

1-1-2017

The Manhattan Project at Oak Ridge: Photographs of Ed Westcott, 1942-46

Teresa S. Welsh
University of Southern Mississippi, teresa.welsh@usm.edu

Follow this and additional works at: https://aquila.usm.edu/fac_pubs



Part of the [Educational Assessment, Evaluation, and Research Commons](#)

Recommended Citation

Welsh, T. S. (2017). The Manhattan Project at Oak Ridge: Photographs of Ed Westcott, 1942-46. *Qualitative and Quantitative Methods in Libraries*, 6, 19-46.
Available at: https://aquila.usm.edu/fac_pubs/16670

This Article is brought to you for free and open access by The Aquila Digital Community. It has been accepted for inclusion in Faculty Publications by an authorized administrator of The Aquila Digital Community. For more information, please contact Joshua.Cromwell@usm.edu.

The Manhattan Project at Oak Ridge: Photographs of Ed Westcott, 1942-46

Teresa S. Welsh, Ph.D.*

* Professor and Director, School of Library and Information Science,
The University of Southern Mississippi

Abstract: The photographs of Ed Westcott, a civilian hired to document the Manhattan Project at Oak Ridge, Tennessee, are a valuable educational resource for school children as well as scholars. During the war years, Westcott was the official government documentarian of the construction and operation of Oak Ridge as well as photojournalist for the local newspaper. His photographs, which are a cultural and historical record of that unique time and place, have been published in numerous books on the history of the Manhattan Project. This study is based on historical documentation as well as a lecture by and interviews with Westcott.

Keywords: WWII, Manhattan Project, Ed Westcott, historical photographs, atomic bomb.

1. Introduction

The photographs of Ed Westcott during the WWII era are in the public domain and are a valuable educational resource for schools and other organizations to use for instruction on the Manhattan Project and the history of the development of the first atomic weapons. This study is important in that it can provide context and history to the photographs.

1.1 Background

In the summer of 1932, two sixteen-year old boys set out from Nashville, Tennessee, on a hitchhiking trek to the Smoky Mountains with only a sack of canned goods for provisions. They found a ride to Crossville, Tennessee, and approached the local sheriff about sleeping in a jail cell. The sheriff told them the jail was too dirty for them, but they could sleep in his office. In return, one of the boys took a picture of the sheriff with his deputies that he later mailed to



him. Ten years later, James Edward (Ed) Westcott, now employed as an Army Corps of Engineers photographer for the Nashville District, was sent to Crossville to locate and photograph one of several proposed sites for an Italian officer prisoner-of-war camp. Westcott went to the local sheriff to ask for directions and noticed that the photo that he had taken as a boy was hanging in a prominent place behind the sheriff's desk. After identifying himself as the photographer, Westcott was given a personal escort to the site by the sheriff. The site, which he had documented with his camera some years earlier, was chosen as the site for the prison camp. In the fall of 1942, the Corps of Engineers Ohio River Division was closing its Nashville District office and Westcott was offered a choice of two jobs: one in Alaska and the other near Knoxville, Tennessee. He chose Knoxville, and was given directions to the site of Oak Ridge and a government car to deliver (Westcott, 1998).

Purpose of Study

The purpose of this qualitative study is to document the context and history of the WWII Era photographs of Ed Westcott related to the Manhattan Project.

1.2 Research Questions

R1. What is the context and history of the official government photographs of Ed Westcott related to the Manhattan Project?

R2. What is the context and history of the WWII-Era social and cultural photographs of Ed Westcott?

R3. What type of equipment did Westcott use to create the photographs related to the Manhattan Project?

1.3 Limitations and Assumptions

This study is limited to information obtained from primary and secondary resources as well as a series of lectures and interviews by and with Ed Westcott from 1999 – 2002.

