REVOLUTION ON A DARE

Edmund A. Smith and His Famous Fish-butchering Machine

By Phillip B. C. Jones

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There is a story about Edmund A. Smith, possibly apocryphal, a story about a time around the turn of the century when he ran a cookhouse in Cascade, British Columbia. Business had turned sluggish, the story goes, and during his idle hours, Smith concocted a race for an upcoming community sports day. The winner would earn a cash prize. After donating the first $50, he invited the town's residents to join him in subscribing for prizes and accumulated $500. Smith drafted the rules for the race and apparently no one noticed that the rules designated a $300 prize for an event called the "fat-man's race." Smith happened to be a very large man.

On the day of the race Smith gamely ran down the main street with the other contestants. He brought up the rear, gasping "I win! I win!" as he heaved himself over the finish line. The crowd laughed at Smith until he pointed out the fine print in the rules: a contestant had to weigh over 280 pounds to qualify for a prize in the fat man's race. Smith weighed 320 pounds and was the only qualified contestant. Edmund Smith reportedly collected the prize money, but barely escaped with his life.

Soon, the large cook would focus his creativity on inventing a machine that would revolutionize the Pacific Northwest's salmon canning industry. This time, his ingenuity would not be buried in fine print.

Born on March 17, 1870, in London, Ontario, Edmund Augustine Smith spent his early years on his family's farm. As a boy he designed and built a small threshing machine; it was a crude device, but it worked. After moving with his family to Victoria, British Columbia, Smith left home at an early age with little formal education. He tried various occupations, including cook and terra cotta presser, and moved through the mining camps in western Canada. In Cascade City he met and married Gertrude Peterson.

On a trip to the Seattle area Smith discovered a valuable clay deposit on a farm in an area that would become the town of Harper, near Port Orchard. In 1898 he settled in Colby and started the Harper Brick & Tile Company with E. L. Grondahl, F. C. Harper, and Richard A. Ballinger, who became mayor of Seattle and secretary of the interior during the Taft administration.

Smith's surroundings must have aroused his predisposition to invent. After observing the deterioration of wooden pilings, he conceived the notion of pilings with a core surrounded by a layer of pottery clay, "as the pile is thus rendered proof against the ravages of teredos or like subaqueous worms and the corrosive effects of salt water." His patent application for a "composite pile," drafted by the end of 1900, explains that the piling core may be made of cement and metal. This, at a time when the use of reinforced concrete for buildings and other purposes was unknown. Although Smith obtained a patent, he lacked the money to follow through on the idea.

Edmund eventually sold his interest in the brickyard at a profit, moved to Seattle, and invested in the stock of the Alaska Fishermen's Union. The organization operated a cannery along the Chilkat River in Alaska. John Wallace and Benjamin R. Brierly shared an interest in the cannery. The three became friends and, eventually, business associates. His composite piling invention might have been ahead of its time, but in 1901 he turned his efforts to another invention that could not have been timelier. And for this project, he found enthusiastic backing.

According to an account in the Pacific Fisherman, a publication edited by Daniel L. Pratt, Smith's close friend, a frivolous whim led to Smith's greatest invention. Apparently, Smith was lounging in the Seattle office of the Alaska Fishermen's Union when a boy dropped by and tried to sell pencils personalized with the organization's name. Smith learned that the young salesman sent his orders to an East Coast company, which would produce the labeled pencils. The boy claimed that he could buy blank pencils at a very low price and make a lot of money if he had a pencil-printing machine. Smith told him that he would make the contraption for a hundred dollars. When the boy said that he did not have the money, Smith proposed that he would construct the machine, print the pencils, and give the printer to the boy in exchange for the first $100 dollars. In less than one hour, Smith constructed a simple printing device that included a roller with rubber type. With Smith printing the pencils, the boy made $100 in a few days and walked out of the Union office with his little printer. Smith later claimed that he could have become rich by selling the machine at $1.50, but that the bottom of the market dropped out after the first sale.

