

THE GIRLS OF ATOMIC CITY

THE UNTOLD STORY OF
THE WOMEN WHO HELPED
WIN WORLD WAR II



DENISE KIERNAN

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DENISE KIERNAN

A TOUCHSTONE BOOK

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There have long been secrets buried deep in the southern Appalachians, covered in layers of shale and coal, lying beneath the ancient hills of the Cumberlands, and lurking in the shadow of the Smokies at the tail end of the mountainous spine that ripples down the East Coast. This land of the Cherokee gave way to treaties and settlers and land grants. Newcomers traversed the Cumberland Gap to establish small farms and big lives in a region where alternating ridges and valleys cradle newborn communities in the nooks and crannies of the earth. Isolated. Independent. Hidden.

In 1942, a new secret came to this part of the world. The earth trembled and shook and made way for an unprecedented alliance of military, industrial, and scientific forces, forces that combined to create the most powerful and controversial weapon known to mankind. This weapon released the power present in the great unseen of the time, unleashing the energy of the basic unit of matter known as the atom.

Author H. G. Wells might have called them Sun Snarers, the people who descended upon the valleys and ridges.

“And we know now that the atom, that once we thought hard and impenetrable, and indivisible and final and—lifeless—lifeless, is really a reservoir of immense energy . . . ,” Wells wrote in his 1914 book, *The World Set Free*. This lesser-known title by the *War of the Worlds* author describes the harnessing of the power of the nucleus: “And these atomic bombs which science burst upon the world that night were strange even to the men who used them.”

Wells wrote this long before the neutron was discovered, let alone fission, and his work began to popularize the phrase “atomic bombs” before those devices ever took form beyond the author’s pages. But years earlier, people in the mountains claim another prophet lay on the ground, overcome with visions of a project that would bring the snaring of the sun to the hills of Tennessee.

They say a prophet foretold it.

A general oversaw it.

And a team of the world’s greatest scientific minds was tasked with making it all come together.

But it was the others, the great and often unseen, who made the visions of the Prophet and the plans of the General and the theories of the scientists a reality. Tens of thousands of individuals—some still reeling from the Depression, others gripped by anxiety and fear as loved ones fought overseas in the most devastating war any of them had known—worked around the clock on the project, the details of which were not explained. For the young adventurers, male and female, who traveled to Oak Ridge, Tennessee, during World War II, doing their part meant living and working in a secret city, a place created from the ground up for one reason and one reason only—to enrich uranium for the world’s first atomic bomb used in combat.

Roots have always run deep here. They were dug up and scattered when the strangers with the project came to the foothills of the Cumberlands, but the newcomers, too, could not resist the

pull of the earth and dug their own roots down deep into the Tennessee clay, soaked by mountain rain and baked by a thousand suns. Permanent. Enduring.

Many of these workers on this secret project hidden in the hills were young women who had left home to fight the war in their own way. They left farms for factories willingly, wrote letters hopefully, waited patiently and worked tirelessly.

A number of these women—and men—still live in Oak Ridge, Tennessee, today. I have had the fascinating and humbling privilege of meeting them, interviewing them, laughing and crying with them and hearing firsthand their tales of life in a secret city while working on a project whose objective was largely kept from them. Over the years they have graciously given me their time and suffered through repeated questions and what must have seemed like insane requests to recall moments from their day-to-day activities roughly 70 years ago. They did so happily and enthusiastically and never, ever with even the slightest bit of bravado. That is not their style. I did not only learn about life on the Manhattan Project. I also found myself taken aback by their sense of adventure and independence, their humility, and their dedication to the preservation of history. I wish I could include each and every one of them in these pages, but I cannot. I hope those who find themselves only in the acknowledgments will accept my thanks in place of more prose. I feel exceptionally lucky to know those who continue to live on, and miss those who have passed since I began working on this book.

Without them, this sun-snaring—this Manhattan Project—would not have achieved its objectives, and because of them a new age was born that would change the world forever.

These are some of their stories.

—Denise Kierna
summer 2010

Principal Cast of Characters

PEOPLE

(THE WOMEN, IN ORDER OF APPEARANCE)

Celia Szapka

A secretary transferred from the Manhattan Project's original offices in New York City, Celia grew up in the coal-mining town of Shenandoah, Pennsylvania.

Toni Peters

A secretary from neighboring Clinton, Tennessee, Toni heard about the Project from its beginnings, when the government seized her aunt and uncle's farm to make way for the secret town.

