The work of painter and illustrator John Clymer reflects his Northwest roots.
Steadman Upham

and Nat Zappia

Magnificent duotone reproductions are viewed within the contexts of U.S. history, the history of Native peoples worldwide, and the individual subjects. More than seventy years after Curtis created his last photograph, these portraits speak not of the “vanishing Indian” he believed he was documenting for posterity but of the resilience of entire nations.

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COVER: "Mountain Goat" (1973). During his career as a commercial artist, John Clymer drew 80 cover illustrations for the Saturday Evening Post. His transition from magazine illustrations to "cover painting" resulted in many wildlife canvases. Clymer's travels throughout the Pacific Northwest and Canada inspired mountain goat paintings, including this excellent canvas. See related story beginning on page 20. (Courtesy of the Clymer Museum of Art, Ellensburg, Washington, and David Clymer)
Statewide Outreach: Serving the Heritage Community

Each year over 100,000 people visit the Washington State History Museum, the Historical Society's most public face. Yet, equally compelling work happens beyond the Museum's walls, across the state and region as our expert staff shares its knowledge and resources with the history community. The newly renamed State Capital Museum and Outreach Center is the most visible manifestation of this less obvious branch of the organization. In Olympia the State Capital Museum has long been a touchstone for the history of Washington’s capital city, and it has now become the base for a growing number of outreach programs.

The museum’s new name reflects its multiple functions—museum, outreach center, and event space—and more accurately signifies what’s inside the walls of the historic 1923 Lord Mansion. Plans are afoot to refresh the permanent exhibits, including an updated interpretation about the Lord family that incorporates recent research. Our outreach programs include:

- Washington History Day, an innovative history education program in which 6th- through 12th-graders conduct rigorous historical research and analysis on a topic, then create a documentary, exhibit, paper, or performance to present their findings. The program culminates with a state contest each May; winners advance to the national contest in June.
- The Traveling Exhibits Service, which creates small, panel-based displays on state history topics for lending to museums, libraries, and community centers.
- The Heritage Caucus, a legislative body that convenes during the session to focus on policy issues of significance to the heritage community.

The Outreach Center administers two other important programs: the Washington Women’s History Consortium, which is gearing up for the Washington centennial of women’s suffrage in 2010, and the Heritage Capital Projects Fund, a state-funded competitive grant program.

Our staff, like our site, is multifunctional. Susan Rohrer runs the education program, including school tours and enrichment classes, and conducts our popular public programs. Melissa Parr leads the Traveling Exhibits Service and works with Washington tribes on issues important to their history. Mark Vessey works on the Heritage Capital Projects Fund, Columbia magazine, facility rentals, and desktop publishing projects. Shanna Stevenson coordinates the Women’s History Consortium and serves on the Capitol Furnishings Committee. Kevin Hanken provides web support for the Women’s History Consortium. Rachel Lilley runs the museum store and assists with National History Day and the Women’s History Consortium. My role is to administer most of these programs, manage the Olympia site, and staff the Heritage Caucus.

All of us are motivated to excellence by the people we serve, whether they walk through our front doors or contact us from afar. We believe outreach is the key to building healthy, long-term partnerships to promote and preserve Washington’s great history, and we believe that history is a meaningful way for diverse groups to find common ground.

—Lauren Danner, Head of State Capital Museum & Outreach Center

State Capital Museum/Outreach Center staff, from left to right: Garry Schalliol (director of Statewide Outreach Services), Susan Rohrer, Melissa Parr, Shanna Stevenson, Lauren Danner, and Rachel Lilley. Inset: Mark Vessey.

Not pictured: Kevin Hanken.
Hanford and History: B Reactor’s 60th Anniversary

By Richard Rhodes

Many people know the history of the Hanford Engineer Works well; some have lived it. I know it as a historian. I wrote about it in my book, *The Making of the Atomic Bomb*, and would have written more, but I simply did not have room. I treated plutonium production as a black box, inadvertently contributing to the myth that the atomic bomb was the work of 30 theoretical physicists at Los Alamos. More recently I have reviewed volumes of primary sources to refresh my memory of the heroic work carried out there between 1943 and 1945, so I think I can speak with some authority about it. I may even be able to clear up a mystery or two.

Scientists at the Metallurgical Laboratory of the University of Chicago selected the site where plutonium would be produced for the first atomic bombs. Thirty-three-year-old Army Corps of Engineers colonel Franklin T. Matthias, known to his friends as “Fritz,” wrote them into his diary after a meeting at DuPont’s home offices in Wilmington, Delaware, on December 14, 1942. The site needed to be spacious enough to accommodate a manufacturing area of approximately 12 by 16 miles, with no public highway or railroad nearer than 10 miles, no town of greater than 1,000 population nearer than 20 miles, an available water supply of at least 25,000 gallons per minute and an electrical supply of at least 100,000 kilowatts. Matthias looked in the Grand Coulee area of Washington and at several sites in Tennessee before flying over Hanford in an army observation plane.

“I came back over Horse Heaven,” he remembered many years later—in the area northeasterly from Plymouth—and over Rattlesnake Mountain to the Hanford site from the west, and I got over that mountain, and I had looked at everything else, and I knew that was it, right then.” His boss, Brigadier General Leslie Richard Groves, agreed, and the Corps of Engineers began land appraisals at the Hanford site in January 1943.

The first great question was what kind of cooling system to use in the production reactors that would be built and operated at Hanford to make plutonium. Uranium metal would serve as fuel, graphite as moderator (to slow the neutrons in the reactor). The fission chain reaction would release tens and hundreds of thousands of kilowatts of energy, and since these reactors were being built to produce plutonium, that energy would not be used to make steam to generate electricity but would have to be transferred away.

The first chain reaction in the pile (reactor) built in the former squash court at the University of Chicago had operated with a barely positive reactivity of 1.006, so conserving neutrons was an important consideration. Helium, which absorbed no neutrons at all, was the coolant of choice at first, but Hungarian theoretical physicist Eugene Wigner, trained as an engineer, held out for water despite its neutron-scavenging propensities because it would be simpler and thus faster to engineer. He judged that they would improve reactivity in the big production reactors with purer materials. He was convinced that Nazi Germany was ahead of the United States in bomb development, and even moved his family out of Chicago in December 1943. He estimated that the German head start might already have given them atomic bombs—which he thought Germany would, logically, drop on the University of Chicago’s Met Lab.

Eventually Enrico Fermi, General Groves, and DuPont’s Crawford Greenewalt agreed on once-through water cooling. Wigner designed an elegant reactor: a three-story assembly of graphite blocks drilled through with a cylindrical lattice of channels into which aluminum-clad slugs of uranium metal could be inserted. Water from the Columbia River would flow through the channels around the slugs for cooling. When the slugs had been sufficiently exposed to the pile’s neutron flux—the concentration of neutrons passing through a given point in the reactor—to breed about a dime’s weight of neptunium per ton of uranium, they could be pushed out the back into a cooling pool, where the neptunium would quickly decay to plutonium.

Which brings up one of the mysteries I mentioned. B Reactor was the first to go critical—maintain a self-sustaining chain reaction—late in the evening on September 26, 1944. Early the next morning the power was increased to 9 megawatts and held there. Then, to everyone’s surprise and consternation, the
reactivity began slowly to decrease, at a rate that would drop the reaction below criticality at about six in the evening. To slow any possible water leak they reduced the pressure, which dropped the power to 200 kilowatts, but the reactivity continued to decline, and they decided to shut the reactor down and hunt for leaks.

When Crawford Greenewalt returned with Fermi the next morning, September 28, he wrote, he “found that the pile had died according to prediction, but had mysteriously come to life starting at about 1 a.m. today. The reactivity had increased steadily,” Greenewalt continues, “and at 7 a.m. they started controlling the power at 0.2 MW. From this time on the activity kept increasing.... During the night an attempt had been made to find leaks but neither conclusively or successfully.”

They continued trying to check for leaks, but by now they had come to believe that something was poisoning the reaction, and that evening, to test their suspicion, they raised the power to 9 megawatts, Greenewalt wrote in his diary, “and the earlier phenomenon repeated itself almost exactly: the reactivity first flattened off, then decreased.... At midnight we dropped the power again to 0.2 MW and when I left at 2:30 a.m. the loss of reactivity was decreasing and looked definitely as though it was going to turn up.”

Since the reactivity seemed to be cycling with the increase and then decrease of the poison, they thought of two possible explanations. Either the reactor’s radiation was causing some substance to deposit on the slugs and tubes—which the cooling water then dissolved when the pile power was reduced—or some short-lived fission product was decaying to a longer-lived radioactive daughter with a large appetite for neutrons. From the data on the changes in the pile reactivity Greenewalt plotted the half-life of the daughter at 11.7 hours, but, he wrote, they “couldn’t think of any reasonable radioactive process which would produce the results.”

By the morning of Friday, September 29, however, physicist John Wheeler had solved the mystery. The offender was a fission chain after all. The most likely, Wheeler thought, was 6.6-hour iodine134 decaying to 9.1-hour xenon135. The loss of reactivity the xenon had caused meant it had 30 times the appetite for neutrons of any isotope previously known. Wheeler calculated that they could override the poisoning by increasing the pile’s reactivity by 1.3 percent, which they could do by loading more channels with slugs—up to 1,500 channels and, if necessary, 2,000.

Why was the reactor built with extra, unused channels? The accepted explanation, which I think may have come from postwar reminiscences by Fritz Matthias, is that DuPont engineers were conservative and wanted to leave a margin of safety in case a problem cropped up. In contrast, Wigner, trusting his calculations and wanting to move ahead as fast as possible to beat the Germans, had designed a lattice—the horizontal cylindrical arrangement I mentioned—that made optimum use of the minimum necessary number of channels. But it was not simply DuPont conservatism that led Crawford Greenewalt to order extra channels drilled through the corners of the cubical graphite structure. John Wheeler had assured Greenewalt there were no unknown decay products that would poison the chain reaction, and Greenewalt seems to have accepted Wheeler’s assurances. (Wheeler’s overconfidence may explain why he hustled so quickly to identify the isotopes that did cause the poisoning.)

Greenewalt was in fact concerned with a different problem: water corrosion of the cladding around the uranium slugs, which could lead to leakage of the highly radioactive fission products into the cooling water and thus into the environment. It was possible, he realized, that the uranium slugs might have to be double-canned to prevent them from corroding, in which case the extra aluminum might scavenge enough neutrons to quench the chain reaction.

To prepare for that possibility, Greenewalt ordered that the corners of the reactor blocks be drilled with extra channels where more uranium might be inserted. This would change the pattern of the lattice from a cylinder to a cube, increasing the reactor’s flux and overriding the aluminum can problem if it emerged. Fortuitously, the channels were then available to override the xenon poisoning no one had expected. Greenewalt’s decision was crucial, and he made it despite contrary advice from the Met Lab leadership. Had DuPont followed the Met Lab’s overconfident advice, the entire Hanford plutonium production program would have been stalled until (continued on page 6)
PRESERVING HANFORD'S HISTORY

By Michele S. Gerber

B Reactor, situated at the far northwest corner of the Hanford Nuclear Site in southeastern Washington, was the world's first full-scale nuclear reactor of any kind. When it began operation in September 1944 nothing remotely like it had existed in the world before. Amazingly, in view of the speed of its construction and lack of prototypes, it actually worked as designed, transforming tiny bits of its massive uranium fuel load into plutonium.

This opened wide the door to our human capacity to tinker with "things nuclear"—weapons with great power to destroy and deter, medicines, space exploration missions, and energy supplies. For good or ill—most likely both—B Reactor changed American and world history in fundamental and significant ways. It "super-sized" the United States to an international leader and transcendent power. It altered the global balance of power from the very moment its product—the Nagasaki weapon—ended World War II, and it will continue to do so far into the future.

Nuclear isotopes, whose practical production was demonstrated by B Reactor, fueled the "space race" with all of its spin-off technologies in satellites, cells, computers, and other inventions that now permeate our lives. Moreover, the huge government/industrial complex that was organized to build and operate B Reactor grew and spawned a life of its own, transforming industries, workplaces, and the very fabric of social life in America. Interesting, well-paying jobs at huge government facilities lured young families from hometowns, creating communities without grandparents, displacing and disorienting familiar patterns and expectations of life outside the workplace, and helping to change the very nature of society.

Anything that significant—anything that altered so many aspects of our lives—ought to be preserved, studied, and debated. We know from experience that if a building, battlefield, concentration camp, or ancient temple is wiped from the face of the earth, we will remember it less, talk and think about it less. Eventually, somewhere down the line of generations, it will be forgotten.

The preservation of B Reactor should not be done in the spirit of "triumphalist history" or be favored only by those who admire the machine and its groundbreaking technology. It should be desired just as much by those who think the reactor was/is an abomination that should never have been built. It should be desired by all Americans who want to know and want their descendants to know who we are as a people and a culture, as well as by those who believe it is good and necessary for present and future generations to look at the positive and negative aspects of B Reactor and ask, "Who built such a thing, and why?"

Preservation Update

The Hanford Site in Benton County has been included in the "Manhattan Project National Historical Park Study Act" passed by Congress and signed by President Bush in October 2004. The act authorizes the National Park Service (NPS) to study historically significant sites at Hanford, the Los Alamos National Laboratory in New Mexico, and the Oak Ridge Reservation in Tennessee to determine their feasibility for preservation and interpretation as park service units. After the study, a distributed national historic site interpreting the Manhattan Project, with Hanford's B Reactor as the key component, may be possible. The NPS study is currently under way.

Construction and exhibit design for the Hanford Reach National Monument Heritage and Visitors Center is in progress in Richland. The 80,000-square-foot museum is to feature displays and programs about Hanford Site history and cleanup and the history of local towns, Native Americans, landforms, and geology. The center is expected to open in 2009.