2. Literature Review

The Manhattan Project

When it went off, in the New Mexico dawn, that first atomic bomb, we thought of Alfred Nobel, and his hope, his vain hope, that dynamite would put an end to wars. We thought of the legend of Prometheus, of that deep sense of guilt in man's new powers that reflects his recognition of evil, and his long knowledge of it. We knew that it was a new world, but even more, we knew that novelty was itself a very old thing in human life, that all our ways are rooted in it.... It did not take atomic weapons to make man want peace, a peace that would last. But the atomic bomb was the turn of the screw. It has made the prospect of future war unendurable. It has led

us up those last few steps to the mountain pass; and beyond there is a different country. J. Robert Oppenheimer (1946)

Oak Ridge, Tennessee, as part of the secret Manhattan Project, produced nuclear material (uranium-235) used in the first atomic bomb, 'Little Boy' dropped on Hiroshima, Japan, on 6 August 1945. The beginnings of the Manhattan Project can be traced to a letter from Albert Einstein to President Roosevelt, informing him that German scientists were coming close to achieving a nuclear chain reaction which could generate 'vast amounts of power' and 'lead to the construction of ... extremely powerful bombs of a new type' (Einstein, 1939). Einstein was concerned that Nazi Germany was pursuing atomic weapons research and requested that President Roosevelt fund American research into this powerful new type of energy.

President Roosevelt approved funding for atomic research in October 1939, and authorized the formation of the Advisory Committee on Uranium. In August 1942, a weapons development program was approved, and Manhattan Engineer District (MED) was established to carry out the project. In September 1942, General Leslie Groves was appointed to head the Manhattan Project and given two objectives, 'to provide our armed forces with a weapon that could end the war and to do it before our enemies could use it against us' (Groves, 1963).

Gen. Groves set out immediately to survey the sites that his staff had recommended for the project: Los Alamos, New Mexico, site of a former private boys' school, where a group of scientists headed by J. Robert Oppenheimer was assigned to develop and construct the atomic weapons; Hanford, Washington, almost half a million acres, where a plutonium processing facility was to be built; and Oak Ridge, Tennessee, where an enormous complex, the Clinton Engineer Works (CEW), was to be constructed on 54,000 acres. Gen. Groves called Oak Ridge 'the heart of our effort to produce material for a fission bomb' (Groves, 1963). He located the uranium separation plants within the CEW complex: Y-12 electromagnetic plant, K-25 gaseous diffusion plant, and S-50 thermal diffusion plant. A graphite reactor and radiochemical plant were built as research prototypes at the X-10 site.

Publications That Feature Westcott Photographs

Many books and articles about the history of Oak Ridge have been illustrated with photographs of Ed Westcott. Some of the publications credited Westcott as the photographer but many did not. *The Oak Ridge Journal*, the only newspaper published at Clinton Engineer Works (later Oak Ridge National Laboratory) during 1942-46, credited Westcott as the staff photographer, but not for individual photographs. *The Oak Ridge Story: The Saga of a People Who Share in History* (Robinson, 1950) used many Westcott photos, some credited to him (including the cover photo) and some listed as Manhattan District photo or AEC (Atomic Energy Commission) photo. Robinson, who was Public Relations

Officer for the Manhattan Project, included a paragraph of text about Westcott's photography.

Dear Margaret: Letters from Oak Ridge to Margaret Mead (Present, 1985) is a collection of correspondence between the author, who lived in Oak Ridge during the 1940s, and her friend, anthropologist Margaret Mead, interwoven with interviews of other early Oak Ridgers and illustrated with credited Westcott photographs of housing and social conditions. *These Are Our Voices: The Story of Oak Ridge 1942-70* (Overholt, 1987) is a collection of historical essays published by the Children's Museum of Oak Ridge. The 550-page book contains many Westcott-credited photographs.