Jane Greer

A statistician-mathematician from Paris, Tennessee, Jane oversaw a team of young women who crunched numbers around the clock to track the production rates of the Y-12 plant.

Kattie Strickland

A janitorial services worker from Auburn, Alabama, Kattie came to Oak Ridge with her husband to work at K-25.

Virginia Spivey

A chemist from Louisburg, North Carolina, Virginia came to Oak Ridge after graduating from the University of North Carolina. She worked in the chemical department of Y-12 analyzing product.

Colleen Rowan

A leak pipe inspector at the K-25 plant, Colleen left Nashville, Tennessee, for Oak Ridge, along with more than 10 members of her extended family.

Dorothy Jones

A calutron cubicle operator from Hornbeak, Tennessee, Dot was recruited right out of high school.

Helen Hall

A calutron cubicle operator and sports fanatic from Eagleville, Tennessee, Helen was recruited from the small coffee shop and pharmacy where she worked.

Rosemary Maiers

A nurse from Holy Cross, Iowa, Rosemary came to Oak Ridge to help open the very first clinic.

OTHER WOMEN OF NOTE

Vi Warren

A columnist for the *Oak Ridge Journal* and wife of the Project medical chief, Stafford Warren.

Ida Noddack

German geochemist who suggested the possibility of fission years before its discovery.

Lise Meitner

Austrian physicist who escaped Nazi Germany and was part of the team that discovered fission.

Leona Woods

American physicist who worked on the first-ever sustained nuclear reaction.

Mrs. H. K. Ferguson

Representing the H. K. Ferguson Company, principal contractor for the S-50 plant. Her real name shall be revealed. . . .

Joan Hinton

American physicist who worked with Enrico Fermi's team at Los Alamos, New Mexico.

Elizabeth Graves

American physicist who worked on the neutron reflector that surrounded the core of the Gadget.

PEOPLE (THE OTHERS)

The General

General Leslie Groves, head of the Manhattan Project.

The Scientist

Robert Oppenheimer, laboratory director of the Manhattan Project at Los Alamos. "Coordinator of Rapid Rupture."

The District Engineer, or The Engineer

Col. Kenneth Nichols, administrative head of the Manhattan Project.

The Secretary

Secretary of War Henry Stimson.

The Photographer

James Edward "Ed" Westcott, official photographer for Clinton Engineer Works (CEW) during World War II.

Eric Clarke

Chief psychiatrist for the Manhattan Project at Oak Ridge.

Ebb Cade

A construction worker at K-25.

Stafford Warren

Chief of the medical section of the Manhattan Project.

Enrico Fermi

Also known as Henry Farmer and the Italian Navigator. Italian physicist and head of the physics group at the Chicago Metallurgical Laboratory; assistant laboratory director at Los Alamos.

Ernest Lawrence

Also known as Ernest Lawson. American physicist who developed cyclotrons and calutrons for the electromagnetic separation process. Head of the Berkeley Radiation Laboratory for the Manhattan Project.

Niels Bohr

Also known as Nicholas Baker. Danish physicist who contributed to the modern understanding of the structure of the atom and to the field of quantum mechanics.

Arthur Compton

Also known as Arthur Holly or Holly Compton or Comus. American physicist and head of the Chicago Metallurgical Laboratory.

PLACES

Oak Ridge, Tennessee

Also known as Site X, Kingston Demolition Range, Clinton Engineer Works, and the Reservation. The designation "Clinton Engineer Works" referred to the entirety of Site X in Tennessee, while "Oak Ridge" referred more specifically to the "Townsite" and other residential, nonplant areas of the site.

Y-12

The electromagnetic separation plant at Oak Ridge, home of the calutrons.

K-25

The gaseous diffusion plant at Oak Ridge and, for a time, the largest building under one roof in the world.

X-10

The pilot reactor at Oak Ridge for producing plutonium upon which the reactors at Hanford, Washington, were based.

S-50

The liquid thermal diffusion plant at Oak Ridge.

Los Alamos, New Mexico

Also known as Site Y or the Hill. Manhattan Project site where the Gadget was designed.

The Chicago Metallurgical Lab, University of Chicago, IL

Also known as the Met Lab, site of Chicago Pile-1 and the first ever sustained nuclear reaction.

Hanford, Washington

Also known as Site W. Site of the Project's full-scale plutonium production facility.

The Gadget

The atomic bomb, both implosion and gun models. “It.”

Tubealloy (Tuballoy, Tube-Alloy)

Uranium. Sometimes referred to as “alloy” or “Product” in its enriched form, which was used as fuel for the atomic bomb.