As reported in a June 1909 article in *Pacific Fisherman*, F. E. Barlow, superintendent of the Chilkat cannery, did not view Smith's brief pencil-printing enterprise with amusement.

"Smith, why don't you turn your inventive genius to some practical use?" Barlow said. "Why don't you invent something that will do yourself and others some good?"

"Just name it," said Smith, "and watch me get on the job."

Barlow explained that his cannery was losing money for stockholders like Smith because there was a bottleneck at the fish butchering tables. The company lacked sufficient labor to clean the fish fast enough to supply the lines of canning machines. "Why don't you get up a machine that will clean fish in the canneries?" Barlow asked. "There have been a hundred or so invented and none of them are any good. The man that gets up a good one will make a fortune."

Barlow did not exaggerate the potential value of a fish-cleaning machine. The salmon canning industry was in dire need of automation at the butchering table, a circumstance created by the country's treatment of Chinese immigrants.

Between 1849 and 1877, 200,000 Chinese citizens, 90 percent men, arrived in the United States. While most went to California, a substantial number settled in the Pacific Northwest. The California Gold Rush brought the first wave from China. Then the Central Pacific Railroad had to be built to meet the Union Pacific. In 1867, the railroad encouraged the immigration of additional laborers, and as one historian wrote, Chinese men "had to be brought across the Pacific, often without being consulted." After completion of the railroad, the Central Pacific laid off most of the Chinese laborers, throwing thousands out of work.

The railroad's backers anticipated that the transcontinental railroad would bring prosperity to California. Instead, it brought inexpensive manufactured goods that hurt local industries. The railroad also brought unemployed European immigrants from the East Coast who joined

thousands of ex-miners, discharged railroad laborers, and former Union and Confederate soldiers, all seeking work. California's economy joined a national economic depression. Violence broke out in California against the Chinese, who became the scapegoat for the poor economy.

Congress attempted a solution of sorts-the Chinese Exclusion Act of 1882. This legislation established a ten-year moratorium on the immigration of Chinese citizens, except for certain select groups, such as diplomats and their servants. The 1892 Geary Act extended the Exclusion Act, and ten years later Congress decided to maintain the restrictions for an indefinite period of time. The Geary Act regulated Chinese immigration until the 1920s.

The Exclusion Act reduced the number of Chinese immigrants from over 8,000 in 1883 to ten in 1887. However, the legislation could not prevent the rise of another anti-Chinese movement, this time in the Pacific Northwest. In the mid-1880s Washington Territory experienced a sharp economic downturn in the wake of a sawmill curtailment and completion of several railroads, including the Canadian Pacific Railroad. Violence against Chinese immigrants broke out in Issaquah, and anti-Chinese forces expelled Chinese residents from Tacoma and Seattle.

While restrictions on immigration decreased the number of Chinese entering the United States, those in the country were leaving to avoid persecution. The decline in the Chinese work force impacted the Pacific Northwest's rapidly growing salmon canning industry, an industry that relied almost exclusively on Chinese men to butcher the fish.

The butchers were the most skilled of the salmon canning crew. A good butcher could remove fins, head, tail, and entrails with eight knife strokes and dress up to 2,000 salmon in a 10-hour day. After the fish were butchered they were sent to the "slimers" who scraped the fish to remove the mucous covering, some scales, and any blood or offal. Then the salmon were cut into small pieces and fit into cans that other workers had salted. The speed of the entire canning process depended on the pace set by the butchers. And speed became critical during a run.

To spawn, salmon travel from the Pacific Ocean every summer into Puget Sound and from there to various freshwater streams and rivers. The five species of Pacific salmon migrate at particular times from spring through fall. For example, King salmon is the first to arrive each year and migrate in early spring. This yearly migration, or "run," might continue for only a few weeks, so canneries have to make the best of it.