The special fiftieth anniversary 1992 issue of the *Oak Ridge National Laboratory Review* (Krause) credits the cover photo, the famous WAR ENDS image (Figure 1), to Westcott, but does not credit him with the other numerous photos within the text. Three notable monographs that feature his uncredited photographs are *Now It Can Be Told: The Story of the Manhattan Project* (Groves, 1962), *The First Nuclear Era: The Life and Times of a Technological Fixer* (Weinberg, 1994), *The Making of the Atomic Bomb* (Rhodes, 1986), *Oak Ridge National Laboratory: First Fifty Years* (Johnson & Schaffer, 1994), and *City Behind a Fence: Oak Ridge, Tennessee 1942-1946* (Johnson & Jackson, 1981). The latter's cover image of girl scouts walking near the X-10 nuclear reactor was taken post-WWII, in 1951 (Figure 2). According to Westcott (1998), girl scouts would never have been allowed this close to the graphite reactor during the war years.



Figure 1. WAR ENDS (Westcott, 1945)



Figure 2. Girl Scouts near Reactor, Oak Ridge (Westcott, 1951)

Picturing the Bomb: Photographs from the Secret World of the Manhattan Project (Fermi, Rhodes, & Samra, 1995) includes forty-three Westcott photographs, a Westcott cover photo, and some biographical text. Fermi interviewed Westcott for the book, which contains photographs of all three Manhattan District sites, as well as Tinnian Island (air base for the Enola Gay), the Enola Gay and crew, and shots of the Hiroshima and Nagasaki explosions and aftermath.

Atomic Spaces: Living on the Manhattan Project (Hales, 1997) contains several credited Westcott photographs, and mentions Westcott as the creator of the famous WAR ENDS photograph (Figure 1). Two recent monographs, *The Girls of Atomic City* (Kiernan, 2013) and *Longing for the Bomb: Oak Ridge and Atomic Nostalgia* (Freeman, 2015) feature Westcott in the text and cite him as official photographer for Clinton Engineer Works and *The Oak Ridge Journal*. Both include credited and annotated Westcott photographs.

In 1981, Westcott published *Oak Ridge Seen 1943-1947: 20 Photographs* for the Children's Museum of Oak Ridge. In 2005, he published *Images of America: Oak Ridge* and was a major contributor to an exhibit catalog, *Through the Lens of Ed Westcott: A Photographic History of World War II's Secret City* (Westcott, Yates, Lee, Freeny, & Westcott, 2005).

3. Methodology

This qualitative study was based on historic publications, images, a lecture and series of interviews with Ed Westcott in 1998 – 2000. Lecture and interview notes were triangulated or cross-checked with primary sources, including Mr. Westcott himself, who reviewed the notes and suggested some revisions and additions, which were incorporated into the notes to ensure accuracy and increase validity of the study. The notes were analyzed and coded using NVIVO software to address each question.

4. Results

R1. What is the context and history of the official government photographs of Ed Westcott related to the Manhattan Project?

Facilities

In his official role of Army Corps of Engineers photographer, Westcott's primary duty was to document the construction of the CEW facilities. Each structure was photographed and the negatives numbered. Photo number, date, and description were entered in a logbook and on file cards indexed and cross-indexed by subject. The original logbook and subject index cards were preserved by Ms. Anna Cononer at the Department of Energy Photography Office, Oak Ridge (Westcott, 1999).

When the Manhattan Engineer District was established on 13 August 1942, a time limit of three years was set for atomic weapon development. Construction of the three MED sites at Los Alamos, Hanford, and Oak Ridge cost \$12 billion and was roughly the equivalent of building a Panama Canal each year for three years. The facility at Oak Ridge cost about \$2 billion and employed 85,000 people at its peak in 1945, 75,000 of whom were residents (Robinson, 1950).

When Westcott arrived in Oak Ridge in the fall of 1942, construction workers were clearing the ground and railroad tracks were being laid (Figure 3). The railroad tracks and roads were constructed first so that construction supplies could be brought in. Construction materials for Clinton Engineer Works and Oak Ridge included: over 200 million board feet of lumber; about 900,000 cubic yards of concrete; over 50,000 tons of structural steel; and 50,000 tons of miscellaneous iron and steel (US Engineering Dept., 1946).