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Plutonium. Element 94. Also referred to as “Product” or “material” in the context of fuel for the atomic bomb.

The Project

The Manhattan Project. More formally known as the Manhattan Engineer District (MED). The MED originally referred to the geographical designation of the Project’s initial headquarters in New York City but came to include all Manhattan Project sites.

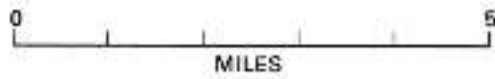
Author’s note: The information in this book is compartmentalized, as was much of life and work during the Manhattan Project.

CLINTON ENGINEER WORKS

Tennessee

1943 - 1945

Contour interval in feet



Oliver Springs Gate

Elza Gate
(To Clinton)

(To Clinton)
Edgemont Gate

OAK RIDGE

300

600

900

1000

1100

1200

1300

1400

1500

1600

1700

1800

1900

2000

2100

2200

2300

2400

2500

2600

2700

2800

2900

3000

3100

3200

3300

3400

Blair Gate
(To Harriman)

Black Oak Ridge

Oak Ridge

Edgar Fork Valley

Turnpike

1000

900

800

700

600

500

400

300

200

100

0

100

200

300

400

500

600

700

800

900

Happy Valley
Housing Area

Power Plant

Gallaher Gate
(To Kingston)

White Wing Gate
(To Lenoir City)

1000

900

800

700

600

500

400

300

200

100

0

100

200

300

400

500

600

700

800

900

1000

1100

1200

1300

1400

1500

Gamble Valley

Pine Ridge

1000

900

800

700

600

500

400

300

200

100

0

100

200

300

400

500

600

700

800

900

1000

1100

1200

1300

1400

1500

300

600

900

1000

1100

1200

1300

1400

1500

1600

1700

1800

1900

2000

2100

2200

2300

2400

2500

2600

2700

2800

2900

3000

3100

3200

3300

3400

Solway Gate
(To Knoxville)

1000

900

800

700

600

500

400

300

200

100

0

100

200

300

400

500

600

700

800

900

1000

1100

1200

1300

1400

Bear Creek Valley

Bethel

1000

900

800

700

600

500

400

300

200

100

0

100

200

300

400

500

600

700

800

900

1000

1100

1200

1300

1400

1500

.

Revelation, August 1945

That morning, the excitement coursing throughout the complex known as the Castle was infectious. The words no one was supposed to speak, the words many had not even known existed, ricocheted off walls and flew freely from the mouths of even the least informed inhabitants of Site X.

Toni was beside herself. How could she not be? Phones rang, women gabbed uncontrollably giving not a thought to what they were allowed to say, and no one tried to stop them. The mere details gleaned from newspapers, the radio, or flapping gums were making their way down the halls, into corner offices and throughout the secretarial pool. Slowly the entire Reservation was igniting, ripples of information expanding outward via word and wire. For every voice that uttered the News, at least two more spread it from there forward, faster this time, exponential increasing the radius of those in the know.

Rosemary was glued to the radio, packed into her boss's office with the others who had abandoned their stations. Colleen and Kattie were at work, too, miles away in the cavernous factory whose purpose was now all too clear. Jane heard such a ruckus outside her office that she threw open the window, waiting for the did-you-hear-don't-you-know shouts to waft up from below. Virginia and Helen had taken long-planned vacations, but the news managed to reach them, too, hundreds of miles away. And Celia and Dot were at home; they were, after all, housewives now. A lot had changed in two years.

Did Chuck already know? Toni wondered.

She had always assumed he would know before her, but no matter. She *did* know and there was no doubt about it. She needed to hear what he thought. Everything would change now.

Wouldn't it?

But when Chuck answered the phone and Toni blurted out the truth, she heard nothing in response.

“Chuck! Chuck! Did you hear me?!”

All she heard was a click at the other end of the line.

Chuck had hung up on her without speaking a word.

She wasn't supposed to know.

Was she?

She had spent years not knowing, wondering, sometimes guessing, and then giving up. She had accepted the need and duty to *not* know, and now this. Today, for no apparent reason, without any warning and out of the sweltering summer blue, came the Secret. Toni had spoken the word that until this day, was not to be spoken. A word to change the world.

Either she was right, or she was in big trouble.

*Everything Will Be Taken Care Of**Train to Nowhere, August 1943*

Southbound trains pierced the early morning humidity. The iron and steel of progress cut through the waking landscape.