The experience of Pacific American Fisheries during the peak of the 1900 sockeye salmon migration illustrates why canneries employed thousands of workers to process the fish during a run. On August 1the company's Fairhaven cannery received 85,000 salmon. From August 3 to 6, the cannery received a total of 232,000 salmon. On August 7 it received 70,000 salmon in the morning and 40,000 in the afternoon. It is no wonder that canneries had to operate almost continuously during the busy parts of the season. Yet, at a time when the canned salmon industry was rapidly growing, the availability of Chinese salmon butchers was diminishing. According to an account in the June 1909 issue of Pacific Fisherman:

> *The Chinese laborers were skilled and difficult to replace. The training of new men meant the loss of much time and money. Moreover, it was impossible to get other laborers who were willing to do this work. The situation was a serious one and might have resulted in inestimable damage to one of the greatest industries in the West.*

The canneries faced an additional problem: at the time of the salmon canning industry's peak development, the majority of Chinese men who remained in the business were getting old. The exhausting labor of a salmon butcher would begin hours earlier in the day than the rest of the crew, because they had to butcher a quantity of fish before packing could start. During the extended shift, salmon butchers worked with long sharp knives, their hands continually in water and fish guts. The butchers' feet and ankles became swollen from hours of standing in water and fish slime. Salmon butchering was not a job for the elderly.

The function of salmon butcher was ripe for automation. But the creation of a fish-butchering machine presented several obstacles. The process was complicated and needed precision to waste as little salmon as possible. By 1901 over 250 fish-cleaning devices had been patented and cannery men had tried many in their plants. None were successful.

Edmund Smith had never seen the inside of a salmon canning company at the time that Barlow had dared him to invent a fish-cleaning machine. Nevertheless, Smith took up the challenge. After he agreed to devise an automatic fish butcher, F. E. Barlow and John Wallace took him to a cannery on the Seattle waterfront where he watched Chinese butchers cleaning fish by hand. Noting that the workers grabbed the fish by the tail and cut with the knife toward the head, Smith resolved that his machine would imitate the technique as closely as possible.

Wallace and Barlow advanced Smith's living expenses and set him up in a 10-by-14-foot workroom in a building on the corner of First Avenue and Seneca Street. Several weeks later Benjamin R. Brierly bought a substantial interest in the project. Smith began building prototypes with just a hammer, chisel, and hacksaw, but soon managed to convince his partners to purchase a $35 turning lathe. The inventor labored at his machine in the downtown workshop and drew blueprints on tablecloths at home. After eight months, however, he found that he had only created a substantial debt.

During a 1969 interview with Mrs. Helen Smith Sallee, Edmund Smith's daughter, she described one night when her father returned home and told his wife Gertrude that he would give up and get a job to repay the investment money. Gertrude simply advised him that if he took a bath, he would feel better about the situation.

Her advice must have helped. Smith awoke at three in the morning and exclaimed, "Gert! I've got it." Unable to hire transportation at that hour, Smith ran from Yessler Way and 16th Avenue to his workshop. He worked for ten solid days. According to Sallee: "We didn't see hide nor hair of him. Then he came home, all smiles, and got dolled up. He went to the bank to borrow some more money and took a patent attorney to Washington, D.C."

Smith built his first fish-cleaning machine during the winter of 1901-02 and filed his first patent application in May 1902. The automatic butcher consisted of a simple framework supporting a cam-driven plunger that carried the fish on a horizontal plane past knives and cleaning devices. The machine was not elegant, but it cleaned fish. Smith and his partners established the Smith Manufacturing Company in 1902, and the inventor continued to perfect his machine. He also found time to file a patent application for a machine that weighed and sorted packages, such as cans filled with salmon.