For more information on Manhattan Project historic preservation in Washington, visit: www.b-reactor.org or www.atomicheritage.org.

Michele S. Gerber, a historian in Richland, has a long career in World War II and Cold War history. She is on the board of directors of the Hanford Reach National Monument Heritage and Visitors Center and author of On the Home Front: The Cold War Legacy of the Hanford Nuclear Site, now in its third edition.
Six plutonium extraction runs were processed in January 1945, resulting in a plutonium “charge” of 97 percent purity: “The charge was loaded into a ‘sample can’ . . . on February 1, 1945,” the DuPont History reports. “Because the closure on the sample cans had been shown to have a high probability of leakage,” the History explains, “it was decided to evaporate the product solution nearly to dryness after loading. This was done on the first and all subsequent shipments.” According to Matthias, the quantity involved was “72,000 units,” which probably means 720 grams—three-quarters of a kilogram—painstakingly extracted from tens of tons of uranium.

Matthias himself made the delivery, on February 5, 1945: “I drove from Hanford to Portland,” he remembered. “I had a guy with me and we had a locked space on the train from Portland to Los Angeles. [The container with the plutonium was] about a two-foot cube, wrapped up in wrapping paper and ropes, and inside was a test-tube thing suspended and secured—all surrounded by lead and rigged so it stayed right in the middle of that box. It was quite a heavy thing, and I carried it just like a box any traveler might have with him.”

F Reactor went critical on February 25, 1945, and another shipment of “product” left Hanford on March 1. F Reactor was soon running smoothly, one of three now that were breeding plutonium around the clock. Matthias was able to inform Groves early in March that 10 kilograms of plutonium—enough for two bombs—would be ready for shipping between April 18 and July 12. The first 5 kilograms would be used to test the implosion system Los Alamos had invented; the second 5 kilograms would be destined for Japan. In a memorandum Groves prepared for President Truman on April 23, 1945, after the death of Franklin Roosevelt, he resolves another mystery, whether we would have used the bomb on Germany had it been ready before the German surrender in May. “The target,” Groves says he told the president, “is and was always expected to be Japan.”

By May 3, Matthias calculated that 20 cans of plutonium—about 3 kilograms—had left Hanford for Los Alamos. After the initial deliveries, Matthias had begun shipping the cans by army ambulance to Salt Lake City, where they were transferred to another ambulance driven up from New Mexico. The shipments took only two days, start to finish, to reach Los Alamos, Matthias noted proudly, “far better than could be done by train.” He noted VE Day—Victory in Europe, the defeat of Nazi Germany—on May 8, prompting himself to make sure the War Department film “Two Down and One to Go” was shown to remind Hanford workers that the Allies had defeated Fascist Italy and Nazi Germany but were still fighting a war in the Pacific against the Japanese.

Matthias was happy with plutonium production results, which he attributed to “the reduction of initial cooling periods” that permitted “processing of pushed material at an earlier date than scheduled.” Colonel Kenneth Nichols, Groves’s deputy, was able to write Los Alamos director Robert Oppenheimer on June 1 promising cumulated production and delivery of 7 kilograms of plutonium by June 1, 13 kg by July 1, 20 kg by August 1, 26 kg by September 1, 40 kg by October 1, and 54 kg by October 31. At 5 kilograms per bomb, that would be enough for 10 bombs, with a little left over.

Oppenheimer had his first 5 kilograms by May 18. Los Alamos used it to fuel the first atomic bomb that was exploded on a 100-foot tower in the desert north of Alamogordo in mid July. Groves wrote a description, intended for President Truman’s eyes at Potsdam, of the successful test of the “Fat Man” plutonium implosion bomb fueled with Hanford plutonium:

At 0530, 16 July 1945, in a remote section of the Alamogordo Air Base, New Mexico, the first full-scale test was made of the implosion type atomic fission bomb. For the first time in history there was a nuclear explosion. And what an explosion! . . . The test was successful beyond the most optimistic expectations of anyone. Based on the data which it has been possible to work up to date, I estimate the energy generated to be in excess of the equivalent of 15,000 to 20,000 tons of TNT; and this is a conservative estimate. . . . There were tremendous blast effects. For a brief period there was a lighting effect within a radius of 20 miles equal to several suns at midday; a huge ball of fire was formed which lasted for several seconds. This ball mushroomed and rose to a height of over ten thousand feet before it dimmed. The light from the explosion was seen clearly at Albuquerque, Santa Fe, Silver City, El Paso, and other points generally to
about 180 miles away. The sound was heard to the same distance in a few instances but generally to about 100 miles.

In his previous work as head of military construction, Groves had designed and built the Pentagon. Now at the end of his report he added his ultimate measure of the destructiveness of the new weapon: “I no longer consider the Pentagon a safe shelter from such a bomb.”

Hanford went public with President Truman’s announcement of the atomic bombing of Hiroshima on August 6, 1945. “By afternoon today,” Matthias wrote in his diary, “the project area around Richland was besieged with reporters, newsreel people, and radio people to get firsthand accounts of the story of Hanford for their newspapers and radio stations.” Matthias assessed Hanford morale in his diary entry for August 7:

The general attitude of the project employees both in the Government offices and the DuPont Company offices is one of great relief and one of renewed enthusiasm for the job. In addition to the natural lift experienced by people all around this part of the country there is the consciousness in the minds of people directly working at the Hanford Project that they have contributed to the mechanism that will certainly end the war very soon.

They had, and it did. On August 14, 1945, after the United States bombed Nagasaki with a Fat Man bomb charged with Hanford plutonium that exploded with the force of 22,000 tons of TNT, the Japanese surrendered unconditionally. The Imperial rescript that the Emperor Hirohito recorded for broadcast to his people that day, asking them to lay down their arms, answers the continuing debate regarding whether the two bombs were necessary. The Japanese people had never heard Hirohito’s voice before. He told them:

Despite the best that has been done by everyone, the war situation has developed not necessarily to Japan’s advantage, while the general trends of the world have all turned against her interest. Moreover, the enemy has begun to employ a new and most cruel bomb, the power of which to do damage is indeed incalculable, taking the toll of many innocent lives. This is the reason why We have ordered the acceptance of the provision of the Joint declaration of the Powers.

B Reactor went on after the war to produce plutonium to fuel the burgeoning United States nuclear arsenal. Now we are attempting to arrange its preservation as a historic site and museum. Bills have passed both the House and the Senate funding a review by the National Park Service for preserving Manhattan Project sites in Tennessee, New Mexico, and here in Washington as a distributed national park.

Why should they be preserved? Should we be proud of the work of the Manhattan Project in the years of World War II?
Why are the Declaration of Independence and the United States Constitution maintained in elaborately sealed cases lowered at night into expensive bombproof vaults when there are perfectly readable copies around? Why preserve Williamsburg? Why Fort Walla Walla? There are reasonably good scaled-down reconstructions at Disney World and in Las Vegas of everything from the Eiffel Tower to the Taj Mahal. And certainly many people go to such theme parks to view authentic social facticity they can never wholly substitute for the original, any more than copies of a painting can substitute for the original. And that uniqueness informs the purpose and justifies the expense of historic preservation.

Of course we do not preserve all the past. We pick and choose. Every building where human beings have lived or worked is embedded densely with memories. Most of those memories are private, however; not many structures or artifacts embody historic transformations. There were log cabins everywhere in rural and frontier America, but only a few witnessed the birth of poets or presidents. Shops and laboratories and factories have fared even less well than birthplaces, perhaps because the historic events they nurtured were less universal as human experiences go and therefore less emotionally resonant—were invention and discovery rather than birth and marriage and death. Nor do we often preserve places where we did things we are ashamed of, except to educate future generations and to memorialize and commemorate the victims.

Where does the Manhattan Project fit into this spectrum of values? Do its remaining historic structures deserve preservation? How will history judge this endeavor—was it a great achievement or was it, as some have accused, a monument to "man's inhumanity to man." When Robert Oppenheimer recruited scientists for Los Alamos, he was restrained by the requirements of national security from telling them what their work would be. So he found an equivalent that appealed to their patriotism and altruism. He walked them out across their campuses at Harvard, Wisconsin, Berkeley, and Columbia and whispered to them that the work he was inviting them to join "would probably end this war and might end all war." And within certain limits, I think he was right.

Obviously there have been wars since 1945. But look more closely, from a longer perspective, and a different pattern emerges. Imagine a graph. The vertical scale is man-made deaths—deaths from war and war's attendant privations—in millions. The horizontal scale is years, starting in 1900. Man-made deaths begin a steep climb in 1914 with the outbreak of World War I, rising to above 3 million in 1915, dropping a little, then rising to above 6 million in 1917 and 1918, the period of the Russian civil war. They drop off abruptly to below 1 million annually through the mid 1920s, rise again to almost 4 million with forced collectivization in the Soviet Union, drop, then rise in the later 1930s to above 3 million with the Stalinist purges, drop a little, then surge across the early 1940s to a peak
of 15 million in 1943. By 1945 they have dropped to below 3 million, by 1948 to about 1 million.

For the rest of the century man-made deaths smolder along at an average of about one million deaths per year, comparable in scale to the annual toll of some of the less virulent epidemic diseases, considerably less than the annual worldwide toll from tobacco. Purges in China, the Korean War, Vietnam, Cambodia, and Afghanistan show up on the graph. But after 1945 we see nothing like the steep spikes of the two world wars. Just as public health brought most epidemic diseases under increasing social control in the West during the first half of the 20th century, so does it appear that something brought man-made death under increasing social control in the second half of the 20th century.

What was that something? I would propose to you that the discovery of how to release nuclear energy, and the application of that discovery to the development of small, portable, immensely destructive weapons of war, are responsible for the reduction in man-made death from periodic conflagrations—world pandemics, if you will—to smoldering, limited, local epidemics. God knows those smoldering levels are terrible enough, but they are an order of magnitude less than the horrors that marred the first half of the 20th century.

Does anyone doubt that the United States and the Soviet Union would have gone to war, given their mutual belligerency and their mutually exclusive ideologies, if fear of nuclear retaliation had not kept the war cold? We have more than half a century of experience now with a nuclear world, enough to say with some confidence that the discovery of how to release nuclear energy effectively ended world-scale war by making it too destructive—too self-destructive—for even the most belligerent nations and leaders to dare.

Of course, a consequence of that limitation on the scale of war, that limitation on national sovereignty, was and is the risk of the very nuclear holocaust we have sought to prevent. Had we been wiser, or less afraid, we might have done things differently—built fewer weapons, worked harder at negotiation and diplomacy—but we were exploring uncharted territory, both abroad and at home. We made every mistake possible along the way except the one mistake from which we might not have recovered, the mistake of using nuclear weapons against a nuclear-armed foe.

There are comparable mistakes and risks in the history of public health. I think the message of these experiences with weapons and with public health is that prevention and control of biologic or man-made death can never really be accomplished once and for all. It requires continual surveillance and continual adjustment, a change in the nature of our relationship with the natural world in the case of disease, a change in the nature of our relationship with the social world in the case of man-made death.

Please consider my analysis of the influence of the nuclear discovery on the world. If I am even partly right, then you have, here in your midst, one of the most significant historical sites anywhere, a place where work was done that changed the human world forever and for the better, that has already contributed to a vast reduction in human suffering—in man-made death.

In the fullness of time, that change may well lead to the prevention not only of world war but of all war. When science demonstrated that matter, properly arranged, is all energy, it revealed a natural limit to national sovereignty that made unlimited war suicidal. No one had conceived of such a limit before. War had seemed to be, and had grown to be, unlimited.

We have been forced by a new knowledge of the natural world to find less destructive ways to settle disputes, and if less destructive processes can be substituted, by necessity, for world war, there is no reason why they cannot substitute for limited war as well. We have every reason to hope that alternatives to even limited war—negotiations, regional communities, international law—will continue to emerge in the shelter created by this natural limitation. In the end, Robert Oppenheimer may turn out to have been right with both his predictions about the end of war. B Reactor embodies the social reality of that millennial transformation. We should save it while we still can.

Richard Rhodes is author of 21 books, including the biography, John James Audubon: The Making of an American; the Pulitzer Prize-winning The Making of the Atomic Bomb; Dark Sun: The Making of the Hydrogen Bomb; and four novels. He is currently researching a third volume of nuclear history, Endgame, which will examine the international politics of nuclear weapons across the past two decades. The above essay is based on a presentation he gave at the B Reactor 60th Anniversary Banquet on October 9, 2004.

COLUMBIA 9 FALL 2006
ILLUSTRATING Lewis & Clark

No artist accompanied the Lewis and Clark expedition. Yet, if you go to a library, pull out a book on the expedition, and begin flipping the pages, you will quickly notice how important visual images have been to the retelling of Lewis and Clark’s story. Portraits of the two captains are standard features; photographs of journal pages and landmarks are equally numerous, and many books include artists’ renditions of what the expedition might have looked like at various points in the journey. Over the years, this absence of an expedition artist has posed a formidable though apparently not insurmountable challenge to would-be publishers of Lewis and Clark-related books, some of whom refused to be restrained by truth or fact in coming up with illustrations for their volumes.

When Meriwether Lewis returned from his expedition he planned to publish a highly illustrated multi-volume work. This never materialized, mainly because of Lewis’s untimely death in 1809. But there were numerous publications about the Lewis and Clark expedition printed in the 19th century that did contain illustrations. What types of illustrations Lewis hoped to include in the official published account, who he wanted to draw them, and what images eventually reached the public in the 19th-century is the focus of this article.

