection site was dedicated at Cherry Creek State Park where it powered the campgrounds. The solar collectors were designed to track the sun across the sky.¹³⁹ There was no such fanfare when the collectors were removed from the park several years later. The technology continued to evolve and by 2017 solar collectors in Colorado were generating over 256 MW of electricity, but only 3% of the total electricity need by PSCo.¹⁴⁰

PSCo began gathering wind data in the early 1980s and continued as the technology improved to the point that wind turbines became a viable source of power.¹⁴¹ Windsource was developed by PSCo and was approved by the Colorado PUC early in 1997. The program allowed individuals to pay a little more on their PSCo bill, \$2.50 for a block of 100 KW, to help develop wind power.¹⁴²



Courtesy Denver Public Library, PSCo collection, WH1367
 Windsource was PSCo's first large-scale venture into renewable energy. This is the first turbine being erected on the Ponsequin Windfarm in 1998

Governor Romer signed up the Governor's mansion and held a press conference in the back garden.¹⁴³ He later said, "Renewable technologies are here to stay," and "Beginning this winter, 75% of Colorado consumers for the first time will have the option of purchasing electricity generated by wind."¹⁴⁴ Windsource became the largest customer-driven wind project in the U.S.

By the time the first of thirteen turbines were erected at the Ponnequin wind farm on the Colorado-Wyoming border early in 1998, it had become a product of the newly created company, New Century Energies.¹⁴⁵ The thirteen turbines would generate 10 MW of electricity. By February 1999, fifteen turbines were operating and by September 1999, about 14,500 PSCo customers had subscribed to Windsource. In April 2000, a press conference announced that thirty-one federal agencies operating in Colorado had signed up for Windsource.¹⁴⁶ PSCo, also called Xcel Energy-Colorado, was producing 20 MW of power with twenty-nine wind turbines.¹⁴⁷ The PUC allowed PSCo to increase the number of turbines by fifteen to add 36 MW to the grid.

Boulder's *Daily Camera* reported in July 2001 that there were 14,000 Windsource subscribers and over a thousand on a waiting list.¹⁴⁸ In October 2001, a second windfarm, near Peetz, was added to Windsource. This farm was a joint project with Cinergy Global Power of Cincinnati and generated 30 MW using thirty-three turbines. Another 108 turbines south of Lamar, in December 2003, added more wind power to Xcel's capabilities. This time Xcel was buying the power, to the tune of about \$16 million a year, from a windfarm it did not build.¹⁴⁹ By April 4, 2007 Xcel's Windsource program has a total of 63,028 participants including 39,440 in Colorado.¹⁵⁰

A screen shot from Xcel's website updated to 2017 shows 1,600 wind turbines in Colorado. On October 14, 2017 wind power supplied more than 60% of its customers energy between 1 and 2 pm.

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1936-1979	<i>Lines</i>
1959-1982	<i>The Messenger</i>
1974-1989	<i>Newslines</i>
1979-1987	<i>Q Magazine</i>
1989-1997	<i>PSCo Times</i>
1997-1999	<i>NCE Now</i>
1999-	<i>Excel Extra</i>

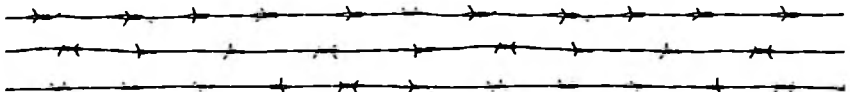
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Over the Corral Rail

*Compiled by Ed Bathke. Please submit your items of news, etc. to Ed.
Deadline is the 10th of the first month in the date of publication.*

Pikes Peak Posse Presentations

The Pikes Peak Posse kicked off the new year with a program by Dr. Jack and Patricia Fletcher, "The Cherokee Trail: The Major Route West for Gold Seekers, Emigrants, Cattle Drives, and Mail and Stage Routes 1849-1883." The Fletchers have devoted years of research in studying the trail and have published extensive volumes on the diaries of the Cherokee Trail.