After his first study of a salmon butcher's technique, Smith did not see the inside of a cannery until the fall of 1903 when he installed a version of the machine known as "Jumbo" in the

Fairhaven (now South Bellingham) plant of the United Fish & Packing Company, operated by E. B. Dudden. Smith designed Jumbo as a vertical wheel that carried salmon past knives and cleaning attachments. The vertical orientation required significantly less floor space than Smith's prototype and conventional models that operated along a horizontal plane. Despite the innovative design, cannery men remained skeptical about Jumbo in light of the failure of 50-fish cleaning machines invented by others. Yet on the first day, Smith's machine cleaned 22,000 fish in nine hours, or about 40 fish per minute.

On December 1, 1903, Smith, Wallace, Brierly, and Barlow incorporated the Smith Cannery Machines Company; John Wallace was named president of the company. During the following year Smith developed a smaller model of his machine and leased it to six canneries for a royalty: three in Alaska and three in the Puget Sound area.

Although the fish-cleaning machines operated successfully, Smith's business did not. Smith Cannery Machines Company never received a royalty payment. By the end of 1904 the company had yet to take in one cent. Then, Everett B. Deming of Pacific American Fisheries, Inc. (Bellingham), bought three machines in 1905, the company's first sale. Deming reportedly made the payment with check number 1 of his newly incorporated cannery. Two automatic butchers supplied seven lines of canning machinery, which packed an average of 9,000 cases of sockeye salmon a day, and over 10,000 on some days. For comparison, the company had operated in 1901 with nine canning lines and a large butchering crew working continuously to pack 8,600 cases on the best day. Smith boasted that the "iron chink kept them continually supplied and the lines of machinery never were idle for want of fish and frequently there were from 30,000 to 70,000 fish cleaned ahead"

The Pacific American Fisheries sale probably saved Smith's company. Moreover, the cannery's success with the machine generated much-needed publicity. In 1906 eight new Smith Butchering Machines were installed in the United States and five in British Columbia. To keep pace with the increased business, Smith's manufacturing plant expanded its Seneca Street facility.

A *Pacific Fisherman* article published in May 1906 describes the operation of the machine at that time:

> *The method of cleaning the fish is simple in the extreme. Two men are required to prepare the fish before they enter the machine, one of whom seizes the fish as it comes down the elevator and guides it past a knife which cuts the head off. The other passes it by a knife which cuts off the tail, and then the fish is ready for the machine and is placed in the trough which feeds the cleaning cycle of the "Iron Chink." The fish comes through the cleaning trough tail first, the back fins coming in contact with the self-sharpening knife which trims off the large and small fins. In the trough an automatic feed works consistently with the six clamps on the wheel, which clamp the fish by the tail, carrying them up through a centering device which holds them firmly when the back clamps close on them. The remaining fins are removed in uniform manner by self-sharpening, self-adjusting knives at the top of the machine, and the fish pass on down to the splitting saw which splits the fish in the exact center. Further on the fish come in contact with a rotary, grappling device which removes the entrails and stirs up the blood on the backbone, and the fish are then ready to be washed out with the aid of a stream of water and a rotary brush, after which they pass on to a point within a few inches of where they entered the machine.*

The fish then traveled on a conveyor to the gang knives and on to the canning machinery.

A limitation of the machine was that, although it could be set to handle fish of different sizes, it could not adjust itself from one fish to the next. Certain canneries, such as Columbia River canneries, received fish in a wide variation of sizes, and the use of the butchering machine under these conditions would require frequent resetting or manual sorting of fish by size. This would work against any potential savings of time and labor. Nevertheless, companies continued to purchase the butchering machines and place them in canneries where the salmon runs and type of salmon justified their use.

The early models of the Smith Butchering Machine frequently needed repair. Smith learned about his invention's defects by living in a cannery, observing the machine's operation, improving it, and sleeping between repairs. His improvements are reflected in four patent applications that he filed between 1903 and 1909. The 1908 model proved so satisfactory that no major alteration was introduced during the next 10 years.