The first building to be erected, the Manhattan Engineer District administration building, began construction on 22 November 1942. Construction of three main plant sites began soon after, along with worker housing, recreation facilities, utilities, schools, a hospital, and stores. Control over entry into the area was established 1 April 1943, when armed guards were placed at checkpoint gates into the area and fencing was put up around the perimeter (Figure 4) (Gosling, 1990; Robinson, 1950).



Figure 3. Cabin with Construction in Background (Westcott, 1942)



Figure 4. Perimeter Security Gate, Oak Ridge (Westcott, 1942)

Westcott was required to photograph exterior shots of every building at the CEW plant sites and interior shots of equipment and workers (Figure 5) unless the equipment was deemed too sensitive by Army Intelligence. One interesting shot depicts a group of young women operating the control panels in the Y-12 electromagnetic plant (Figure 6). These young women were trained to do a very specific job, without knowing they were producing uranium-235.

As General Groves recounted, ‘Compartmentalization of knowledge, to me, was the very heart of security’ (1963, 140). Even the scientists and the few people who knew what was being produced never said the words *atomic* or *nuclear* or *uranium*. Instead they spoke of the ‘product’ from Oak Ridge that would be used in the ‘gadget’ (code for A-bomb).

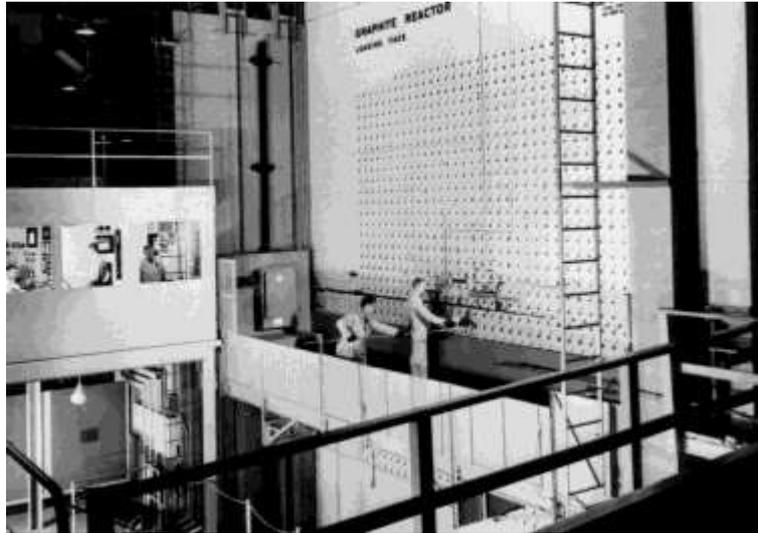


Figure 5. Interior of Graphite Reactor (Westcott, 1944)



Figure 6. Women Workers at Y-12 (Westcott, 1943)

Since everything on the Oak Ridge site belonged to the army, even the worker housing, Westcott also documented the housing and living conditions. Housing ranged from large dormitories for single men, single women, and married couples to pre-fabricated houses and duplexes for families (Figure 7), and barracks for the military. On the low end of the spectrum were trailers, crude wooden hutments, and tents (Figure 8).

Many Westcott photographs of housing and living conditions at Oak Ridge were used to illustrate the book *Dear Margaret: Letters from Oak Ridge* (Present, 1980) and a few were used in the book *Atomic Spaces* (Hales, 1997).



Figure 7. Aerial View of Prefab Houses (Westcott, 1944)



Figure 8. Hutment Interior (Westcott, c. 1943)

Officials

The VIP's and high-ranking officials who visited Oak Ridge during the war years stayed in the Oak Ridge Guest House. An image of one visitor, Dr. Oppenheimer, taken at the Oak Ridge Guest House is a particularly fine portrait (Figure 9) and Westcott tells the story that before he could take the picture, he had to help chain-smoker 'Oppie' make change to purchase some cigarettes.