The February meeting complemented January's topic, as Bruce Watson presented "Mapping the Cherokee Trail in Colorado." Bruce participated in the Colorado-Cherokee Trail Chapter's efforts in using modern mapping techniques, GPS, drones, etc., coupled with historical evidence, in creating detailed mapping along the trail through Colorado. The El Paso County portion, especially the area around Jimmy Camp, was featured.

Colorado Corral is Back in the Saddle

Following a year's hiatus due to being unable to meet in person, the Colorado Corral of Westerners hosted its first Zoom meeting in February. The program, "A History of Hops and the Craft Beer Revolution," was presented by Peter Kopp, Associate Professor of History at the University of Colorado Denver. Peter is the author of the award-winning book *Hoptopia: A World of Agriculture and Beer in Oregon's Willamette Valley*.

In Memoriam: Peter Randolph Decker

In 2006, one of the monthly programs of the Denver Westerners was presented by Peter Decker, Colorado historian best known for his work *The Utes Must Go*. Peter died in December 2020, but he was of Eastern heritage, born in New York in 1934. He earned a Ph.D. from Columbia University, and served as Assistant Professor of History at Duke University. This was followed by a stint in politics and journalism, as a speech-writer for Senator Robert Kennedy, a correspondent for AP, and a senior writer at the *Congressional Quarterly* in Washington, D. C. But both he and his wife Deedee had fallen in love with the West as teenagers, and in 1974 they bought the Double D Ranch in Ridgway, Colorado, and with no experience they became cattle ranchers. His success is indicated by being appointed by Governor Romer to be Colorado's Commissioner of Agriculture in 1987. He was also appointed to the Colorado Commission on Higher Education and was a Trustee of the National Western Stock Show. Peter was a story teller, and he authored six books, three on history – with which many of us are familiar – and three novels. He lived a life that truly epitomized the West. As Western historians we will miss our connection with him and his work.



Westerners Bookshelf



The Second Colorado Cavalry: A Civil War Regiment on the Great Plains, by Christopher M Rein. Volume 69 in the Campaigns & Commanders Series. University of Oklahoma Press, Norman: 2020. Illustrations, maps, tables, index. 274 pp. Hardcover, \$34.95.

When the Civil War started in April 1861, northern states rallied to President Lincoln's call to arms. Many state regiments responded and eventually most had their regimental histories written to preserve their contributions to the war effort. When Union regiments are listed, all the northern state regiments are included, but overlooked are the two territories that stepped up and produced troops: Nebraska and Colorado. Additionally, those territorial troops are looked down upon as making few, if any, contributions to the war effort. Their regimental histories have not received the notice as those state regiments. This is no longer the case.

Christopher Rein has highlighted the life of the Second Colorado Cavalry. The detailed history lesson is thorough, inclusive and full of individual contributions by the men. Rein supplies historical details to the Second, dividing his book into five chapters, corresponding with the Regiment's years of service.

1861 tells of life in Colorado Territory, including the coming together of many folks of different backgrounds and their seeking a new life. Many came to get rich quick in the "gold fields" while others sought a new style of life in this outpost of civilization. The mixture from where they came brought about some conflicts that were added to the concerns of Native Indians. Colorado was the receiving end of one of the two major trails west, along the Smoky Hill and Republican Rivers through Kansas. The other was along the Platte River further north through Nebraska Territory.

1862 marked the Second's first venture into fighting as it helped repel the Confederate invasion coming from Texas towards Colorado through New Mexico. They stayed in New Mexico and moved back and forth into the Indian Territory (modern Oklahoma). 1863 has them in Kansas moving back and forth into Indian Territory. This period serves as a foundation for future understanding of the relationships with Native Indians. It also makes an impression on Colorado troops, as they served as the buffer in the Kansas-Missouri conflicts. In western Missouri in 1864 they fought Confederate armies, again repelling two invasion attempts. Here Rein emphasizes how battling Confederate guerrillas in Missouri influenced how postwar Union soldiers would deal with the Native Indian "guerrillas." Extermination seemed to be the main objective. In 1865 they returned to Kansas to once again deal with the Indians along the trails.