By mid 1909 there were over 60 butchering machines in use at canneries situated in Puget Sound, British Columbia, and Alaska. The demand was so great that Smith's company announced plans for a new three-story manufacturing facility at First Avenue and Stacey Street-the first reinforced concrete structure in Seattle. Edmund Smith did not live to see it.

Seattle's Alaska-Yukon-Pacific Exposition was set to open on June 1, 1909. Smith assembled an exhibit for the event that would show visitors how his machine cleaned salmon. On May 31, Edmund drove his sister, Mrs. J. Sutcliffe, to see the display on the grounds of the University of Washington. According to a June 1 *Seattle Times* article, on the way there they drove down a blind alley about one block north of the Latona Bridge (now, the site of the University Bridge); while backing out, the automobile ran into a rut and rocks perforated the rear gas tank, causing it to explode. Burning gasoline drenched the occupants of the car. Although pinned beneath the steering gear and blinded by flames, Smith managed to shove his sister over the side of the car to the ground. He did not follow her because he was afraid that if he fell on her his weight would cause her more injury. Instead, he tried to work his way over the brakes to the other side.

Rescuers arrived, disentangled Smith from the car, and rushed the two to Pacific Hospital. Smith's doctor said that he would have to amputate several of the inventor's fingers, and he requested that Smith's relatives donate skin for extensive grafts. Although Mrs. Sutcliffe was severely burned, her doctor did not anticipate a need for skin grafts.

A *Seattle Times* reporter visited Smith on the morning of June 1. Mumbling between blistered lips, Smith told the reporter: "I guess you'll have some trouble to understand me, because this isn't much fun. You may say however, that soon as I am able I want all of those who so kindly helped me at the scene of the accident to call and let me personally thank them."

Smith said he and his sister would "be able to see the fair long before it closes and have a good time with our friends." But he died unexpectedly at 5:45 on the morning of June 2.

Daniel L. Pratt, who had known Smith since he first started experimenting with the fish-cleaning machine, told a *Seattle Times* reporter that the country had lost a second Edison. Pratt hinted at inventions Smith had been devising in the experimental department of his factory. The June 1909 issue of *Pacific Fisherman* offered a tribute to Edmund Smith that concluded:

> *His jovial face and his cheerful, sunny disposition will be missed in a hundred different circles in the Pacific Northwest where he has been known and liked, and not hundreds but thousands have*

> *felt in the past few weeks the pangs of sorrow that come with the loss of a good friend and the untimely passing of a man who, being of much real good on this earth, was snatched away before the period of that usefulness had run its full course.*

Smith may not have had the chance to realize his full potential as an inventor, but by age 39 he had certainly left his mark. His automatic butchering machine revolutionized the canned salmon industry. After Smith's machine removed the holdup at the butchering table, new production bottlenecks arose, forcing the development of new machines and the improvement of older technology. As Patrick W. O'Bannon wrote in his 1982 *Agricultural History* review, the industry's adoption of the automatic butcher "unleashed a wave of innovative activity both inside the cannery and on the fishing grounds." A 1927 overview of the salmon industry provides another measure of the invention's impact:

> *Machine butchering in salmon canneries, as performed by the famous "Iron Chink," has been among the greatest forward steps in the development of this branch of the fisheries, and is one of the principal factors making possible the increase of production from about 3,000,000 cases in 1900 to over 10,000,000 in 1926 and record years of war times.*

Smith's fish-cleaning machine not only enabled the growth of the salmon industry, but ultimately created more jobs than it eliminated. United States and Canadian salmon canneries still use the latest model of the "Iron Butcher." The Seattle-based business, Smith Berger Marine, Inc., traces its roots to Smith's old company and promises to continue the legacy of Edmund Smith.

Phillip B. C. Jones worked as a patent attorney before becoming a freelance writer, specializing in articles on history, science, law, and forensics. He has written articles on historical topics for History Magazine*,* The Strand Magazine*,* Today's Science*, and* Old News*.*