**Figure 9. Dr. Oppenheimer, Oak Ridge Guest House
(Westcott, c. 1942)**

General Groves, the head of the Manhattan Project, was photographed by Westcott many times at Oak Ridge, such as the image of him addressing a group of Women's Army Corps (WAC) (Figure 10).



Figure 10. General Groves Addressing WACs (Westcott, c. 1943)

One of the most famous Westcott photograph of Groves is the July 1945 shot of General Groves looking at the map of Japan (Figure 11). Westcott was summoned to the Washington, D.C. office of General Groves for a series of photographs. In an interview in *Popular Photography*, he recounted, 'I arrived in Washington two days after General Groves witnessed the test in New Mexico, and of course I didn't know anything about it.

I waited eight hours in an outer office before I could go in and photograph him. He had made several quick ins and outs of the office, and I later learned he was making special reports to the Secretary of War...' (Ogden, 1946). After Westcott was finally called into the office, 'There were all sorts of phone calls and secret conversations. After the official news was released later, I was told that he had been talking to Dr. Oppenheimer and was making arrangements to deliver the atomic bomb to the air forces and have it dropped on Japan. There I was in the room where history was being made and didn't know it' (Westcott, 1999).

To set up the shot, General Groves was asked to stand by his wall map and look at Tokyo. The general replied that he would not look at Tokyo, but at someplace nearby. Only later, did Westcott realize that the general was referring to Hiroshima. This photograph (Figure 11) became famous because it was released as part of the public information packet that announced the dropping of the bombs on Japan on 6 and 9 August 1945. While others describe the General as gruff and inspiring fear in subordinates, Westcott describes him as courteous and recalls, 'People were afraid of him, but he was nice to me'.



Figure 11. General Groves, Washington, D.C. Office (Westcott, 1945)

Official Events

In addition to photographing construction and facilities at Oak Ridge, Westcott was subject to being called by any officer who wanted his project photographed. Many times, he was called to Oak Ridge Hospital to photograph an interesting or unusual surgical procedure or autopsy (Westcott, 1998).

Every photograph that was published had to be cleared by Army Intelligence such as the one taken at a war rally for the workers at K-25 (Figure 12). The scene was shot with the speaker, Sgt. Mike Miller, a wounded soldier back from Germany, in the foreground and beyond, the attentive faces of the workers. The right side of this picture, which showed the K-12 gaseous diffusion plant, was cut away by Army Intelligence before publication.



Figure 12. War Bond Rally, K-25 Plant (Westcott, c. 1944)

Another of his official photographic duties included developing prints from the classified negatives of other photographers, and in this capacity, he was the first person to view the classified military photographs of the destruction of Hiroshima and Nagasaki after the atomic bombs were dropped. When asked if he was shocked by the photos, and he replied, ‘Yes, of course ... the destruction was terrible’ (1999).

R2. What is the context and history of the WWII-Era social and cultural photographs of Ed Westcott?

According to an article in *Popular Photography* (Ogden, 1946), the *Oak Ridge Journal* featured Westcott (Figure 13) in its column ‘You’re in the News: Meet Ed Westcott’:

People who have dialed the number 5-4127 at odd times in the past have been rather startled to hear the telephone answered by ‘Abie’s Delicatessen’... ‘Slaughterhouse’ or ‘Krubisch Hardware’. The number is that of Ed Westcott, photographer, who makes pictures for the *Oak Ridge Journal*, and the voice, in a variety of accents, belongs to Ed himself. Ed gets so many calls from people who want pictures that it may be that he had adopted this form of answering the telephone as a matter of self-protection. On the other hand, he may be exercising his sense of humor. Only Westcott knows, and he won’t tell. One of the great things about ‘The Shoulder’ as he is known, is his ability to keep his face perfectly straight and sober at all times. (Ogden, 1946, 160)



Figure 13. Ed Westcott, Oak Ridge Photo Lab (Westcott, 1945)

Civilian Facilities

Oak Ridge, called the ‘city behind the fence’ since it held many civilians and their families who worked at the plants, included all the amenities of a small town including a church that was shared by all the denominations, an elementary school, a high school (Figure 14), a public library and bookmobile (Figure 15).