Celia sat in her berth, the delicate folds of her brand-new dress draping over her knees as she gazed out the window of the train. Southbound. That much she knew, and that she had a sleeping berth because it was going to take a while to get to her destination. Towns and stations simmering in the August heat rippled past her view. Buildings and farms bubbled up above the horizon as the train sped by. Still, nothing she saw through the streaked glass answered the most pressing question in her mind: *Where was she going?*

Already many hours long, Celia's trip felt more endless because her final stop remained a mystery. She had no way to measure the distance left to travel or to let her subconscious noodle over what portion of the trip had already elapsed. There was only the expanding landscape and the company of a small group of women, previously unknown to her, but with whom she was now sharing this secrecy-soaked adventure. Celia had quite willingly embarked on a journey without first obtaining much tangible information. So she sat, waiting to arrive at the unknown.

A wavy-haired 24-year-old, Celia was always up for a change of scenery, and this trip was new to her first. Her hair was a deep brown, not quite as black as the coal ash that coated life in the Pennsylvania town that she had left behind: Shenandoah. It was a town about 100 miles and roughly the equivalent in light-years from Philadelphia, and which writer George Ross Leighton referred to as "a memorial to the age of rampant industry." He described her "once-prosperous hometown as one that was, in many ways, reminiscent of so many other American towns: past its prime, fighting to survive, and abandoned by the business that had spawned its heyday, a business that kept the lion's share of profits far from the reach of the rock-shredded, blackened hands that had built it. It was already a region in decline, even back in 1939. But that mining town had given Polish families like hers—and Czechs, Russians, Slovaks—work. Sometimes the work was steady, most times not, but it was a chance at a decent living.

Land of anthracite! Celia's hometown was like many mining towns in the east, its lifeblood linked to the precious rock buried down deep in the surrounding hills and valleys; a high-carbon, low-impurity, more lustrous incarnation of mineral coal. Locked in the bonds that held it together was energy itself. It could be released in dreamy blue flame and bestow its power on its liberators. But soon the allure and sheen of coal had given way to grime and neglect, much as the banking room of the Shenandoah Trust, a victim of the Great Depression that was still fresh in the folks' minds, had given way to Stief's Cut Rate Drug and Quick Lunch. Rather than thriving, the

town was choking. Rusted smokestacks punctuated the now-polluted horizon, redbrick edifices had surrendered their vibrancy to the soot of an overworked earth, all dingy reminders of an industry that once ran rampant and now hobbled on its last legs.

That was behind her now. Every passing moment separated Celia from what could have been an ash-covered existence as the wife of another miner. She had never wanted that future but only recently realized that it was not carved in stone. As for her new employment and soon-to-be home, “secret” was the operative word. It was repeated frequently, and rendered the most innocuous of questions audaciously nosy. When Celia had asked the obvious—*Where am I going? What will I be doing?*—the answer was that she was not allowed to know any more than she had already been told. She would be given only the information that she needed to get where she was going. Asking questions was frowned upon.

She had gotten a taste of this “don’t ask” world of work during the short time she had spent working as a secretary for the Project in New York City. Secrets were secret for a reason. She had to believe that. If there was a need for her to know something critical, she would be told when the time was right. Whatever “it” was, it must have been very important. That said, hopping a train with her one, simple suitcase in hand had felt more than a little odd. Would she know her stop? Would something jump out at her from the landscape, some detail of its appearance crying out to her, “Yes, Celia Szapka! This is it!” Then again, she had never ventured south and she was now southbound. That much she knew.

Everything will be taken care of. . .

Celia had chosen to trust her boss, and so far what little he told her had proven true. The limo had picked her up the morning before from her sister’s home in Paterson, New Jersey. She sat alone in the car and the driver made no other stops as the car motored south through the industrial heart of the Garden State before arriving at the train station in Newark. There she boarded the train, situated her scant belongings in her prearranged berth, and waited to depart. Once at the station, she had been joined by other young women, most seeming to be about her age, and none of them any more informed than she was. Celia was somewhat relieved to know that she was not the only one being kept in the dark. She and all the other young (and she assumed single) women sitting around her were heading in the same direction. They were All the Same Boat.

Neither Celia nor any of the other girls sitting on the train would complain about the secret. Complaining was not in fashion in 1943, not with so many sacrifices being made thousands of miles away, across oceans she had never seen. So much loss of life and family. How could she or anyone else heading to a good, safe job complain? The war permeated every aspect of existence from sugar, gas, and meat rations to scrap metal drives and the draft. Businesses across the country were abandoning the manufacturing of their usual wares—from kitchen appliances to nylons—in order to churn out everything from tires and tanks to ammunition and airplanes.