By 1800 several lavishly illustrated exploration narratives had been published in Europe and America. One of the most popular related the travels of Massachusetts-born Jonathan Carver into the interior portions of the North American continent, published in 23 editions following its initial release in 1778. Some even contained hand-colored plates (American editions appeared from 1784 to 1802). Other prominent examples included Captain James Cook’s story of his voyage to the Pacific Coast, which appeared in 1784 with several quality engravings, and George Vancouver’s highly illustrated account of his travels along the Pacific, which reached the public in 1798.

Having grown increasingly accustomed to these handsome prints and pictorial images, the public expected a similarly illustrated narrative from this first great American journey. Cook and Vancouver, however, had taken with them several artists, making the illustrations in their accounts the product of first-hand experience with both the people and the landscapes they encountered. Lewis and Clark needed to be more creative.

Upon his return in 1806, Meriwether Lewis had every intention of publishing an illustrated multi-volume account of his travels. He quickly entered into an agreement with John Conrad, a Philadelphia printer, who immediately issued a prospectus of the forthcoming publication under the title *Lewis and Clark’s Tour to the Pacific Ocean through the Interior of the Continent of North America*. From the prospectus we learn that Lewis planned a three-volume octavo work,
which he would personally prepare. Volume one would contain the
narrative of the journey, a map, a chart of the Columbia and Missouri rivers,
and be “embellished with views of two beautiful cataracts of the Missouri.” The
second volume would focus on geography and Indians, and contain “twenty
plates illustrative of the dress and general appearance of such Indian nations
as differ materially from each other,” detailing their habitations, weapons,
and domestic utensils. Volume three would be much more ambitious. It would focus on
natural history, particularly botany, zoology,
and mineralogy. This volume “will be
ornamented and embellished with a
number of waterfalls. One of these likely
served as a sentinel to the Rocky
Mountains, and physically—for sheer
ts and beauty.

When first reaching them, Lewis
spent hours describing, sketching, and
absorbing their power and complexity.
On the return trip he remarked
that he took two hours to make “a
hasty sketch.” He found them much
lower than the previous year, but they
remained a “sublimely grand object.”
That night, still caught up with the
sensations evoked by the falls, he
determined to make a second drawing.
The following morning Lewis arose
particularly early and made his way to
the falls. He drew for only a short time,
making it back to camp by breakfast,
satisfied of having captured enough of
the mood to add to his verbal
descriptions and thereby re-create some sense
of his feelings. These sketches have not
 survived and we will probably never
know whether he gave them to Barralet
or simply described them verbally and
expected the artist to do the rest.

For the Indian sketches, Lewis
sought out Charles de Saint-
Mémin, an artist who had
fled to the United States
during the French Revolution. Saint
Mémin specialized in portraits, and
Lewis hired him to produce likenesses of
several Osage and Mandan Indians he
had brought to Washington with him.
We know that Lewis paid him at least
$83.50 and that the artist actually
completed a number of portraits. In fact,
several still exist: one of the Mandan
chief Sheheke and another of Sheheke’s
wife Yellow Corn demonstrate the
quality and style of Saint-Mémin’s
work. Most Lewis and Clark scholars
recognize Saint-Mémin for his portraits
of Lewis and Clark, particularly of his
full body depictions of Lewis wearing
a ermine-skin mantle with the Rocky
Mountains in the background.

For the illustrations to be used in
the third volume, Lewis engaged three
artists: Charles Willson Peale, Frederick
Pursh, and Alexander Wilson. At
the time, the most famous and perhaps
the most talented of the three was
Peale, best known for his portraits of

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the leading men of the revolutionary generation and the early years of the nation as well as his growing museum of natural history, which he started in Philadelphia in 1786.

Peale was fond of hunting, stuffing, arranging, and displaying animal and bird specimens within his museum, typically painting habitat scenes within each display. He solicited natural history specimens from virtually everyone, and to say that he was thrilled when Lewis gave him the majority of the zoological and ethnological collections from the expedition is truly an understatement; it was a gift that tremendously enhanced the museum. After such a lavish donation, Lewis easily persuaded Peale to make animal drawings for the third volume. Today, the American Philosophical Society has four drawings of each of the feathered American plants. Lewis turned over the plant specimens with a number of drawings of each of the feathered plants; however, when the specimens; however, when the money had changed hands and work had been done.

So what happened? The now-familiar story follows Lewis's sad decline in health and spirits. As pressure mounted in his role as governor of Louisiana, preparations for publication of the journal fell into darkness. When depression finally ended Lewis's life in 1809, Clark was left with a major problem. Not only had he lost his close friend and co-commander of the expedition, but, aside from producing a map, he had been largely left out of the publication process. Clark felt wholly unqualified to edit the journals himself and eventually turned them over to Nicholas Biddle for help, with the natural history volume falling into the hands of Dr. Benjamin Smith Barton.

It is unclear if Clark knew about Lewis's contracts with the five artists, although we do know he visited and met with Charles Willson Peale. In truth, circumstances were against Clark. He felt mounting pressure to publish, but adding to his problems came news of the collapse of John Conrad's publishing business. The American Ornithology published Flora Americae Septentrionalis, with several plates based on Lewis and Clark's plant specimens.

LEFT: In 1813 Frederick Pursh published Flora Americae Septentrionalis, with several plates based on Lewis and Clark's plant specimens.

Published in the Dublin 1817 edition of the Lewis and Clark journals, this is the first illustration printed with the journals and is likely made after a drawing by John Barralet.

Photograph of the Great Falls of the Missouri taken around 1880 by F. Jay Haynes, highlighting the series of cascading falls on the right and the one large waterfall on the left.

The published journal even more interesting. While the 1814 edition did not have any illustrations, J. Christie of Dublin published the same account in 1817 with several maps and one image, entitled the “Principal Cascade of the Missouri.” This view of the Great Falls of the Missouri River was the only illustration reproduced in the official journals until Elliott Coues and Reuben Gold Thwaites reedited the journals around the turn of the 20th century. The plate of the falls is probably an engraving based on a drawing by John James Barralet and one that likely would have been included in the first volume of Lewis’s publication, but how Christie obtained the image from Barralet is entirely unknown. Following Lewis’s death, William Clark noted that Barralet had made two drawings for Lewis and that they were of “the falls of the Missouri & Columbia.” There is evidence that Clark believed the drawings were imperfect, and perhaps this explains why he did not include them in the 1814 edition.

A comparison between the engraving and a 19th-century photograph of the Great Falls is revealing. It bolsters the sense that the engraving was made from a drawing by Barralet and that Barralet had received either a sketch of the falls from Lewis and/or details on its general composition. Although both views are not entirely the same, they do present the scene from a perspective below the falls and looking up the river. The photograph shows the right side of the falls as a series of cascades with the left side appearing as one larger fall. Remarkably, the engraving is similar. Barralet took more artistic license in the rest of the drawing by placing a small Indian encampment in the bottom right corner with five lodges, three domestic-looking cattle, and a few Indians standing amidst the trees. He also added mountains in the background. Yet, despite the illustration’s inaccuracies, it presented a decent attempt to depict a landscape that the artist had never seen.

The plate, having been printed in Dublin, had little, if any, influence on American views of the West at the time. In fact, it was not until mid-century that the engraving of the falls became widely available to the American public—by this time the first white artists, Samuel Seymour and Titian Ramsay Peale, had traveled into the West with the Long expedition and...
These six engravings adorned the pages of a volume of Sergeant Patrick Gass's journal published by Mathew Carey in 1810. Carey's edition was the first illustrated account of the Lewis and Clark expedition.

returned to publish the first views of the Rocky Mountains in 1823.

Beginning in 1842 and continuing until 1917, Harper and Brothers of New York published the expedition journals based on the 1817 Dublin edition, with a re-engraved plate of the falls of the Missouri done by W. G. Evans of New York. The nearly 20 printings by Harpers were small runs of about 250 copies, and not all of them contained the engraving of the falls. Thus, the plate received little attention and paled in comparison to the much celebrated work of Seymour and Peale. In fact, in comparing the Dublin and Harper plates, Harper's version is slightly inferior in both quality and detail.

Although the official Lewis and Clark publications were disappointing in their illustrations, there were other attempts to illustrate Lewis and Clark. When the American public learned that Lewis and Clark had returned alive from their incredible adventure, demand for information regarding their journey soared. For the young nation, the West was a land of opportunity and uncertainty veiled in the mystery of the unknown. Lewis and Clark, it was thought, could now reveal the land's secrets.

Without question, Lewis believed the captains' journals should corner the market when it came to recounting the story of the expedition. Within six months of the Corps of Discovery's return, however, Sergeant Patrick Gass entered into a publishing agreement with David M'Keehan of Pittsburg, who immediately issued a prospectus announcing the volume. In April 1807 the Gass volume first appeared in print, selling at the affordable price of one dollar. M'Keehan likely refined portions of Gass's journal (the original has been lost for comparison), but he chose not to include any illustrations. This changed in 1810 when Mathew Carey of Philadelphia reprinted the volume, reissuing it a second time that same year and again in each of the two years following. What makes the Carey editions exceptional is the series of six engravings of various events that took place during the journey—some of the earliest published images depicting the West—making this the first illustrated account of the expedition.

The Carey images have certainly become more famous than the quality of the work merits. They have been reproduced countless times by 20th-century scholars looking to decorate the pages of their texts, not unlike the original use to which the images were put—to adorn the pages of the Gass volume. Consequently, if readers are familiar with any of the illustrations found in the expedition publications during the first century following its return, it is most likely the Carey images. These rather crude engravings have often been dismissed by Lewis and Clark scholars as "fanciful renderings," "naive depictions," and "remarkably unconventional illustrations." There is some truth to this, and perhaps this explains why interest in these images has typically focused on their simplicity instead of what they tell us about American interests in visual depictions of the expedition and the West.
The historical record is silent as to why Carey decided to illustrate the Gass journal and how he determined the scenes he wanted to portray. There are two obvious explanations. As the leading publisher in America at the time, Carey must have been familiar with at least some of the highly illustrated European exploration narratives and felt that Gass's account fell into the same category. Even more likely, he believed visual images would help him sell books. Many of Carey's publications of that time period included engravings, albeit of varying quality, and perhaps he had found greater success with these illustrated volumes. Regardless, he certainly sensed a demand from the public and this was his attempt to capitalize on it.

Each of the woodcuts correlates with a specific event described within the journal—danger, Indians, and grizzly bears being the overriding themes. The first woodcut appears as the frontispiece and hints at the dangers associated with river travel by depicting two men in a canoe crashing into a tree while attempting to swim their horses across a river. According to the journal, the event happened on May 30, 1806, and Gass explained how the men lost several personal items, including their blankets, making this the "greatest loss which hath happened to any individuals since we began our voyage." In the second illustration Lewis and Clark, in full military dress, hold a council with a group of Oto and Missouri Indians, while the third illustration corresponds to the construction of Fort Mandan and depicts Clark and several of his men erecting "a line of Huts" as they prepared for the winter.

Grizzly bears are the focus of the next two illustrations; the first portrays Clark and his men on a hilltop shooting down at three bears, or, as Gass described it, "We discovered three bears coming up the river towards us; we therefore halted a while and killed the whole of them." In the next image the circumstances have changed dramatically—a grizzly bear (which looks more like a large dog) has chased a member of the expedition up a tree. Gass himself brought more life to the episode on July 15, 1806, one of the men had been out alone on horseback when a bear so frightened his mount that it threw the man off at the feet of the bear; instead of shooting it the man hit the bear over the head with his gun and scrambled up a tree. The final image is of Lewis's engagement with the Blackfeet on the Marias River, an episode of dubious distinction with long-term consequences within Anglo-Blackfeet relations but one that is often twisted into a positive light by some scholars who cite it as the only violent episode with Indians during the expedition. Carey's illustrator depicted the scene with the Indians running away as Lewis and one warrior took aim at each other.

As the first published images of the expedition, they were not up to the public's expectations. The engraver was not part of the expedition into the West, and more than likely he never consulted Gass or any of the other expedition members. They are an Easterner's attempts to visualize the West and, as such, all six woodcuts retain a distinctly prosaic quality. A viewer would only recognize them as western adventures by reading the accompanying text.

Carey's engraver has never been identified. (One scholar has suggested, "Perhaps it was the quality of the images that kept Carey from identifying the engraver.") When Mathew Carey first published the Gass edition in 1810 there were a number of skilled engravers working in America. The crude images found in the Gass editions therefore reflect Carey's inability or unwillingness to hire a quality engraver, someone who certainly could have been found at the time in Philadelphia, Boston, or New York.

Although the earliest woodcut illustrations in America appeared in the late 17th century, American book illustrations began in earnest in the late 18th century, focusing largely on maps, portraiture, and buildings. During the early republic, high-quality illustrations could be had by hiring an engraver in Europe, but this was generally too expensive for most American printers. Payment methods varied as well. Printers could pay a negotiated fee for an illustration, solicit bids from several engravers, or pay on a daily or hourly rate.

The occupation was such that many early American engravers did not rely solely upon engraving for their livelihood. Cheaper publications tended to use illustrations crafted from woodcuts while more expensive works were often decorated with illustrations made from copper and later steel plates. Woodcuts had the potential to warp, crack, and wear out quickly and thereby alter or completely ruin the image, likely the reason Carey had the Gass illustrations recut for the 1812 edition. In fact, the 1812 plates show slightly more detail in the people, trees, and
animals, but still retain the general simplistic feel of the 1810 edition.

Though the Carey-Gass illustrations do relatively little to reveal the West, they do show America's heightened interest in the expedition and particularly the encounters with animals (grizzly bears) and Indians. When the last Carey edition appeared in 1812 the official account was still two years from the press. There were, however, a number of bogus narratives circulating throughout the nation. These counterfeit editions, which number close to a dozen and were printed through the 1840s, have stymied and surprised Lewis and Clark scholars. They can best be explained as simple attempts to capitalize on American interest in the expedition, something that the delayed official account failed to do.