Since Westcott was the only photographer in Oak Ridge during the war years, he took photos of weddings and other social events and used a badge camera to take photos of high school seniors for the yearbook.



Figure 14. High School Library, Oak Ridge (Westcott, c. 1944)



Figure 15. Public Library Bookmobile (Westcott, c. 1944)

Westcott's photographs of long lines at the grocery and of cars stuck in the mud are evidence of the frontier conditions that existed in the early years (Figure 16).

As the first town manager, Capt. P.E. O'Meara wrote to the residents in the *Oak Ridge Journal*, 25 September 1943,

Yes, we know it's muddy.... You think prices are too high in the grocery store.... Coal has not been delivered.... It takes six days to get your laundry.... The grocer runs out of milk and butter.... The post office is too small.... There are not enough bowling alleys... Your house leaks.... Everyone is not courteous.... It takes too long to get your passes ... The telephones are always busy.... You can't get all the meat you want.... Your house isn't ready.... There's confusion in the cafeteria.... The dance hall is crowded There's no soda fountain.... The guest house is full.... Employees are inexperienced.... You don't like the way things are run.... Things were different 'back home'.... You could do better.... You would have planned it differently. (Robinson, 1950, 54-55)



Figure 16. Trailer with Wooden Steps to Avoid Mud
(Westcott, 1943)

Population

The population of Oak Ridge was primarily young adults, as documented by high birth rates and low death rates. From 1942 to 1946, there were 2,740 children born in Oak Ridge Hospital and only 241 deaths. As the Westcott photographs document, while construction workers were men, most of the workers in the plants were young women (Figure 17), many just out of school (U.S. Engineering Dept., 1946).



Figure 17. Workers Leaving Y-12 Plant (Westcott, 1944)

Segregation

Westcott's images document the segregation that existed in the 1940's – separate housing (Figure 18), schools, social events (Figure 19), even workers' outhouses (Figure 20).



Figure 18. Housing for 'Colored' Family, 'White' Family (Westcott, 1940s)



Figure 19. ‘Colored’ Teen Dance, ‘White’ Teen Dance (Westcott, 1940s)



Figure 20. Separate Outhouses (Westcott, c. 1944)

Daily Activities, Recreation

In addition to work, Westcott documented the social life at Oak Ridge such as the roller-skating rink and swimming pool (Figure 21). He photographed children at day-care, at a comic book stand (Figure 22), and at Boy Scouts (Figure 23).



Figure 21. Roller-Skating Rink, Swimming Pool (Westcott, c. 1944)



Figure 22. Community House Day-Care, Neighborhood Comic Book Stand (Westcott, c. 1944)



**Figure 23. Boy Scouts with Christmas Seal Posters
(Westcott, c. 1944)**

Security

Despite the scenes of normal activities, residents were constantly reminded of the high security at Oak Ridge and were required to wear an ID badge from the age of 12 (Westcott, 1998) (Figure 24). The perimeter of Oak Ridge was ringed with high wire fencing and patrolled by guards (Figure 25).



Figure 24. 12-Year Old Boy with First ID Badge (Westcott, c. 1943)



Figure 25. Security Fence and Guard Patrols (Westcott, c. 1943)

The tight security and patriotism of that era were evidenced by the billboard slogans that appear in many Westcott photos, such as ‘Whose Son Will Die in the Last Minute of the War? Minutes Count!’ (Figure 26), ‘If You Believe in Freedom, Work for It’, ‘What You See Here, What You Do Here, What You Hear Here, When You Leave Here, Let It Stay Here’, ‘Loose Talk Helps our Enemy’, and ‘Hold Your Tongue, the Job’s Not Done: Silence Still Means Security’. *The Oak Ridge Journal*’s by-line read ‘NOT TO BE TAKEN OR MAILED FROM THE AREA’ and as mentioned earlier, every Westcott photograph to be published had to be approved (and sometimes censored) by Army Intelligence (Westcott, 1999).