Details of battles and news of troop movements did little to shorten the excruciating lapses of time between letters arriving from abroad, or to relieve the sadness for losses suffered by friends which were sometimes followed by a twinge of guilt-laden relief when news of the dead had been spared your home yet again. Small flags of remembrance, a star for each loved one, marked the

homes of those affected by the war. So many stars hung in so many windows, stitched carefully by nervous mothers, sisters, and sweethearts. No matter the town, a walk down any residential street was sure to turn up blue-star banners waving alone in living-room windows, requesting silently to passersby to pray for the safe return of the brother, father, or husband that each five-pointed fabric memorial signified. And every Blue Star Mother lived in fear that her star's color might one day change, might be rendered gold by an unwanted telegram or a knock at the door that what once hung as a sign of support and concern would be transformed into a symbol of mourning.

Everyone's patience and nerves were being tested, and Celia's were no exception. Certainly the Szapka family had endured their share of difficulties. Despite it all—the tight money, her father's long hours in the coal mines, the ceaseless work at home—they persevered. Complaining would not help secure the safe return of her brothers Al and Clem. It wouldn't make her father work any more steady or do anything to clear his persistent cough, which seemed to be getting worse with each labored breath.

In summer, the mines had no work for her pa. The proud Pole, never one to take a handout no matter how tough things got, refused to go on the dole. So with little money to feed their kids, Celia's parents packed Celia and her three brothers and two sisters—when they were all at home—off to their grandmother's house in New Jersey. Memories of those summer visits to Grandmother were not filled with hopscotch, swimming, or cookie-baking. Celia was put to work, cleaning and scrubbing floors. Her grandparents looked after her and her siblings, making life a little easier on her parents until the mines opened back up and it was time for the kids to go back to school. But there would be no mining work for her brothers. Her parents never wanted that for the sons. They were all gone now: Al to the Philippines and Clem off to Italy. And Ed, lovely Ed, her oldest brother and her favorite, was in the tiny town of Vernon, Texas, the only place he could get his own Catholic parish.

And this was how Celia was doing her part. She quickly learned that all the women on the train had been told that their new jobs served one purpose only: to bring a speedy and victorious end to the war. That was enough for her.

• • •

It had taken several years to break the bonds with Shenandoah and her mother. The year Celia had graduated high school, her mother sent her to New Jersey—"that's where the jobs are"—to live with her older sister in Paterson. But that was about as far as Mother wanted Celia to travel. Celia got a job making three dollars a week as a secretary and hated every minute of it. She wanted badly to attend college, but there was no money. Her parents believed her younger sister Kathy, needed the leg up more than Celia did. At three dollars a week, Celia knew she wasn't going to be able to set money aside for college anytime soon. That prospect looked no more promising in Paterson than it had back in Shenandoah.

Then a new opportunity presented itself. Celia's cousin told her about the civil service. There would be classes, he explained, and then a test. Jobs could be anywhere, he said. Sometimes the government sent you overseas to places like Europe. *Europe*. The possibility alone was enough

get Celia to class. *Besides*, she thought, *what's the harm in taking a test?*

Sure enough, within three weeks the first offer came through: to work for a reconstruction finance company. Celia wasn't exactly sure what that was, but it didn't matter: Mother forbade it.

You're not going away. You're too young. We need you close to home . . . Her mother spouted a litany of reasons why Celia should not be allowed to explore the best opportunity that had ever come her way. Celia's older sister was married. Her younger sister was going to go to college. Celia was stuck in the middle, the grip of the Keystone State unrelenting, suffocating. At her mother's insistence, Celia declined the offer. Then another job offer arrived, this one with the State Department in Washington, DC.

This time when the letter landed in Celia's lap, Celia's recently ordained brother was home visiting from Texas. How she'd missed him. Seven years her senior, Ed had moved away when Celia was still in elementary school. She'd cried for days. Maybe you're not supposed to have favorites, but Celia didn't care. Ed was hers. Mama had always said the pair were cut from the same cloth. Ed saw Celia's eyes light up when she received the State Department letter and his face began to fall when Mama started to protest about Washington being too far afield. Celia had gotten over not being able to go to college, she'd gotten over saying no to the last job offer, she thought she'd get over this, too.