One scholar has noted that “the best possible argument for believing that many persons did buy it, and that the compiler profited, is the fact that so many other similar editions soon followed.” Nearly all of the editions are comprised of material borrowed from various printed sources ranging from government reports of Lewis and Clark to Jonathan Carver, Alexander Mackenzie, and William Dunbar. The one exception is George Phillips, whose totally fictitious account of traveling through North America appeared in the 1820s to 1840s.

The first illustrated phony account emerged in 1809, published by Hubbard Lester of Philadelphia, and contained five rather remarkable portraits of wildly outlandish Indians supposedly encountered by the expedition. They are as inaccurate as Jefferson’s Northwest Passage. Two of the illustrations are identified as Sioux Indians, while the other three consist of a “Mahas Queen,” “Ottoes Chief,” and a “Serpentine Chief.” Unlike the Carey-Gass plates that illustrate a scene within the text, these woodcuts are more decorative, taking on an almost cartoonish character, and reflect the shameless quality of the publication. Even more startling is an 1811 German printing (although published in Lebanon, Pennsylvania) of the same publication, which contains rather exotic renditions of the original plates.

Many Lewis and Clark scholars might be more familiar with the spurious 1812 account published by James Sharan in Philadelphia, for it contains the first published likenesses of Lewis and Clark. These portraits, however, are the only illustrations and bear no resemblance to the two captains. In 1813 a similar account appeared in Maryland with more detailed, albeit equally inaccurate, portraits and four additional plates. For a book purportedly on Lewis and Clark, woodcuts portraying an Indian being burned at the stake, St. Dennis with a few French soldiers attacking Natchez Indians, and a gently sloping landscape scene along the Washita River certainly added to the confusion of an already distorted account.

The most noteworthy illustration, and really the only one that could relate at all to the expedition, is “The Bear Pursuing his Assailant.” In it, a bear (again, looking like a dog) is chasing a man toward a river. The facing text explains how the upper Missouri abounds with light-colored bears who are not afraid of man. “One of our party shot at one of them,” the account states, “and wounded him; the bear, instead of being intimidated by the smart of the wound, was stimulated into rage, and rushed with great fury to devour the assailant,

RIGHT: The first published portraits of Lewis and Clark, found in a false account of the journey published in Baltimore in 1812.

BELOW: Published in an 1813 apocryphal account of the expedition, “The Bear Pursuing his Assailant” hardly does justice to the rugged West Lewis and Clark encountered.

LOWER RIGHT: In one of the first landscape illustrations ever published within Lewis and Clark literature, “Moon-Light on the Western Waters” shows a lone traveler paddling upriver in a darkened landscape.
who saved his life by running headlong down a steep precipice." In the illustration, the steep precipice appears to be about the height of the man being chased, and if he were to take a mighty leap there is a chance he could propel himself to the opposite side of the narrow river. Thus, the picture hardly does justice to either the ferocious bears or the wild landscapes that were characteristic of the rugged West Lewis and Clark encountered.

Nearly 30 years later, in 1840, an Ohio publisher brought out a similar edition, claiming that "the great demand for the Journal of Lewis & Clarke, has induced the edition, saying that "the great many of the same illustrations used in the 1840 apocryphal edition. There are a few notable exceptions. One of the most startling is of an apparent koala bear climbing a tree. Apparently this was meant to be a badger, which Gass described as a "praw, about the size of a ground hog and nearly of the same colour. It has a head similar to that of a dog, short legs and large claws on its fore feet; some of the claws are an inch and a half long." Even more surprising is a picture of a lion and a Cape buffalo fighting. Obviously, this image has absolutely no relationship to anything found in Gass's account. There is, however, a long footnote near the image that tells the story of a Cape buffalo and lion fight that took place in an entirely different country (the buffalo appears to have won). Perhaps more than anything else, what the plates do tell us is that even in the 1840s the American public still found the West to be a land of mystery.

There was one other illustrated fictitious volume relative to Lewis and Clark that went through several foreign printings during the first half of the 19th century. The account told the story of one George Phillips of Ireland who traveled the world looking for adventure and preaching Christianity. According to the narrative, Phillips eventually made it to St. Louis and joined up with the Lewis and Clark expedition. Better yet, Phillips claims to have played a key role in the expedition. The account even had Lewis and Clark returning in 1816.

This incredible story, published under the title Travels in North America, appeared in 1822 and 1824 in Dublin and again in London editions of 1831 and 1846. Each edition contained a handful of engravings mostly unrelated to the supposed expedition portion of the narrative (for example, "Mexican Soldier," "Falls of Niagara," "View of Icebergs," "Meeting of English and Esquimaux," "Inside of a Hut"). There were, however, two plates that tied into Phillips's travels with Lewis and Clark: one of a moose on the title page of the 1831 edition, and another collage of four scenes from the American West in the frontispiece to the 1846 London volume.

While some of the engravings in the Gass editions and the apocryphal accounts are more commonly known today, there were other illustrations of the expedition published in some of the
juvenile literature of the 19th century that are relatively unknown. Although this is one area that Lewis and Clark scholars have left largely undeveloped, a few publications have been identified. In 1821 Harvey and Darton of London published *Scenes in America*, *For the Amusement and Instruction of Little Tarry-at-Home Travellers*. It was reprinted numerous times through the 1850s, with five American editions appearing between 1825 and 1851. The structure of the book is based on the illustrations, with short descriptions in the surrounding pages. There are 12 plates relative to Lewis and Clark. One, in particular, is of the captains gazing out at the ocean at the triumphant moment of having reached the Pacific Coast.

Two additional pictures show Sacagawea. In the first she is barely discernable in the upper right corner of the engraving as Clark attempts to boost her and her child up a steep, rocky ledge to avoid rising water. The second is possibly the first published plate to specifically focus on Sacagawea and praise her role in the expedition. The text briefly describes how Sacagawea (although only identified as the wife of Clark’s interpreter) was taken prisoner from her home and later married to the Frenchman Charbonneau. As they crossed over the mountains and encountered a party of Indians, the account states, “she began to dance, and show every mark of extravagant joy.” As they approached, “a young woman forced her way out of the crowd, and recognizing her long lost companion, with whom she had played in infancy, and with whom she had suffered in captivity, they embraced, with all the symptoms of ardent affection.” The engraving is of two Indian women reaching out to each other, as two members of the expedition stand on the far right and one Indian warrior on the far left.

A second notable children’s book appeared in the 1830s under the title *Tales of Travels West of the Mississippi*. Although geared toward a younger readership, this publication did more than any other early 19th-century account to illustrate various scenes of the expedition. Many of the numerous engravings are of fauna: buffalo, grizzly bear, elk, rattlesnake, turkey, beaver, wolf, antelope, prairie dog, Rocky Mountain goat, deer, and panther. While most of the engravings are far from accurate, several are particularly noteworthy.

“The Travellers in Winter Quarters on the Shore of the Pacific Ocean” is the first published image of Fort Clatsop. It shows several members of the expedition interacting with Indians in front of a small log house; chimney smoke rising into the sky and two canoes floating in the distant water make the scene look particularly welcoming.

Two other engravings mark the first published images that specifically name members of the expedition other than Lewis and Clark—“Sergeant Pryor going to the Dahcotah Camp,” and “MacNeil [sic] and the Bear.” The engraving of Sergeant Pryor is of three men in military dress approaching a peaceful Indian encampment. In the illustration of Private Hugh McNeal and the bear, McNeal is shown as a relatively small individual trapped in the top of a tree with a menacingly large bear rising up nearly half the length of the trunk in pursuit while McNeal’s horse runs off in the distance. This is the same encounter Mathew Carey portrayed in his printings of the Gass journal, but the Gass engraving does not specifically name McNeal as the man involved.

One last engraving in *Tales of Travels* deserves mention. The illustration, “Meeting with the Blackfoot Indians,”

**LEFT:** These illustrations from *Scenes in America*, an 1821 publication geared toward a juvenile audience, depict several events of the Lewis and Clark expedition.

**BELOW:** This image from the same volume is rare in that it focuses on Sacagawea and her role in the expedition.
attempts to portray Lewis's precarious encounter in 1806. In it, a leader and three other white men appear calm and well-dressed as the leader, who must be Lewis, stretches out his hand in a gesture of peace. In contrast, the Blackfeet are depicted in a more aggressive and war-like fashion. Most startling, however, is that the Blackfeet are shown as skeletons with black outlines in what is perhaps one of the earliest published images of the old Western myth that bad guys wear black. By the 1830s, when this account appeared in the East, the Blackfeet had indeed become the most powerful force contesting American fur traders in the West. Whether this influenced the engraver or whether he was merely interpreting the written account is impossible to know. The accompanying text simply describes the Blackfeet as having been "painted frightfully, according to their custom when they go to war."

Illustrations of Indians like this one of the Blackfeet as well as the outlandish portraits in the 1809 apocryphal account and even the simplistic drawings found in the Gass volumes speak to the general state of white attitudes toward Indian affairs in America during the early 19th century and vary dramatically from the true story of Indian-white relations during the expedition.

The western landscape within many of the other illustrations is equally distorted, often taking on an impersonal and almost untouchable quality. It is clearly there, but largely as an unknowable backdrop to bear attacks and Indian encounters. Through it all, these images of the West in 19th-century Lewis and Clark literature did little to shape American conceptions of the expedition, Indians, animals, and the land. They do, however, serve as reminders that for many Americans during the first half of the 19th century the West was a mystery known only through the printed word and the imagination of an artist's brush and an engraver's plate.

In retrospect, had Jefferson sent an artist with Lewis and Clark, American sensibilities toward the West might have been dramatically different. The same could be said if Lewis had fulfilled his plans to publish an illustrated multi-volume account of the expedition in the years following his return. Today, for the large numbers of Americans who have traveled along parts of the Lewis and Clark trail, it is not 19th-century illustrations but 20th-century photography and paintings that have helped fashion a spirit of place around landmarks like Fort Mandan, the Gates of the Mountains, the Great Falls of the Missouri, the Three Forks, Lemhi Pass, Pompey's Pillar, the Yellowstone River, the Columbia, Fort Clatsop, and others.

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I have always tried to take the viewer to an actual place and make him feel that he was there.

—John Ford Clymer to Walt Reed, 1976

in his Teton Village, Wyoming, studio in 1973, acclaimed western painter John Ford Clymer recalled a unique experience from his youth in Ellensburg in the early 20th century. Clymer remembered an elderly Native American woman "who used to come to our house when I was just a little boy. And she couldn't speak any English; she spoke Chinook [Jargon], you know. And she'd come and sit in the corner of the kitchen. And my mother could speak Chinook. And they'd sit and visit and visit. I remember her so well. And I never knew [until years later that] she was the daughter of Chief Moses..."

John Clymer had not grown up in the 19th-century pioneering and homesteading period of the Kittitas Valley. Yet, as the story about Chief Moses' daughter (Cecilia) shows, Clymer personally experienced important connections to the historic Kittitas County frontier lifestyle and culture. His upbringing in Ellensburg and youthful wandering across the region strongly influenced his lifelong work as a celebrated American illustrator and painter. The scenes and ambience of the greater Pacific Northwest—Kittitas County and Washington state, western Canada and the Yukon, Alaska, Idaho, Montana, and Wyoming—are crucial components in Clymer's greatest illustrations and paintings.
John Ford Clymer was born in 1907 and grew to maturity in a home on the corner of Chestnut and Capitol streets in Ellensburg, Washington, Kittitas County. Clymer's father, John P. Clymer, had moved west with the Northern Pacific Railroad and launched a successful greenhouse and florist business in Ellensburg. There he met his wife, Elmira Ford Clymer, who was born of Kittitas Valley pioneer farmer immigrants. "Junior" Clymer was drawn early on to the canyons and high desert scrublands surrounding his home town at the eastern foot of the Cascade Mountains. He fished, hiked, and camped in the Taneum, Manastash, Umptaneum, and other canyons in the Yakima River drainage. He also spent leisure time drawing and doodling, oftentimes in his Presbyterian Church hymnals.

According to biographer Walt Reed, a visiting circus inspired Junior to create an elaborate brown wrapping-paper frieze, with cutout animals, wagons, and a circus band. He began poring over magazine illustrations, drawn to compelling pictures of Walt Louderback, N. C. Wyeth, and Harvey Dunn. When, in 1923, the Ellensburg Rodeo began, the budding 16-year-old artist gained commissions to produce rodeo posters and paint storefront windows.

One year later, in 1924, John Clymer sent the Colt Firearms Company unsolicited drawings of an outdoorsman carrying a Colt Woodsman pistol. A Colt Firearms agent immediately responded by purchasing one of the drawings for an ad campaign, and John Clymer's career as a professional illustrator begun.

Anxious to formally study art, Clymer asked his parents to enroll him in a correspondence course offered by The Federal School, a distance education company. They agreed, insisting he also continue his studies and graduate from Ellensburg High School. He did both, graduating in June 1925. One week later he left Ellensburg, never to return as a permanent resident of his beloved Kittitas Valley.

Eighteen-year-old John Ford Clymer was bound for Vancouver, British Columbia, and a career as an artist/illustrator. Clymer's first decade as an art student and professional illustrator in Canada lent evocative images of western Canadian milieu and Alaska to his artistic vision, and a stint as a deckhand on the Yukon River left lasting impressions of the wilderness experience.