Figure 26. Oak Ridge Billboard (Westcott, c. 1944)

R3. What type of equipment did Westcott use to create the photographs related to the Manhattan Project?

The only equipment that the Army Corps of Engineers furnished Westcott when he first arrived at Oak Ridge was an Argus C3 35mm camera (cost of about \$69) that had been used by an engineer. Later he had a 4x5 Speed Graphic and an 8x10 view camera or field camera. Westcott had much of his darkroom equipment made by the shops on site (Figure 13). Sinks for the chemical processing trays were made of wood, with one lead-lined to be waterproof. He also had wooden racks made to hold the processing trays up from the bottom of the sinks to keep the chemicals at the right temperature (Westcott, 1999).

Aerial shots were taken at intervals from a small Piper Cub or a larger C-47 to get an overview of the various stages of facilities’ construction (Figures 7 & 27). The right door of the plane would be removed, and Westcott would hang out to take the photographs with only a climber’s belt around the waist to secure him. The early aerial shots were taken with the Argus C3. Later, Westcott

designed and had made a 'wind hood' by the CEW metal-workers to fit the Speed Graphic camera for aerials. It was crafted of sixteenth-inch sheet metal with holes at the top and sides to attach to the camera with bolts and wing nuts. A heavier strip of metal was used in bracing the lower part of the hood under the camera. The hood was painted black, and proved to be a good sunshade as well as protection from the wind (Westcott, 1999).



Figure 27. Aerial Photo of X-10 Graphite Reactor (Westcott, 1943)

(Note: Westcott noted that you can tell Graphite Reactor images were taken during WWI if roof is painted black for security blackout at night)

The photographers at ORNL, Curtis Boles and Jim Richmond (2002), when asked about Westcott, talked about his wonderful technique and the sharpness of both foreground and background detail in his black and white prints. Westcott, when asked about this, explained that by using the view camera, which has flexibility in the angles of the film cartridge, he could focus sharply on both the foreground and background (Westcott, 1998).

5. Conclusion: Historical Importance of Work

Westcott's favorite photographs are also his most famous ones. A series of photos known as the WAR ENDS shots were taken by chance on the evening of 14 August 1945, V-J (Victory in Japan) Day. Westcott heard a commotion at Townsite town square and rushed there with his camera. A crowd of Oak Ridge residents had just heard that the war was over and that they had played a significant role in ending it. Westcott jumped into the back of a pickup truck and took photos of the crowd around him (Figures 1 & 28). These pictures, which were published world-wide, captured the joy, pride, and disbelief of the people, some of whom were holding up the newspaper headline, 'WAR ENDS'.

Westcott took another widely-published and historical shot later that evening when he returned home. He gathered as many newspapers as he could find, arranged them on his living room floor, and photographed them as a montage of V-J Day headlines (Figure 29).



Figure 28. WAR ENDS (Westcott, 1945)

Rachel Fermi, granddaughter of Enrico Fermi, wrote that the Manhattan Project photographers 'used the camera, which is a means of making something public, to document secret activities within a private world. In many respects, that world has a veneer which looks and feels familiar to us, yet we know now, looking in from the outside, that the familiarity is deceptive' (Fermi, Rhodes, & Samra, 1995, 199).



Figure 30. Ed Westcott, Westcott Exhibit,
Oak Ridge Museum of Science & Energy (Young, 2012)

In each of his roles, Westcott captured many memorable and poignant images. As Selma Shapiro, Director of the Children’s Museum of Oak Ridge, stated in a 1998 interview, Westcott’s photographs are not only historically significant, they are true works of art and a wonderful educational resource.

(Note: Ed still lives in Oak Ridge and celebrated his 95th birthday on 11 January 2017).