But Father Ed wasn't standing for it. And tough-but-loving Mary Szapka was no match for a priest on a mission. The discussion was heated but short, and it was decided: Celia was going to Washington to take that job, Ed said. "And I'm taking her."

Washington had been a spectacular experience, one that had reshaped Celia's ideas about her own future. She adored living in the boardinghouse on E Street, having roommates her own age working for the State Department. And the salary! By the time she left DC she was earning \$1,440 a year! She never thought she'd ever see numbers so big on a paycheck that had her name on it, let alone at 22 years old. She shared a bedroom in a boardinghouse with five other girls and each day made her way down the grand sidewalks of the nation's capital to work. There, the office she shared with the other secretaries had a small balcony with its own view of the White House Rose Garden. Celia would walk out there on her breaks, and on a few lucky occasions, she and the other young women spied President Roosevelt down below, as he slowly made his way around the manicured grounds. The girls would wave excitedly. Once he even waved back. The President of the United States. Imagine that.

Those years in Washington had loosened Celia's ties to home, but her mother kept on tugging. When her boss, Ambassador Joseph Grew, wanted Celia to transfer to Australia—a big vote of confidence in Celia's abilities—that tug turned into a yank. But Celia couldn't return home. Not anymore. She'd seen too much, done too much, earned too much. Any future in Shenandoah seemed dismal, certainly devoid of any intrigue. There had to be a better way to pacify her mother and not abandon everything she had already built for herself. She had to see about getting a job *closer* to home—just not *at* home.

New York City. When Celia's transfer came through all she knew about her job was that it was for the war effort, it was *not* in Shenandoah, and her mother couldn't complain that it was Australia. She was living back in New Jersey again, but this time it was different. She was a re-

working woman now, joining the hordes of other Jerseyites who took the train every day across the Hudson and into Penn Station.

Celia adored Manhattan—the noise and grime and glitz and crowds. Her walk from the train to her office was filled with shops and people and a constant buzz that sustained her every step. Sometimes after work, she walked along Fifth Avenue, or strolled through Times Square. Shenandoah was again a memory.

At first glance, there was nothing particularly noteworthy about the Arthur Levitt State Office Building at 270 Broadway in New York City. Standing across from City Hall Park, it was a large office building in a sea of large office buildings cramming the twisting streets of lower Manhattan. By the time Celia boarded her southbound train in August of 1943, the 18th floor of 270 Broadway had been the home of the North Atlantic Division of the Army Corps of Engineers and the first headquarters of the Project for nearly a year.

The 270 building wasn't the only site on the island that played a role in the Project for which Celia now worked. All across New York City, other pieces were falling into place. The Madison Square Area Engineers Office at 261 Fifth Avenue was charged with securing materials. Research was happening in Pupin Hall at Columbia University. The Baker and Williamson Warehouses offered temporary storage for tons of processed material from the Eldorado Mining and Refining Limited company in Canada, material that was the key to the Project. This material was not the kind of ore from Celia's corner of Pennsylvania, but another rock altogether. This ore was called Tubealloy by many in the Project, its real name no longer to be spoken aloud or written down. Tubealloy was the element upon which all the Project's hopes depended, and huge quantities of it were stowed away across New York Harbor, in the Archibald Daniels Midland warehouses on nearby Staten Island.

Tubealloy was why Celia's job existed, though she knew no more about it than the average New Yorker bumping and bustling past her on the overrun train platforms. But all across the island, in anonymous buildings and offices, countless people were quietly dedicated to finding, extracting, and purifying the Tubealloy needed for the Gadget.

Celia quickly became accustomed to secrecy in her secretarial post. She signed many papers, offered her fingerprints willingly, and endured not a few lectures about the importance of never discussing anything that she did at work. She could still hear her mother's voice warning her about the dangers of contracts.

"Be sure you read everything you sign! You might sign your life away!" she said.

Celia had responded with the customary "Oh, Mom . . ." But she had, nevertheless, read everything that she had signed. It all seemed natural to her somehow, as though the absence of detail implied the job's importance.

This latest, peculiar transfer had come shortly after Celia had relocated to the Project office in New York City. Only four months had passed when Celia's boss, Lt. Col. Charles Vandenberg Bulck, called Celia into his office and asked her if she would be willing to transfer yet again. The offices were relocating, he explained, and he needed to know if she was willing to go along with them.

"Where are we going?" Celia asked.

“I can’t tell you.”

Celia wasn’t quite sure what to make of this and pressed a bit, wanting to know at least what direction she was headed. If it was far, she was going to hear it from her mother.