Walt Reed has chronicled Clymer's early Canadian career. In Vancouver, Clymer worked each day as an illustrator for a mail order catalog firm, drawing buttons and detailing "herringbone suits" and myriad catalog images. Each evening, he studied at the Vancouver School of Art. He supplemented this with private lessons from European-trained artist George Southwell. After 16 hours of work and school, John retreated to his own studio at Southwell's, where he drew and painted before sleeping four or five hours and beginning this arduous daily schedule all over again.

George Southwell gave John Clymer extensive training in the use of oil colors. It was also at this time that Clymer learned the necessity of painting outdoors. Sketching outdoors became a lifelong habit, and when traveling Clymer always kept a sketch box at hand. The brilliant colors that characterize his work can thus be ascribed in part to his Canadian education and experiences.

Clymer was fast becoming an accomplished artist, but his 18- to 20-hour workdays were exhausting him. In 1927, at the urging of his physician, he temporarily quit work and study. Seeking fresh air and physical exercise, he shipped out as a deckhand aboard a Yukon River steamboat. "I never planned it that way," he later remembered, "but that chance summer's trip has guided and shaped my life ever since." His summer on
During the decade spanning the late 1940s and 1950s, Clymer drew 80 Saturday Evening Post covers, making him one of the most famous and beloved illustrators in America.

the Yukon reinforced what he later described as an enduring urge “to go north or go to the mountains” to gain ideas and inspiration for his art.

Clymer traveled to his steamboat job by way of Skagway, Alaska, and the White Pass Railway to White Horse, Yukon Territory. His boat, the Thistle, was a side-wheeler pushing a barge loaded with flour, kerosene, canned goods, fuel, and various sundries up and down Canadian and Alaskan stretches of the Yukon River.

Although the year was 1927, the Yukon culture more closely resembled that of the late-19th-century American frontier. Upon boarding the Thistle, Clymer had literally stepped back in time to an era similar to that during which his pioneer grandparents settled the Kittitas. The Thistle stopped daily at Indian villages, tiny towns, trading posts, and the lone campsites of north country trappers, hunters, and fishermen. As he hauled cargo up and down the shore and chopped dozens of cords of wood to feed the steamboat's boilers, Clymer met a wild array of coarse frontiersmen whose images would loom large in his artistic imagination for decades to come. When the summer ended he returned to Vancouver a new man with expanded visions.

Clymer continued to study art while pursuing freelance illustrating. He added a score of Toronto firms, including MacLean's Magazine, to his resumé and staged his first gallery show. Two years' study at the Wilmington (Delaware) Academy of Art solidified Clymer's determination to hone his artistic abilities through formal training; and meetings with his heroes, N. C. Wyeth and Harvey Dunn, proved inspiring. He returned to Canada and by 1932 had begun a career path and he flourished under Dunn's tutelage. Meanwhile, his illustrative work paid the bills via new accounts with New York Life Insurance Company, True and Field and Stream magazines, and work illustrating detective stories and novels. At home John and Doris were happy in the Westport milieu, surrounded by other illustrator friends who formed a close and friendly community.

Although in his mid-thirties at the outbreak of World War II, John Clymer joined the United States Marine Corps as an artist. He remembered that when artist friend Tom Lovell "called up one day and said, 'Let's join the Marine Corps,' I didn't hesitate a minute."

The 36-year-old trained at the Parris Island, South Carolina, Marine Corps Recruit Depot: "[G]oing through boot camp with a bunch of kids nearly killed me!" Clymer earned the rank of sergeant and was stationed (with Lovell) in Washington, D.C. They painted hundreds of wartime illustrations for Leatherneck Magazine and The Marine Corps Gazette. In addition, the two created an important series of paintings tracing the entire history of the United States Marine Corps.

At the end of World War II, John Clymer returned to Westport and, after Jo's birth, moved his family to Bridgewater, Connecticut. This period marked one of Clymer's most lucrative and famous artistic ventures. On a visit home to Ellensburg, John had made notes and a sketch of young David peering into a flier's nest atop a high tree stump. He finished the picture and sent it to The Saturday Evening Post, and they immediately published it. During the decade spanning the late 1940s and 1950s, he drew 80 Saturday Evening Post covers, making him one of the most famous and beloved illustrators in America.

Clymer's Saturday Evening Post covers, like those of his colleague Norman Rockwell, extol the virtues of rural American culture and small-town life. Many of Clymer's covers reflect rural New England lifestyle and sensibilities. But, beginning
with the flicker's nest image, John tapped his Ellensburg roots and Canadian and Alaskan memories for Post illustrations. Dozens of covers visibly reflect the semi-arid eastern Washington foothills in which the artist grew to maturity. Images of rodeos, ranching, small towns, fishing, swimming holes, camping, family vacations, and the flora and fauna of the American West populate Clymer's Saturday Evening Post canvases. Then, as now, Northwesterners can readily identify specific locales—Snoqualmie Pass, the Yakima River Canyon, Upper Kittitas County (Roslyn and Salmon la Sac), and the Yukon River and Glacier Bay—on the covers of the Saturday Evening Post. Scenes from Montana, Idaho, and Wyoming also appeared. Interestingly, this familiarity created minor problems for the artist. Most Post covers, he recalled with amusement, drew a score of letters from locals who knew the settings well and pointed to his "inaccuracies."

Success as a book and magazine illustrator brought him greater breadth and opportunities. Clymer, with Doris as his researcher, began to engage in painting wildlife and historical Western art. This began in his Connecticut studio in the 1950s and early 1960s and culminated in the Clymers' return to the West in 1970.

Biographer Walt Reed chronicles a pivotal 1954 Canada/Alaska trip John took with David and friend Robert Lougheed. Traveling north along the Canadian Rockies to Banff, Jasper, the Yukon, and Alaska, they saw grizzlies, foxes, elk, moose, mountain sheep, and caribou. Clymer had spent much of his life around wildlife but these animals were in the remote corners of Canada and Alaska—the true wild—far from the game preserves and national parks he had visited so often. "This was an excellent opportunity for us to sit and watch their [grizzly bears'] behavior, how they walked and moved around," he remembered. The party trekked as far north as the Arctic Circle, and John noted, "Many of the things I saw on this wonderful trip [became] the subject for a painting."

Clymer painted wildlife throughout the late 1950s, 1960s, and 1970s. Much of his work appeared on the covers of Field and Stream and premier wildlife venues. Yet, more of his wildlife pictures began also to appear in art galleries as he slowly made his transition out of illustration work and into "easel painting." The loping deer in Ridge Run (1965) live in the far north country, as do the grizzly mother and cub in Spring Freshet (1974). Clymer painted several acclaimed mountain sheep canvases, including High Ground and Windswept (both 1973), while Time of Hunger (1975) features a mountain lion in winter.

John Clymer's most famous painting of buffalo is Tribal Hunt (1972), winner of the Franklin Mint's 1973 Gold Medal Award. Set on the Great Plains in the Upper Wind River Valley, this painting also features Indian hunters decked out in traditional Plains attire. The combination of wildlife and human actors marks Clymer's final transition into the field of historical art.

By the mid 1960s John and Doris had reached a turning point in their lives. "I was becoming less and less interested in magazine assignments and deadlines and more and more interested in painting subjects of my own choosing...." After an early 1960s Montana trip, Clymer told biographer Walt Reed, "I did my first history painting" and placed it in New York's Grand Central Gallery on consignment.

They weren't at all sure they could sell it... in about a week someone came in and bought it.... The next day another person came in and said, 'Where's that history painting you had here the other day?' He was very disappointed to find that it was gone and asked to see the next one I did. The time had come. I decided to finish up my remaining commitments and make a clean break... from now on I was going to become a full-time painter.

Now Doris Schnebly Clymer's role in their career came to the fore. "I wouldn't be doing it [history paintings] if she
hadn't gotten me in it .... I'd [still] be doing wildlife," he told Reed. The Clymers had always used long family summer automobile vacations to gather new materials for Post and Field and Stream covers. With David and his younger sister Jo grown, the summer treks became historical research trips per se. Doris organized the itinerary and did advance research, then read to John from historical works as they drove.

The Clymers retraced Doris's grandparents' Oregon Trail route, then Lewis and Clark's trail. They followed the military campaign route of Nez Perce Chief Joseph and the old Chisolm Trail. As they learned more and more, their focus narrowed to developing expertise on the first 40 years of the 19th century. The Clymers' great passion became early national Rocky Mountain exploration, trapping, and Indian culture. They were fascinated by Lewis and Clark, Sacagawea, the mountain men, and Great Plains Indian tribes.

Back in the studio after each summer's travels, Clymer would paint up to a dozen history canvasses. With books and articles, Doris's copious notes, and his own sketches (he called them "doodles") at hand, he set to work. "We all have our own approach" to realism, he once observed:

Although some artists begin with the foreground and "paint back," I work just the reverse:

I paint the distance first. And I establish the ground and the sky and the atmosphere in the picture. And then I put my people or horses in it because they're affected by the color of the sky (the top of them). The under part is affected by what the color is that's on the ground. And to make my people stay in there I have to establish what kind of day it is and what the light is.

The final stage was the finishing, with precision and exactitude, the details of material artifacts and culture. He once told historian William E. Goettmann, "History paintings, if they are not as correct as you can make them, are not worth doing." Walt Reed writes that this attention to historical accuracy puts Clymer's paintings "in the tradition of Karl Bodmer, Alfred Jacob Miller, and George Caleb Bingham, artists who also recorded the events of the frontier where white and red men first met."

Like his illustrious predecessors, Clymer pleased the viewer while simultaneously preserving for posterity the history of traditions of both Indian people and European explorers and trappers. Clymer would spend much of the next 25 years rendering through art the history of the Rocky Mountain exploration and fur-trapping frontiers.

Clymer's return to the West in 1970 marked the beginning of the final, and most illustrious, stage of John's career. From his Wyoming studio he produced some of his most highly ambitious, accomplished, and acclaimed paintings. While Old Fort Benton (1967) came during the end of his Connecticut years, he
painted Narcissa Whitman Meets the Horribles (1971) after the move to Wyoming. Alouette (1976) features mountain men reveling around a winter campfire. Crazy Horse (1975) represents warring Plains Indians in full regalia, while Escape From the Big Hole (1976) tells the story of Chief Joseph's heroism and stamina in the Nez Perce War. "Painted in a representational style with painstaking attention to detail and accuracy," writes B. Byron Price of the University of Oklahoma, "Clymer's historical works possess a depth and finish that distinguishes them from his earlier magazine illustrations."

"Visitors at Fort Clatsop" (n.d.) reflects John Clymer's proficiency at historical art. John and Doris's growing fascination with the Lewis and Clark expedition and indigenous (in this case, Coastal) people is also evident.

Clymer pleased the viewer while simultaneously preserving for posterity the history of both Indian people and European explorers and trappers.

The mid 1970s proved to be John Clymer's artistic pinnacle. Whisky, Whisky (1973) claimed a gold medal at the Cowboy Artists of America (NCAA) Exhibition, while Sacajawea at the Big Water (1974) earned gold from the National Academy of Western Art (NAWA). The following year John Colter Visits the Crows, 1807 (1975) earned NCAA gold. Out of Silence (1976), Clymer's compelling painting of a lone Indian riding horseback amid deep winter snow, won the NAWA's Prix de West award and today resides in the collection of the National Cowboy Museum and Western Heritage Center in Oklahoma City.

In 1989, John Clymer died at age 82. In his final years he and Doris were honored by the founding of a Western art museum and gallery in their hometown of Ellensburg, Washington. The gallery offers a retrospective of Clymer's life and art while simultaneously staging exhibitions of contemporary Western art.

Clymer's youth in Ellensburg and the greater Pacific Northwest indelibly stamped his artwork. Today, John and Doris's legacy is carried on through the work of Ellensburg's Clymer Art Museum and Gallery.

Michael Allen was born and raised in Ellensburg and served as a United States Marine in Vietnam. He has written five books, most recently A Patriot's History of the United States (with Larry Schweikart, Penguin/Sentinel, 2004). His sixth, Congress and the West, 1783-1787, is forthcoming. He is professor of history at the University of Washington, Tacoma, and a founder of the Ellensburg Rodeo Hall of Fame. This essay is based on the Curtiss Hill Lecture he presented at the Washington State Historical Society's June 2006 annual membership meeting.
The imposing shell of towers and turrets stood on a bluff overlooking Tacoma's Commencement Bay. This once-elegant French renaissance structure was intended to rival other chateau-style hotels worldwide.

The Northern Pacific Railway, purveyor of this dream, was forced to halt construction by the financial panic of 1893. The following years found the eight-storied cavity filled up with lumber and assorted debris. In 1898 a suspicious fire gutted the interior. Facing a $150,000 loss without insurance, the railroad abandoned the project. They recouped some of the loss by removing many of the bricks and shipping them off to Montana and Idaho as building material for train stations.

Demolition would have been next on the agenda were it not for some Tacoma School Board members who were searching for a school building site. The former hotel seemed a perfect alternative. The deal was cinched with a $34,500 check. Beginning in 1906, 878 students and 38 teachers began to enjoy a most unusual experience—holding classes in lofty turrets. Generations of alumni would fondly refer to their alma mater as "the brown castle."

In order to construct a sports stadium, school officials turned to neighboring "Old Woman's Gulch." This was the deep, wooded ravine next to the school inhabited by a number of female squatters. These homeless residents were expelled and the stadium excavated. Tacoma High School changed its name...
to Stadium after a second high school, Lincoln, was built for the city's growing population around 1912. For decades the Stadium Bowl served as a forum for many significant events, including speeches by presidents Teddy Roosevelt and Woodrow Wilson. Stadium Bowl helped put Tacoma on the map. Our family delighted in Bob Hope's appearance. John Phillip Sousa's band marched there. This was decades before I marched over the same ground, practicing with the Stadium marching band.