References

- Boles, C. & Richmond, J. (2002). Personal communication.
- Fermi, R., Rhodes, R. & Samra, E. (1995). *Picturing the Bomb: Photographs from the Secret World of the Manhattan Project*. New York: H.N. Abrams.
- Freeman, L. (2015). *Longing for the Bomb: Oak Ridge and Atomic Nostalgia*. Chapel Hill: University of North Carolina Press.
- Gosling, F.G. (1990). *The Manhattan Project: Science in the Second World War*. Washington D.C.: US Department of Energy.
- Groves, L. (1963). *Now it Can be Told: The Story of the Manhattan Project*. London: A. Deutsch.
- Hales, P. (1997). *Atomic Spaces: Living on the Manhattan Project*. Urbana: University of Illinois Press.
- Johnson, C.W. & Jackson, C.O. (1981). *City Behind a Fence: Oak Ridge, Tennessee, 1942-1946*. Knoxville (Tenn.): University of Tennessee Press.
- Johnson, L. & Schaffer, D. (1994). *Oak Ridge National Laboratory: First Fifty Years*. Knoxville (Tenn.): University of Tennessee Press.

Kelly, C. (2007). *The Manhattan Project: The Birth of the Atomic Bomb in the Words of its Creators, Eyewitnesses, and Historians*. New York: Black Dog & Leventhal.

Kiernan, D. (2013). *The Girls of Atomic City: The Secret History of the Women Who Built WWII's Most Powerful Weapon*. New York: Simon & Schuster.

Krause, C., ed. (1992). *Oak Ridge National Laboratory Review*. Oak Ridge National Lab, Oak Ridge, TN.

Oppenheimer, J.R. (1946). The atom bomb and college education, from a speech at the University of Pennsylvania, February 1946. Reprinted in *The General Magazine and Historical Chronicle* 48 (Summer 1946), 262-265.

Overholt, J. (1987). *These are Our Voices: The Story of Oak Ridge, 1942-1970*. Oak Ridge, Tenn.: Children's Museum of Oak Ridge.

Present, T. (1985). *Dear Margaret: Letters from Oak Ridge to Margaret Mead*. Knoxville, Tenn.: East Tennessee Historical Society.

Rhodes, R. (1986). *The Making of the Atomic Bomb*. New York: Simon & Schuster.

Robinson, G. (1950). *The Oak Ridge Story; The Saga of a People Who Share in History*. Kingsport, Tenn.: Southern.

Shapiro, S. (1998). Personal interview, Oak Ridge, Tennessee, 19 June 1998.

U.S. Engineering Department. (1946). *For Your Information: A Guide to Oak Ridge*. Oak Ridge, Tenn.: U.S. Department of Engineering (Figure ...).

Weinberg, A. (1994). *The First Nuclear Era: The Life and Times of a Technological Fixer*. New York: AIP Press.

Westcott, J.E. (1998). Guest lecture, Oak Ridge Institute for Continuing Education, Oak Ridge, Tenn., July 15, 1998.

Westcott, E. (2005). *Oak Ridge (Images of America)*. Charleston SC: Arcadia Pub.

Westcott, E. (1981). *Oak Ridge Seen 1943-1947: 20 Photographs*. Oak Ridge, Tenn.: Children's Museum of Oak Ridge.

Westcott, J.E. (1998). Personal interviews, Oak Ridge, Tennessee, 19 June 1998, 31 July 1998, 12 February 1999.

Westcott, J.E., Yates, S, Lee, B. Freeny, L., Westcott, E. (2005). *Through the Lens of Ed Westcott: A Photographic History of WWII's Secret City*. Knoxville, Tenn.: University of Tennessee.

Westcott, J.E. (2000). *Y-12 Oak Ridge Plant* [motion picture on DVD]. Oak Ridge, Tenn.: B&W Y-12 Video and Motion Picture Services.

Young, S. (photographer), Munger, F. (author). (2012). Ed Westcott, famed Oak Ridge photographer, turns 90, *Knoxville News-Sentinel*, January 31, 2012. Retrieved from <http://archive.knoxnews.com/news/local/ed-westcott-famed-oak-ridge-photographer-turns-90-ep-361224624-357236041.html>