“It all depends on how far away it’s going to be,” she tried to explain.

But Vanden Bulck still would not say. All he would tell her was that the move was for an important project and that the destination was top secret.

“Well then, what will I be doing?” she wondered.

Again, no real details. She wasn’t quite ready to give up yet. They had to tell her *something*.

Didn’t they?

“For how long?” she finally tried. If she were going away again, her mother would at least want to know how long she would be gone. Surely they could tell her that much.

“Probably about six months, maybe nine,” was the answer.

There it was, her official offer: some kind of new job in some kind of place and probably for about six, maybe nine, months. Perfect. Her mother would love it.

“How am I going to get there?”

“We’ll pick you up and you’ll go by train. Everything will be taken care of.”

Celia signed on.

She would explain to her mother that it was for the war, for Clem, and for Al. Mama couldn’t say no to that.

My God, it was a job! A good job, a well-paying job. There were worse fates than a bit of secrecy as far as she was concerned. Other women in other cities were doing what they could, moving into the workforce in record numbers. A cover of the *Saturday Evening Post* in September 1943 would depict a Stars and Stripes-clad woman, marching forward, toting everything from milk, a typewriter and a compass to a watering can, telephone, and monkey wrench. Women’s roles in the workforce were expanding exponentially. And with not one but two brothers fighting overseas, Celia felt something that overrode any misgivings: Purpose. Duty. If doing her part meant leaving home for some unknown, godforsaken place, then that’s what she would do.

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Now the tracks stretched out before the train, the distance that separated Celia from her parents was the greatest it had ever been, and was growing still. She had managed to get some sleep during the night as the rickety sway and swivel of the train rocked bodies gently to and fro. She had made some new friends on the journey. But it was past dawn now and she was getting anxious. She was wearing her new dress, the one her sister Kathy had bought for her. The dress was black and white, with a straight skirt—not too long but certainly not too short. It may not have had a designer label, but it was the fashion of the moment. A smart hat sat atop her meticulously groomed locks, and she wore the coveted I. Miller shoes that she had bought for herself near Times Square in honor of this new clandestine assignment. Wherever she was going, she wanted to look her best. “Don’t hold her back,” Father Ed had said to her parents. She wouldn’t be here without him. She had the chance to make something of herself. She wasn’t going to waste it.

Soon a slight buzz grew into a full chatter that bounced off the sleepy bodies in the train car. The gaggle of girls began whispering to each other that the train was slowing and that they were all getting off at the next stop. Celia looked out the window and soon the sign hanging above the station platform came into view: Knoxville, Tennessee.

Is this it? she wondered.

Celia gathered her bag and followed the other women as they made their way through the car down the stairs, and onto the platform. August smacked her unceremoniously in the face, a humid stagnant “hello” greeting her as she exited the train. It was quite an exodus. It appeared to Celia as if everyone had gotten off the train.

A man approached them explaining a car was waiting to take them the rest of the way.

Everything will be taken care of. . .

Celia piled into one of several vehicles parked outside the station, bursting to know their next stop. But it was early still—right around six o’clock in the morning—and the official-looking man who had come to fetch them said they were all going for breakfast.

The downtown buildings loomed high for Knoxville but not so much in Celia’s eyes, accustomed as she was to the cloud-grazing rooftops of New York City. The car turned down Gay Street, one of Knoxville’s main drags. The streets were starting to awaken. Deliverymen carted what rationed meats and sundries were available to the shops vying for their share, the bark of a newspaper vendor cut through the early morning hum and shuffle of workers heading off for their early shift. The town car slowed and halted at 318 North Gay Street. Celia looked up. Nestled beneath the Watauga Hotel sat the Regas Brothers Cafe.

She exited the car and entered the restaurant, a long, large, open space with soaring ceilings. Booths lined one wall and a long counter anchored the opposite side of the room, its length measured by 18 swivel stools. Six larger tables stretched between them down the middle of the room, draped in starched white tablecloths and flanked by arched, cane back chairs. Men in crisp white shirts, long ivory aprons, smocks, and narrow, black ties hurried across the polished tile floors. Celia and the other girls sat at the counter pondering the menu.

One menu item puzzled them. Like Celia, most of the women hailed from Pennsylvania, New York, and New Jersey. None had heard of any such thing as “grits.” At the Szapka house, it was Polish food three times a day, and that suited Celia just fine. Even when things were tight—and they almost always were—her mother put a good meal on the table. Neighbors who lacked Maria Szapka’s baking prowess shared extra butter and flour in exchange for a share of the treats that popped out of the Szapka oven. And whenever Celia’s mother sent Celia to the butcher with a dollar—“Get as many potatoes as you can!”—the butcher, who had known Celia her entire life, always threw in a few extra. Potato pancakes, potato pie, potato dumplings. Potatoes.