Stadium High School was built so solidly—with walls five feet thick at the base—that it withstood the devastating 1949 earthquake. The tremors were less kind to the Stadium Bowl, causing massive damage to its steel and concrete structure. And there it stood for decades, fenced off and condemned. The classes of 1976, 1977, and 1978 helped raise money for repairs from donations, commemorative coins, and one-foot pieces of stadium turf. The bowl was rededicated on May 18, 1976.

A las, like the hotel before it, the stadium's playing field faced an uncertain future. Incorrect fertilizer applications turned the field an ugly brown. Although a $2 million federal grant promised to set things right in 1977, more challenges arose. A storm drain burst, wiping out a large chunk of its eastern edge. The damage required removing a full block of adjoining E Street in order to add structural reinforcements. On October 25, 1985, the fully renovated bowl was once again dedicated.

I attended Stadium High 50 years after the first class. My classmates and I always knew the "brown castle" was steeped in history. On the walls unsmiling groups of students from the early 20th century stared at us from behind framed glass.

Things have changed, though, since I trod those halls in the 1950s. The former boys' and girls' gymnasiums underneath the main courtyard have been rebuilt into a new gym large enough to hold the entire student body of 1,800. The auditorium has become a performing arts center. In the 1950s our auditorium doubled as a study hall—it contained desks, not theater seats—and was home to countless class plays, band concerts, and pep rallies.

A two-year, $105 million renovation that began in 2004 reached completion in September

OPPOSITE PAGE: A 1920 issue of Tahoma, published by Tacoma/Stadium High students.

ABOVE: Gridiron action in the Stadium Bowl during the 1915 football season. The newly constructed (1911) Washington State Historical Society Museum stands in the background.

RIGHT: Tacoma (Stadium) High School's 1906 graduating class.

The Bowl

A plaque installed at the southwest entrance to the bowl by Stadium students in May 1993 describes the construction process:

Construction began in June 1909. A steam shovel and sluicing pipes moved more than 180,000 cubic yards of dirt down the sides of the gulch until it half-filled the great cavity to form a level playfield of two and a half acres. Thousands of board feet of lumber were hand cut to make the forms for the seats, which were molded in concrete. The original seats (with an estimated seating capacity of 32,000) rose 31 tiers high, with the top seat 52 feet above the field level.

Besides hosting Stadium Tigers' sports events, the Stadium Bowl has served as the venue for many public events, including a reenactment of the burning of Rome in 1911, Independence Day fireworks displays in the 1920s and 1930s, and appearances by numerous visiting performers, celebrities, and dignitaries.
Old Woman’s Gulch

Different sources provide varying accounts of the origin of the name “Old Woman’s Gulch,” a ravine in the Stadium High School area. The most common description of the residents refers to “elderly widows of fishermen (or longshoremen) who lived in shacks” at the mouth of a stream that flowed through the gulch from Wright Park.

Gary Reese, in Origins of Pierce County Names, describes the gulch as inhabited by “Indian women who lived in shacks.” Reese’s Origins appears to be the only source that refers to the residents as Native Americans. The homes of the gulch residents, who were either primarily or exclusively elderly women, were destroyed with apparently little or no attempt to compensate or relocate them. Herbert Hunt in his History of Tacoma reports: “Several small houses built by squatters stood in the gulch, and some of the occupants were removed with difficulty. One woman became hysterical and remained in her hut until the water, mud, and stones poured into her back door.”

2006. Gone now are the days when those with band in the basement and their next class on the fourth floor would have to race up seemingly endless flights of stairs—two elevators have been installed. During the project, workers often found the past leaking into the future: mysterious stairwells led nowhere, unexpected levels of the school’s foundation cropped up beneath the sub-basement and original clay drainage pipes crumbled under a touch. Not surprisingly, none of the windows conformed to modern-day building codes.

Now the construction crews are gone and Stadium High School stands with renewed vigor on the bluff overlooking Commencement Bay. The centennial celebration will occur in mid September 2006, attracting many of the thousands who have been part of the history of the beloved brown castle. The fairy tale castle lives on.

Wynne (Graham) Crombie graduated from Stadium High School in 1956. She received her bachelor’s degree in education from the University of Washington and went on to teach with the Department of Defense School System in Italy and Berlin. She now teaches part-time at a suburban Chicago community college.
A century ago more Washington citizens were dying of tuberculosis than from any other cause. The terrible disease was ubiquitous, its classic symptoms including progressive weakness, fever, and an exhausting, racking, blood-producing cough. Called "consumption" for centuries because of the way it "consumed" the lungs, in the late 1800s it was officially designated tuberculosis (or TB) after the tubercles, or lesions, in the lungs that characterized the disease.

Tuberculosis was utterly unpredictable. Death could be preceded by a miserable, chronic illness or by a rapid decline of the brain, spine, bones, kidneys, intestines, skin, and neck glands. It could also "seed" throughout the body in "miliary" form, in which tiny lesions the size and shape of millet form in multiple organs. Inexplicably, tuberculosis could even subside and apparently disappear, or be so mild from onset as to escape detection in more cases than were recognized at the time. The disease could even flare up from a "latent" form and become extremely virulent and contagious. Before 1900 virtually every citizen of the "Northwest Corner" who had not already succumbed carried either active or latent tuberculosis. TB had become a true epidemic, ominously...
tuberculosis threatened the growing and prospering new state of Washington.

Its multiethnic sources (see sidebar on page 30) combined to make TB Washington's number one cause of death: 124 out of 1,356 total deaths in the sparsely populated state in 1892, 447 by 1902, and 1,406 out of 12,000 deaths in 1913. Statistics for the number of known cases, reported as only 1,000 in 1913, were utterly unreliable—many thousands would have been more accurate, based on later knowledge. The state health department (1906) noted that only a third of the recorded tuberculosis deaths had been previously reported as known cases.

Scientific advances in prevention and control of somewhat similar "ancient" diseases—smallpox, syphilis, etc.—were well-known by the mid 1800s, but there were as yet no vaccinations or medications for consumption. Tuberculosis care had benefited from some clinical observations, such as transmissibility, demonstrated in 1868 by Jean A. Villemain. Rene P. H. Laennec learnedly described diagnostic lung findings in 1816 with use of the stethoscope, and then died of consumption himself, as did many giving care to active cases.

Finally, in 1882, Dr. Robert Koch of Austria reported his anxiously awaited medical-biological discovery of a microbe, the bacillus that had previously defied laboratory scrutiny. He rendered the germ visible with special staining under the microscope, found it in "sick" tissues, grew it in the laboratory (cultures), transmitted it to new tissues, organs and cultures, thus confirming its infectiousness and the fact that it was the cause of tuberculosis.

Although the tuberculosis bacillus, Mycobacterium tuberculosis, had been "captured" in Europe in 1882, it was not tamed until 30 or more years later and continued to infect a large portion of the population. In 1900 TB's presence in Washington was most alarming, and yet, inexplicably, officials were ignoring it.

A Dr. E. Jordan of Seattle voiced an apparently popular view, that Koch's assertions were "poppycock," and claimed that his own theories and treatment were beyond criticism. By that time it was not unusual for many doctors, particularly those with some writing ability, to author articles and even texts proclaiming their own interpretations and treatments of many conditions as the best, without need for scientific proof. Major reforms in medical education and standard physician qualifications took place at this time. Standards of practice and high-caliber medical schools soon became the order of the day.

The public was gaining awareness of the TB epidemic, albeit slowly. Editorials declared the grave danger of the disease. The state medical society appointed a special committee on tuberculosis before the turn of the century. Washington's Department of Health in its first biennial report (1892) drew attention to the imminent dangers of ignoring the disease. The health department's report on TB in 1908 still described the lack of governmental initiative but noted that the new society for the Study, Prevention, and Control of Tuberculosis was energetically advocating greater public concern and action.

The first such society in Washington was formed in Spokane on September 12, 1906, by Dr. William R. M. Kellogg. He sought to involve other areas of the state with publication of a bulletin. Unfortunately, he soon died, but what he had started was picked up in Seattle in 1909. Dr. Christen Quevli, who had come to Tacoma from Norway, was deeply involved in the anti-tuberculosis activities of the area's leagues and medical societies. It is of note that when he became president of the Washington Society for Prevention and Control of Tuberculosis, the legislature passed regulations for documentation and initial control of TB. He eventually became president of the national anti-TB group while also carrying on a practice with major tuberculosis emphases.

Local groups were enthusiastically supported and increased in number to 38 locations throughout the state. They became unified, went through multiple name changes, and became allied with the rest of the country and then the world. They coalesced into the
Washington Tuberculosis and Health Association and in the 1950s linked with similar groups elsewhere to form the National Tuberculosis Association (NTA), which had a medical arm, the American Thoracic Society (ATS). A final transition in name took place in the latter part of the 20th century when the NTA became the American Lung Association. The state organization is now the American Lung Association of Washington (ALAW), which has reduced emphasis on tuberculosis and given greater attention to other respiratory diseases.

These surface details only hint at the basic and most meaningful activities of many concerned citizens who came together with one purpose: to conquer the illness that had produced such overwhelming havoc—tuberculosis. With the aid of the Boy Scouts of America, churches, civic and business groups, the anti-TB leagues sought to bring about legislation, sanitation, treatment, isolation, and other measures, and through education reduce the spread of the disease. They were successful to a degree, although they engendered some resentment and backlash. There were those who labeled the clamor an excessive “phthisophobia” (fear of phthisis—TB specialists are still occasionally referred to as phthisiologists).

Within the first 10 years of the 20th century the anti-TB activists in the east had adopted the banner of a red cross in conjunction with the American Red Cross organization and initiated the development and sale of seals, or stamps, at Christmas time, providing much-needed income for both organizations. The two organizations separated in 1919 and the NTA adopted a new seal design with the double-barred Cross of Lorraine, calling them Christmas Seals, a title they have used ever since.

These seals became indelibly etched in the minds and hearts of the American people as the symbol of a fight for the good of all persons against seemingly insurmountable odds, most specifically against tuberculosis. The seals were sold singly or in sheets, by mail, or door to door, by volunteers, at newspaper stands, in the cold blustery weeks before Christmas. They clearly symbolized the fight against TB, their prizewinning motifs changing from year to year. Christmas Seals were depicted in posters, magazines, movies, and newspapers; adopted in school contests or on stage; evenually adorning accessory scarves, jewelry, tree decorations, address labels, greeting cards, etc. Some were modified to a Jewish Chanukah style.

All 38 anti-TB groups in Washington promoted the sale of Christmas Seals, adding to the yuletide spirit with gala festivities, and attractively enhancing the season. The seals were colorful, picturesque, timely reminders of the holidays, and yet underneath there was always the dismal note of despair over the ravages of an undefeated enemy—“The White Plague,” tuberculosis—invading the bodies of innocents. Early activities of the anti-TB groups in Washington centered on preventing transmission of the disease and treating those most ill. Spitting was condemned because it spread germs; laws were passed to criminalize it, and arrests were made. This culminated in the “death of the spittoon.”

Treatment remained uncertain. Henry Trudeau, in the Saranac Lakes area of upstate New York, came to be considered the protagonist of bed rest, fresh air and sunshine, good diet, and mild exercise as therapies for TB. He brought the concept from Europe, instituted it in the local mountains, created a cadre of physicians and nurses (almost all had had tuberculosis, as did Trudeau), and spread the gospel to the rest of the country. There was no question but that it was more successful than less rigid measures used previously.

The very best place to manage a patient for this type of treatment was in a sanatorium, an institution much like a hospital but limited to patients with tuberculosis. Washington had no such institutions, although there had been “tent cities” and “pest houses” in some areas. Naturally, city neighborhoods were opposed to TB tent cities within their bounds.

Seattle was the first site, in 1911, of a sanatorium, Firland, where beautiful buildings housed 100 adult patients and dozens of children. It provided a place for Trudeau-type treatment with full medical and support staff. It also was the locus of a controversy between staff and private physicians, the latter feeling they were illegally being denied the right to give continued care to their own patients. The Anti-Tuberculosis League was one of the main defendants in a suit that was finally settled amicably.
Firland was ultimately donated to King County. Spokane built a similarly beautiful sanatorium, Edgecliff. Tacoma had the Pierce County Sanatorium, and Seattle acquired another institution, Morningside. The United States Public Health Service, Cushman Institute, became an Indian Health Service hospital (Tacoma). There were also the Marine Service and the Veterans Administration TB hospitals. Eventually, there were 13 sanatoriums only partially meeting the state's needs in the first half of the 20th century. After World War II a converted wartime naval hospital became a new, larger Firland, providing many more much-needed beds.

Sanatorium hospitalization could either be a great relief for the sick patient or a burden of incarceration, but the greatest overall benefit for well over 50 years was the isolation of active cases, which kept uninfected individuals from being exposed to a patient's breath, sputum, or other body secretions. As more and more active cases were removed from the mainstream, the number of new cases declined and public health was improved. The logical next step was searching for new cases. Identifying previously unknown victims of the disease

LEFT: Educating the public, especially tuberculosis patients and their close contacts, was one of the main emphases of private and public health organizations. This 1925 insurance company booklet was part of that effort.

BELOW, LEFT: Before the development of more mainstream treatments, a multitude of patent medicines were touted for curing consumption (tuberculosis). This ad ran in the Seattle Times around the turn of the 20th century.

BELOW: A Red Cross Christmas Seals leaflet. Tuberculosis and Red Cross organizations shared Christmas Seals in the early 1900s at a time when some groups began to combine their efforts in the fight against TB.
was of utmost importance in gaining control over it.