Rein captures not only the history of the regiment but what was happening at the places the Second patrolled. His main contribution is telling the stories of the people involved, not only of the officers, but of many "regular" soldiers. The epilogue tells stories about the soldiers postwar.



Finally, this is not just opinion and a gathering of various stories. Rein has extensive scholarship and references. Endnotes offer many supportive details with great reference locations. In this book, Rein contributes two major understandings: first the history of the Second Colorado Cavalry; and second, what life was like in the Territory of Colorado from 1860 to 1866. He does both very well.

– Everett Brailey

Massacre in Minnesota: The Dakota War of 1862, the Most Violent Ethnic Conflict in American History, by Gary Clayton Anderson. University of Oklahoma Press, Norman, 2019. 384 pp. 42 illustrations, 2 maps, index. Hardcover, \$32.95.

In reading Gary Clayton Anderson's book, *Massacre in Minnesota*, the reader has much to scrutinize before accepting the author's interpretation of events.

Although Anderson has much knowledge about the Dakota Indian tribes, his interpretation of the conflicts between the U.S. Government and the Dakotas lacks scholarly objectivity. Anderson is irrationally biased towards favoring the Indians and biases readers against the pioneers. For example, he refers to the settlers as "invaders" despite the fact the pioneers did not use violence to destroy Indian villages during emigration. Instead, the immigrants bought or cultivated land. The author's indiscriminate use of the word "invaders" from the earliest chapters immediately biases the reader against the settlers long before the reader can consider the book's entire story.

Revealing his anti-pioneer bias further, Anderson fails to distinguish the wrongdoings of certain politicians from the actions of newly arrived immigrants. Failing that, the author makes the pioneers look as if they are "guilty" of the same things only the politicians are exclusively blamable for.

For example, despite explaining delays by politicians in moving tribes to promised new lands, Anderson arbitrarily criticizes the immigrants for "encroachment" on Indian lands. In addition to political procrastination, the wilderness had no objective demarcation line identifying, for newcomers, the range and limits of temporary Indian lands. Consequently, Europeans moved onto empty land without knowing they were in supposedly Indian territory. Yet, the author's own text indicates the politicians were to blame for neglecting to move the tribes (as per treaty agreement) and for the resulting close proximity of settlers' homes to tribal lands. The preceding shows the author's lack of even-handed treatment of Indians, settlers and politicians.

On the positive side, the author reveals much about Indian beliefs and shows the reader how English names are spelled in the tribal languages of the Dakota Indians. He also explains how the different Indian tribes were connected. He also provides some accurate information when describing the events leading up to the Dakota massacres of pioneers in the early 1860's. However, the author fails to mention all the facts about how the settlers viewed the situation and why they took the actions they did. He also avoids giving them the favorable bias he gives the Indians.

Anderson also fails to clarify the extenuating reasons behind the mass trial of Dakota Indians. But even an author like Anderson realizes he cannot continually evade all the facts. So, he mentions enough accurate information that, despite his intentions, clearly shows the Dakotas



committing inhumane atrocities against the pioneers. That becomes obvious in the middle and later portions of the book—only Anderson tries portraying Indian atrocities as just being “understandable” and not really atrocious. Meanwhile, all the whites—the settlers included—arc viewed as the “evil white oppressors.”

– George Kouceas

Pleas and Petitions: Hispano Culture and Legislative Conflicts in Territorial Colorado, by Virginia Sanchez. University Press of Colorado, Louisville, CO, 2020, 392 pp. Tables, illustrations, index. endnotes. Hardcover \$34.95

Were Hispanics unfairly treated by territorial governance in the San Luis Valley in south-central Colorado? Ms. Sanchez gives an aggrieved account of how Anglo laws and customs denigrated the alleged age-old traditions of Hispanic forbearers after the 1846 annexation of this area into the United States.