The mental anguish that tuberculosis patients and their loved ones suffered can be likened to the dismay engendered these days by cancer, AIDS, Alzheimer's, and the like. There are some still living who can recall the desperate fear that gripped those who came under the shadow of TB. This fear was channeled into such meaningful endeavors as the Anti-Tuberculosis League, which provided education, guidance, and assistance.

A sanatorium stay was by no means a holiday. Edgecliff (Spokane) records for early years showed that deaths often exceeded live discharges. Even those who improved had long stays involving a great deal of bed rest. Betty McDonald, author of The Egg and I, wrote about her fears in the semi-fictional account, The Plague and I, during the 1940s. Her humor could not hide the fear and despair she felt, but she did leave “The Pines” (Firland) cured.

Many well-known books and operas dwelled on the languishing fate of those chronically suffering and then dying in “sans,” TB “villages,” or at home. There was a certain aura of prestigious romanticism attached to consumption, such as in Camille, La Traviata, or the lovers in The Magic Mountain. Sharpened senses were claimed, characterized by bright eyes and red cheeks in a pale countenance. Many well-known politicians, authors, philosophers, poets, artists, and their subjects succumbed to the disease. The impression of consumption being a disease of the elite was probably false since we know that in the last 500 years mortality in Europe alone was horrendous for all segments of the population. In more recent years, Eleanor Roosevelt, Vivien Leigh, Adolf Hitler and his father are a few of the more notable or notorious victims of the disease. Dashiell Hammett wrote some of his novels while a patient at Cushman Institute in Tacoma.

The “typical” tuberculosis patient, however, at least in the logging centers and seaports of Washington, was too often noted to be from the overcrowded flophouses, filthy rooms, taverns, and brothels of Skid Road where person-to-person spread of all diseases was practically a matter of course. As this became obvious, some of those active in the community effort to stem tuberculosis, after witnessing the self-inflicted squalor of drunks, prostitutes, beggars, and such, lost their enthusiasm for helping.

As cases of TB were confined for treatment, the incidence and mortality of the disease gradually and significantly declined. The battle against TB in this state and elsewhere entered a new phase. Thanks to the isolation of active cases, the chances of becoming infected were diminishing. Quarantine of all active cases was suggested—a theoretical albeit impractical ideal. Milk as a source of tuberculosis was handled by killing all skin-test positive cows.

Roentgen's invention of the “x-ray” (1890) was the godsend that allowed early and easy detection of TB. Since most cases were pulmonary, the chest x-ray could show negligible, minimal, moderate, or advanced lung disease. If abnormal, the chest “film” demanded thorough medical follow-up. Chest x-rays of inductees in both world wars unexpectedly revealed large numbers of “hidden” cases.

Voluntary chest x-ray screening of Washington's entire population became the goal of health departments and tuberculosis associations at all levels, and they attained that goal. Intercommunity contests were held to reward the county or locale that could screen “the mostest the fastest.” Mobile units, horse-drawn or horseless, were used. Additional focus was placed on jails, hospital admissions, nursing homes, teachers, and food handlers. These case-finding efforts paid off as numerous unsuspected early cases were found in the many thousands thus tested. This put a tremendous load on existing care and isolation facilities.

There were those who were not happy at being confined, and in some instances refused isolation, thus contributing to
CRISIS & CHRISTMAS SEALS

the spread of the disease. This predicament, which went on for many years, called for court-ordered incarceration. Washington, under the direction of Dr. Cedric Northrop, TB control officer for the Seattle/King County Health Department, led the way with “locked wards” in sanatoria for the recalcitrants who, for whatever reason, would not voluntarily stay confined. Generally, there was compliance with isolation since most understood its importance in preventing spread of the disease. The Christmas Seals agencies participated actively in education and counseling under health department supervision.

Dr. Robert Koch and others had sought to produce immunity to tuberculosis, injecting nontoxic extracts, as was being done successfully with some other illnesses. Unfortunately, this did not work with TB, but a unique situation was discovered. The skin injection site would react with swelling and redness (positive) or not react at all (negative). A positive skin test was found to identify persons with viable tuberculosis bacilli in the body, even when there was no sign of active infection. This “latent tuberculosis” might flare up at any time, thereby spreading infection. It is surmised that 100 percent of the population in Washington (and the world) in 1900 had active or latent TB. By 1950 isolation had reduced positive skin tests to only 8 percent in children. They are found today in only 0.4 percent of school-age children in average United States populations.

As the 20th century dragged on, particularly after the 1930s when sulfa drugs were curing many other infections, consumption could still only be treated with conventional fresh air and bed rest. The frustration of tuberculosis patients and their physicians was turning into desperation. Researchers sought anything that would return a TB patient to even near-normal health. Surgery had become safer, and occasionally removal of a solitary “tuberculoma” had resulted in a cure. The success of this approach depended on the disease having a single focus, which was rare. Then another role for surgery was found.

Dr. Christen Quevli, the elder, in Tacoma was credited with performing the first “collapse therapy” for tuberculosis in Washington. Thoracoplasty, removing ribs at the top of one side of the chest and shrinking that lung, became the prime form of surgery thought to be useful in healing tuberculosis during the next several decades. A major surgical procedure, or combination of such, it produced a partial collapse of the tuberculous lung. Surprisingly, this promoted healing, and infected sputum was no longer produced. Obviously, the disease had to be localized to one side. It was a difficult, painful procedure, often done in stages, and did not always work. Yet, often enough it did, even though the collapsed lung lacked full function.

Less traumatic procedures were devised, such as placing space-occupying bags of air, paraffin, or Lucite “ping-pong balls” under the upper ribs. Alternatively, air could be injected into the body cavity and replenished at weekly intervals (pneumothorax, pneumoperitoneum). There were lines of patients in the hallways awaiting their turn on the special equipment for their weekly “refill.” These and other procedures of the 1930s, 1940s, and 1950s, now seen as radical, were the best tuberculosis specialists had to offer until after World War II. Sanatoria were converted to include surgical suites or patients were

LEFT: The x-ray evolved from the primitive equipment of a century ago to efficient screening apparatus in the span of a few decades. “Case finding” led to treatment and prevention. Tacoma exceeded 73,000 screenings, making it the first United States city to reach its quota in 1949.

BELOW: X-ray lab at Riverton Sanatorium, a private facility in Seattle, c. 1925.
temporarily transferred to large hospitals in the nearest metropolitan centers. Volumes of new thoracic surgery texts and journals were produced, and additional academic faculty positions and services were created all over North America and Europe, due in large part to the new collapse procedures.

Over half of all tuberculosis patients availed themselves of such measures, including writer Betty MacDonald. Some success was apparent, and patients could be discharged with “negative” sputum. In retrospect, a significant number with only mild or moderate disease would probably have improved on their own. Former patients who had undergone thoracoplasty were often seen listing towards the resected side. Ping-pong balls or wax spicules could erode to the surface years later.

Finally, in 1947, streptomycin made its appearance—the first effective anti-TB drug. It was developed after a member of the National Tuberculosis Association suggested to Dr. Selman Waksman, a soil biologist, that there might be anti-TB substances in “dirt.” Waksman and an associate, Dr. Albert Schatz, isolated an extract from a soil fungus, streptomycetes, and found it to be highly effective for inactivating the tuberculosis bacillus. A Nobel Prize was awarded to Waksman alone, engendering a great deal of resentment on the part of Schatz.

“Strep,” which had to be injected intramuscularly, had some serious side effects; and resistance to the drug could occur unless it was given with another anti-tuberculosis drug. Nevertheless, it was infinitely better than the previous “nothing.”

Pharmaceutical firms in many countries raced to find a cure for the hundreds of thousands of consumptives and those with nonpulmonary TB. But it was not until 1952-53 that the world was elated by the results of many clinical trials, including those done in Washington, with isoniazid (iso nicotinic acid hydrazide, INH), plus another drug—PAS (para amino salicylic acid, a relative of aspirin) and/or streptomycin. At least two drugs had to be taken for two years, and this could be done at home once the sputum had no bacilli. The combination proved effective enough to nearly eliminate tuberculosis in the United States, Canada, and Europe.

Tuberculosis mortality in Washington subsequently declined strikingly to nearly nil, where it remains at present. Incidence fell more gradually, but by 1985 there were only 6.2 cases per 100,000 population, down to 4.0 in 2003, lower than the national average. Most of the sanatoria in Washington were closed by 1970. Edgeciff in Spokane was one of the last to shut its doors in 1978 after treating 10,000 patients in 64 years. The offices of the American Lung Association of Washington were reduced to four, one for each point of the compass and one central headquarters in Seattle, which is home to Washington's Tuberculosis Advisory Committee, chaired by the state health department's tuberculosis control officer.

Twenty years ago it seemed TB, at least in this part of the world, was conquered or soon would be. Then, unfortunately, with success in sight:

- Many United States cities have had a surge in new cases, mostly in immigration centers.
- The HIV/AIDS virus sequence exploded, interacting with TB, each worsening the other.
- Multiple drug resistance to anti-TB medications appeared, partly spread worldwide from Siberia when the USSR Health Control Program was usurped by new local policies, too often inadequate, encouraging bacilli to become drug resistant.
- The homeless have become a major reservoir; they require physically supervised drug administration for many months.
- Legal and illegal immigrants brought in more active tuberculosis from the rest of the globe where the disease is now worse than ever—over nine million cases and two million and more deaths per year have been reported since 2003.

Paradoxically, as tuberculosis diminishes, fewer and fewer physicians recognize it, and the danger now exists of ineffective treatment due to misdiagnosis.

Despite all this, tuberculosis in Washington is at an all-time low, as it is in much of the developed world. Sporadic newsworthy cases, usually foreign born, pop up occasionally, reminding us of the lurking danger. Incarceration/isolation has been a necessity, albeit rarely. This unconquered disease still requires many months of combined, closely supervised multiple drug treatment, with lifelong follow-up by phthisiologists. Antibiotic resistance still surfaces too frequently.

Fortunately, improved management and control persists in this part of the world and is improving elsewhere. But TB, one of the oldest scourges of mankind, is resisting conquest. Research studies, supported by the American Lung Association and many other sources, some under way at the University of Washington, are finding new avenues for anti-TB endeavors, by genetic, molecular, and other means. True control—which involves diverse socioeconomic, cultural, religious, and multiple international factors—still eludes us, but science is gaining.

Wilbur Hallett, MD, FACP, is guest curator of the exhibit, The Battle against Tuberculosis in Washington, on view at the Washington State History Museum September 10 through December 17, 2006. Hallett is a Washington State Historical Society member and volunteer, and a member of the American Lung Association who has long been active in the fight against tuberculosis.
AFTER GASOLINE—WHAT?

Thus began a 1926 prospectus from the Power Oil & Gas Company of Spokane promoting Vegalene, an alcohol-based fuel made from "potatoes, grain, fruits, sawdust, vegetables, and coal." After predicting that the United States must eventually turn to foreign suppliers for gasoline, the prospectus noted, "The mere fact that we have produced huge quantities and have never had a serious shortage is no evidence that we can always produce all the petroleum we need, but is evidence only of how much we have already used or wasted." The company claimed there would be "A PROFITABLE NEW MARKET for tons of crops that are prolific and easily raised." The "potato patch [is] full of power and heat," trumpeted the booklet, citing the example of an airplane that flew at the astonishing speed of 90 miles an hour with "cull apple fuel." Certainly, Vegalene was years ahead of its time. Despite its warnings and the promise of a profitable investment, the company apparently came to naught. Now, 80 years later, the potential of alcohol-based fuels is being revisited.
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

Edmund A. Smith and His Famous Fish-butchering Machine

By Phillip B. C. Jones
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.”

Pacific Northwest cannery workers gathered among stacks and cases of salmon, c. 1913.
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 1, the 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 cannery laborers 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-butcher 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 cannery 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.”

Soon after it was put into operation, Edmund Smith’s fish-cleaning machine became widely known as the “Iron Chink” because it supposedly could perform the work of about 50 Chinese salmon butchers. (“Chink” was a derogatory 20th-century term commonly used in reference to a person of Chinese ancestry.) The myth arose that Edmund Smith had developed the machine specifically to displace Chinese workers. This fiction might have been fabricated to stimulate interest among cannery owners who wanted to find a substitute for the relatively well-paid salmon butchers.

The Iron Chink

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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.

Smith Cannery Machines Company on First Avenue South, in Seattle's Georgetown district (1911).

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.
In 1940, the $6.4 million Tacoma Narrows Bridge captured worldwide attention when it plunged to a watery grave just 129 days after it opened. Even before completion the span’s wild undulations were apparent, yet many of those involved claimed to be utterly stunned by the failure.

In Catastrophe to Triumph, the author examines the real reasons government agencies revised the original plans, who knew of the imminent danger, what was being done to avert disaster, and why it was too little, too late. He also recounts harrowing escapes and the subsequent investigation. Finally, he relates the triumph of the magnificent 1950 Tacoma Narrows Bridge and the twin currently under construction.

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Admit it. We've all dreamt of ditching our nine-to-five jobs, selling the house in the city, and moving to some remote locale to start anew. Few of us dare to pursue the dream, yet those who do often wind up with a tale to tell.

In 1949 Charlotte Paul and her husband Ed Groshell dared. With two small boys in tow, they left their jobs at a Chicago newspaper, sold their house, gathered their small savings, and moved to Washington to operate the Snoqualmie Valley Record, a weekly community newspaper. "Security," as Paul attests, "is what you carry around in your head, and the heart you put into using it." Several years later she chronicled her family's trek into independence in her bestselling memoir, Minding Our Own Business, (1955) and its follow-up, And Four to Grow (1961).

In this era of lurid sagas based on childhood trauma and adult misbehavior, it's refreshing to read a first-person account that is neither. Charlotte Paul offers a sincere, often humorous retelling of the daily struggle she and her husband faced running their own business, rearing two boys, and fitting into the then-remote Snoqualmie Valley community. Throughout each volume Paul evokes life in rural western Washington in the 1950s with anecdotal verve. Colorful characters abound—the crotchety printer, the drunken Linotype operator, the trapper for the state game department, the chief of the Snoqualmie Indians, the "lady correspondents" scattered from Duval to North Bend, the fussy subscribers—all of whom prove both wary of and welcoming to newcomers.

Charlotte Paul depicts a community quite different from the suburban sprawl served by Metro Transit and Interstate 90 that today is creeping into Snoqualmie Valley. In the 1950s the economy depended squarely on logging. When a strike occurred every small business felt it, including the Falls Printing Company. Though the "big transcontinental highway" cut through the valley, Charlotte and Ed ventured into Seattle rarely: to buy a replacement part for the press, see a medical specialist, or attend a Seattle Rainiers baseball game at Sick's Stadium. Otherwise, the family worked ceaselessly to keep creditors at bay and the small printing company alive.

Unlike the twisted realm of David Lynch's television series, Twin Peaks, Paul presents a Snoqualmie Valley ideal for raising children. Young Hiram and Johnny take the school bus, ride their bikes, deliver newspapers, play in the church baseball league, tramp about the hills, and, despite a bout with polio, grow up healthy and happy. They even write their own columns for the family-owned newspaper.

Many aspects of Charlotte Paul's Snoqualmie Valley remain unchanged: Mount Si looms above, the Snoqualmie River still floods, snow closes the pass, and Johnny eats the immortal cherry pie at the Mar-T Cafe (now Twede's) in North Bend. Yet, as now, valley residents feel Seattle's encroachment into their small-town life. "The first visible changes were to be expected, and only a few die-hard Sea­lophobes resented them," Paul observes, but adds with a note of worry, "The modest signs [of the local bank] ... were replaced by mam­moth, brilliantly lighted insignia of the Seattle chain."

Paul also gives insightful testimony on the challenges of producing a community newspaper. The journalistic imperatives differ from those of a big-city daily. "Our job," says Paul, "was to build, not to destroy, even if it meant telling less than the full truth about some of our citizens." A community newspaper has close ties to its readers. "The publishers of large metropolitan dailies, like the czars of big business, keep a comfortable distance between themselves and their customers," she remarks, but the owners of "Valley Blab," as she dubs their paper, cannot afford such aloofness.

Charlotte Paul recognizes, too, the challenges of being a writer. During the 10-year span of the memoirs, she published three novels and numerous articles and short stories in national magazines, in addition to writing for the Record. She disciplines herself to write every morning, even though "Writing, like rheumatism, hurts more some days than it does others." Unlike her duties as wife, mother,
and business owner, she writes solely for herself. "That's the only part of my life in which I am purely, completely, myself. Me," she exclaims one day to Ed.

While Minding Our Own Business recounts the early years of the family venture, its sequel, And Four to Grow, focuses on the trials of rearing two teenage boys who opt not to follow in their parents' footsteps—except as it means to venture out on their own. Hiram, who at age 14 served as a legislative page in Olympia, eventually became a defense attorney in Tacoma while Johnny, who at one point declares, "I like sports. Someday I might even make sports my career," is today owner of the Snoqualmie Falls Golf Course.

As one reviewer rightly noted, Charlotte Paul avoids writing "those sticky little happy-in-adversity gems that make you want to choke the writer with his own cheerful words." And Four to Grow, which forecasts the eventual sale of the printing company, makes clear the marital strain of running the business. Indeed, soon after its sale, Charlotte and Ed divorced. Ed Groshell went on to write for the Seattle Post-Intelligencer for many years and died in 1996. Charlotte Paul, who remarried, published four more novels for a total of nine. Today the University of Washington English Department annually bestows the Charlotte Paul Reese Award to a worthy undergraduate writer. In 1969 Paul and her new husband moved to Lopez Island, where she lived until her death in 1989.

Women memoirists hold a prominent place in the annals of Washington literature, from Emily Inez Denny (Blazing the Way, 1909) and Roberta Frye Watt (Four Wagons West, 1916) to June Bums (Living High, 1941) and Betty MacDonald (The Egg and I, 1945). With Minding Our Own Business and And Four to Grow, Charlotte Paul made a valuable contribution to this standing—and put Snoqualmie Valley on the literary map.

Additional Reading
Interested in learning more about the topics covered in this issue? The sources listed here will get you started.

Illustrating Lewis and Clark


John Ford Clymer

The Brown Castle
History of Tacoma School District No. 10, 1869-1940. Tacoma Public Schools, District No. 10, 1941.

Crisis and Christmas Seals

Revolution on a Dare
Mapping Identity examines the 19th-century contact history of the Schitsu'umsh people of northern Idaho. Known more popularly as Coeur d'Alene, this indigenous group occupied various landscapes throughout the Inland Northwest before European contact. Subsistence activities carried them across prairies and forests, but the precontact Schitsu'umsh were not the same as the Coeur d'Alenes of today. Indeed, the author argues that contact and interaction with Eurasians ultimately defined what came to be known as the Coeur d'Alene tribe.

Woodworth-Ney traces the emergence of the modern-day Coeur d'Alene tribe and reservation through the mental maps that Europeans and Americans constructed when they came to the Northwest during the 19th century. Lewis and Clark, Catholic missionaries, territorial officials, military figures, and Indian Affairs employees all contributed to the process of defining the Schitsu'umsh based on their limited understanding of native peoples. During the latter half of the 19th century miners, ranchers, homesteaders, and boosters also constructed ideas of the Inland Northwest, often disregarding the presence of Native Americans in the region.

The Schitsu'umsh did not passively accept the constructs imposed on them. Mapping Identity successfully demonstrates the reverse use of these mental maps by the Coeur d'Alenes themselves. Schitsu'umsh leaders, especially Andrew Seltice, adopted and adapted such definitions and boundaries for their own defense and use. Seltice, for example, viewed reservation boundaries as a demarcation of Coeur d'Alene territory rather than as a reservation proper. As such, the purpose of clearly defined borders was to keep white people out rather than Indians in. That the Coeur d'Alenes have a reservation at all is due to their own insistence; Isaac Stevens neglected to negotiate a treaty with them as territorial governor, despite promises to do so. His failure effectively left the Schitsu'umsh disappointed and officially unrecognized by the United States government.

It took 30 years, an executive order, and two full-scale negotiations before the reservation boundaries became fixed in 1889. Mapping Identity portrays the Coeur d'Alene tribe as a group determined to define its own future. Despite internal divisions, and aided at times by Catholic missionaries, the Coeur d'Alene people negotiated favorable agreements. They distinguished between improved and unimproved land, asking for increased compensation for improved land. They also sometimes engineered events to their advantage. They reminded the government, for example, that during the Nez Perce War of 1877 the Coeur d'Alenes remained friendly and loyal to the whites. Coeur d'Alenes are not portrayed in this book as a monolithic group. The author carefully characterizes differences of opinion and action among them. Unsurprisingly, questions of Christianization and assimilation created fault lines.

The research in Mapping Identity is thorough and extensive; footnotes are meticulous. One of the great strengths of the book is the placement of events in historic context. The author provides a solid analysis of interactions between Coeur d'Alenes and newcomers during the 19th century. Numerous non-Indians helped shape Schitsu'umsh history, but not without direction and guidance from the Coeur d'Alenes themselves.

Elizabeth James is a professor at the University of Alaska Anchorage. She previously taught at North Idaho College in Coeur d'Alene.

Domesticating the West
The Reconstruction of the 19th-Century American Middle Class
Reviewed by Michael J. Peifer.

Seeking to illuminate the role of middle class migrants to the American West in the late 19th century, Brenda K. Jackson takes as her subjects two Inland Empire town builders, Thomas and Elizabeth Tannatt. Born in the 1830s in New York and Massachusetts, respectively, Thomas and Elizabeth married in 1860. Thomas served as an army officer in Dakota Territory and, during the Civil War, in the Union Army. Following brief postwar sojourns on the Colorado gold-mining frontier and elsewhere, Thomas secured employment in 1877 with Henry Villard who owned railroad interests in Oregon. Thomas acted as an immigration agent for Villard in the Northeast and Midwest, successfully promoting the Pacific Northwest as a destination, especially among German Russians who migrated from Kansas to the Palouse in the early 1880s.

In 1881 the Tannatts established an orchard and store in Walla Walla, where Thomas served as mayor from 1883 to 1884. From 1893 to 1899 he served on the board of regents for the newly-established Washington Agricultural College and School of Science in Pullman. Meanwhile, Elizabeth labored in Palouse benevolent and patriotic organizations such as the Women's Christian Temperance Union and the Daughters of the American Revolution. The Tannatts spent their last years in Spokane.

Domesticating the West will be of substantial interest to readers focused on the history of community formation in the Palouse. Jackson diligently mines archival sources to construct a solid portrayal of eastern Washington community leaders in the late 19th century. She effectively analyzes the role of Thomas's identity as a civil war veteran, the relationship between Thomas's economic interests and town growth, and Elizabeth's participation in middle class women's benevolent organizations. Several aspects of the book are less developed. Jackson has found only limited information regarding the
Tannatts' income and wealth. More systematic attention to the Tannatts' economic standing and social status at various points in their lives would help readers better understand their middle class status and how they reconstructed it in the West. For example, fuller attention to the social strata the Tannatts encountered in Walla Walla in the 1880s would help us to understand how they may have navigated social structure and deployed understandings of class and race. For example, we learn of Elizabeth's negotiation with and occasional dissatisfaction with Chinese men serving as domestics, but little about what these interactions might tell us about Elizabeth's understanding of class or race. Regardless, the book helps to fill out our picture of middle class formation in the Pacific Northwest and will be read avidly by those interested in the history of the Inland Empire.

Social historian Michael J. Pfeifer is a professor at University of Western Ontario, London, Ontario. He taught at The Evergreen State College from 2002 to 2006.

Seattle's Women Teachers of the Interwar Years
Shapers of a Livable City

Class Wars
The Story of the Washington Education Association, 1965-2001
By Steve Kink and John Cahill. Washington Education Association, 2005; distributed by University of Washington Press; 224 pp., $19.95 paper.
Reviewed by Rita G. Seedorf.

Each of these books presents a unique view of teaching. In the first, Seattle's Women Teachers of the Interwar Years, independent scholar Doris Pieroth creates a verbal portrait of female teachers of the 1920s and 1930s. While focusing on the city of Seattle, she provides an outline of the rise of women in the teaching profession. The second book, written by insiders Steve Kink and John Cahill and cleverly named Class Wars, tells the story of the strategies, battles, defeats, and victories of the state's foremost teacher's union. Together the two works trace the growth and development of the teaching profession as it adjusted to societal demands, population growth, and events of the 20th century.

Pieroth, herself a product of Seattle's elementary school system, shows how the careers of Seattle women were similar to and different from, the national pattern. Many had been drawn to the district during the superintendency of Frank Cooper, a progressive "teacher's superintendent." Experienced teachers streamed in from the Midwest, East Coast, and Pacific Northwest. They flooded into Seattle for its higher salaries, natural beauty, and recreational and cultural opportunities. Sometimes they came to be near relatives or to broaden their marriage prospects. These women, attracted to the place that elected the first female mayor of any major United States city, found some of their dreams realized and others dashed. Those who succeeded in finding a husband were forced to resign when they married. Women were paid 75 percent of the salary earned by their male counterparts, though the Seattle School Board had considered a proposal for equal pay for women as early as 1916.

In this work Pieroth models how to write serious history on a nontraditional topic. Her sources reach beyond published books, newspapers, and magazines to unpublished written work, archival and manuscript collections, and personal interviews. Her use of individual case studies brings the book alive.

Class Wars tells the story of the growth of the union movement in the second half of the 20th century. The book is written in a galloping style that encourages the reader to continue reading through numerous stories with clearly defined heroes and villains: in this case, the union and the administration.

It begins in 1965 with the passage of the Professional Negotiations Act, which caused the old WEA, a professional organization dominated by school administrators, to give way to the new teachers' union that would make great strides in the 1970s, face serious setbacks in the 1980s, and find its focus in the 1990s. Or, to put it another way, it changed the WEA "from a 'tea and crumpets' organization into the state's largest and most powerful public employee labor union."

However, by the end of the 1960s administrators had learned how to use the act to their advantage and new, more powerful legislation was needed. Also, by the end of the 1960s teachers had experienced the adversarial aspect of negotiations and the need for protection, causing them to reject the Professional Practices Act, which would have met one of the requirements of a true profession—the responsibility of setting and enforcing their own standards.

Kink and Cahill vividly describe the victories and defeats that follow. They bring to life the power of the strike and passage of the 1976 Educational Employment Act, which gave teachers the right to collectively bargain with their school districts. They also chronicle the passage of HB 166 in 1981, which placed caps on teacher salaries and caused Washington's teacher salaries to plummet from fifth in the nation in 1982 to dead last in 1985.

The book is pleasantly designed, with two banks of photographs that show the main actors at work in high-fashion period clothing. The narrative is spiked with quotes that give the reader a clear vision of the attitudes that powered the growth of the union—for example, the school board member in Royal City who said he figured that teachers should be paid about what he paid his farm hands. Helpful appendices include the WEA chronology of events and copies of significant documents. Kink and Cahill were players in the drama they describe and their point of view comes through clearly, but the book is a good read, especially for those involved in public education.

Rita Seedorf is emeritus professor of education at Eastern Washington University. She is a past director of the Cheney Normal School Heritage Center.

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