Ms. Sanchez presents the cause well. Upon the coming of Colorado territorial status and later statehood, Anglos changed the laws, disregarded old cultural alignments and cheated the rightful landholders of their inheritance. A major complaint is that the children of the area even now are not taught the correct version of pre-1846 history.

For a differing view, pull out your 1947 Denver Posse of Westerners *Brand Book* and read Posse member Colorado Governor Ralph Carr’s article, *The Sangre de Cristo Grant*.

- Neither Colonial New Spain nor Mexico after 1821 nor New Mexico Province up to 1846 had a marked northern border west of the northward tending Rio Grande.
- Native Americans (Navajo and Utes west of the Rio Grande, Comanche and Apache east, Pueblos in the valley itself) claimed and controlled these northern territories.
- Land Grants were not ancient. The Land Grants which Ms. Sanchez claims were not honored were not granted by the King of Spain, nor by the Mexican President but by Governor Manuel Armijo (Governor of Provincial New Mexico) two years before the advent of the American government.
- The Land Grants were fraudulently conveyed and the colonization requirements for full title were never completed (largely because of the warfare resistance of the Navajo).
- The U.S. Government spent forty-three years investigating the accuracy of Land Grant claims, trying to get the lawful ownership right before final land patent rights were certified. Much of this work went into adjudication of the dominant Indian nation claims.
- Land stealing (claim jumping) was ripe throughout Colorado for three decades after the arrival of Anglo government. Honest settlers, miners, Hispanic farmers and ranchers were all equally aggrieved by unfair but lawful claim jumping.
- By Colorado’s 1876 statehood, most San Luis Valley residents may no longer have been Hispanic. The 1876 declaration of statehood and the state constitution were printed in English, Spanish, and German to get the word out to all settlers.

If the reader can reconcile or discard the above complications, then the rest of *Pleas and Petitions* makes a compelling case that Hispanic Colorado was unfairly cut off from its New



Mexican birthright and culture. Repeated attempts throughout the 1860's and 1870's to have three southern Colorado counties with a total of 7,000 citizens returned to their native New Mexico may have solved the grievances outlined in the book, but statehood would have been delayed for another thirty-six years until New Mexico became a state of the union.

As for the complaint that modern youth are not taught the true nature of Colorado's Hispanic roots, that may be more a criticism of the depth of history education in our schools than of an anti-Hispanic bias.

– Dan Shannon

Race and the Wild West: Sarah Bickford, the Montana Vigilantes, and the Tourism of Decline, 1870 – 1930, by Laura J. Arata, University of Oklahoma Press, Norman, 2020. 285 pp., photographs, footnotes, bibliography, index. Paperback, \$24.85.

Through extensive research, Arata expands a two-page biography of Sarah Bickford into a history of race, vigilantism, mining, and the beginnings of heritage tourism in Virginia City, Montana.

Sarah was born a slave in Tennessee sometime in the early 1850s. Following the Civil War, she moved to Virginia City, Montana where she spent the rest of her life. During that sixty plus years, she married two white men, had seven children three of whom died young, divorced an abusive first husband, and ran several businesses including the Virginia City Waterworks which she inherited after the passing of her second husband. She was the first woman to own a city utility company which she managed successfully for almost forty years. Her business accomplishments, not only as a woman, but as an African-American woman, were previously mostly hidden from recognized history.

Over time many legends appeared about the early life in the Wild West which we all grew up reading about and seeing in our favorite Western movies. The depictions showed the pioneers as white, Native Americans as hostile and savage, and very little about the other races that lived and worked alongside them. Vigilantism was glorified as the needed law before the real law was established. Miners were all white and there was no room for the Chinese and African Americans in the story. As tourism developed after World War I, these legends were ingrained as the accepted history.

This book sheds light on many of those legends. It takes the story of one woman and one small Montana town and expands the historical record to depict how life was actually lived. We see a more inclusive story that adds context and magnifies our understanding of a community that included much more than the legends ever told. It makes one wonder what other stories we are missing about other people and towns of the Wild West. For anyone interested in understanding the whole, inclusive story of the Wild West, this is a must read.

– Leslie Kamauskas