When Celia heard the word grits, her curiosity was piqued by anything that was not so spudlike origin. A tall black waiter in a long white apron gave the girls a simple and straightforward description: Grits were little white things made from corn. And you put butter on them. *Just like potatoes.* The waiter encouraged Celia to give them a try. The bowl of hot, butter-soaked hulled corn arrived and Celia put a steaming, slippery spoonful in her mouth, enjoying the first taste of her new life.

Once the women had finished their morning meal, they piled back into the limo again. The driver, pleasant enough yet wordless, drove on. Knoxville soon disappeared behind them. The landscape opened wide in every direction, framed by the low rolling hills that marked the timeless tail end of the Smokies. The rising sun of the East crept farther up the backdrop of the morning sky behind them.

Though these country roads were far from where Celia had started off in Pennsylvania, the history, too, was being shaped by a burgeoning industry, one also built upon a rock—not as lustrous as anthracite, but one that held tremendous power. This rock, unknown to most Americans, was recasting not only this once-quiet slice of Appalachian farmland but the landscape of warfare forever.

Celia did the only thing that she could: wait.

While she did, other women on other trains kept pulling into the very same station, the routes like veins running down the industrial arm of the East Coast, extending from the heart of the Midwest, the precious lifeblood of a project about which the women knew nothing, all of them coursing toward a place that officially did not exist.

TUBEALLOY

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THE BOHEMIAN GROVE TO THE APPALACHIAN HILLS, SEPTEMBER 1942

"Weaving spiders, come not here."

This has been the motto of the Bohemian Club since 1872, and is emblazoned on the plaque outside its San Francisco headquarters. It was not long before this exclusive, invitation-only, all-male organization, originally founded by journalists, had a waiting list decades long and boasted a membership of US presidents, industry magnates, and cultural tastemakers. However, San Francisco was not the place to be. That honor fell to the Bohemian Grove. About 70 miles north of the city by the bay, on a secluded 2,700-acre parcel nestled deep among towering redwoods, the Bohemian Grove was the club's annual summer encampment, its most enticing and intense gathering. It was here, far from the prying eyes and ears of the uninitiated, that members of the Project had come to meet in September of 1942.

The summer encampment kicked off with the opening ceremony, a ritual known as the Cremation of Care, which featured hooded, torch-bearing men, setting fire to an effigy dubbed "Dull Care," in a ritual described as having Druidic and Masonic overtones—Marcel Gras-style fun to some, creepy to others. The focal point of this fiery fete was the altar of the Great Owl of Bohemia, which stood at the end of the Grove's lake. An imposing, roughly carved wooden owl, symbol of the Bohemian Club, hovered forty feet high atop an altarlike, semicircular stone platform, watchful in its way. The remainder of the two-week, three-weekend encampment had something for everyone: performances, plays, and concerts. Swimming and skeet shooting. Long lunches, lots of liquor, lectures, blazing bonfires, and bonhomie. Nonmembers lucky enough to receive an invitation to the exclusive enclave received written instructions beforehand: no cameras, no recording devices, and so on. Bohemian Grove was—*is*—viewed, by many, as a kind of ritual male bonding deep in the woods, the kind that members believed unattainable in the outside world.

Bohemian Grove attendees were organized into distinct groups of "camps": Hillbillies, Poison Oak. The elite Mandalay. Some camps were known for a particular drink that was always on hand, or a historical artifact that they proudly held in their possession. These groups of men often shared some sort of association, occasionally related to the business they were in. The Pleasant Isle of Aves camp, for example, boasted almost exclusively members that had some sort of association with the University of California at Berkeley.

While the "no women" rule was hard and fast, the "no weaving spiders" directive—*business*—was oft flouted. The group of Project associates meeting at the Bohemian Grove not quite a year before Celia and others like her boarded southbound trains for an unnamed station in the long shadow of the Smokies had come to do just that.

It wasn't the first time that Ernest O. Lawrence, the prairie-raised former aluminum salesman and Nobel Prize-winning physicist from Berkeley, had entertained military guests at the Grove Clubhouse overlooking the Russian River. But the stakes were higher now and the group assembled far more influential. Among those gathered were members of the University of California radiation, or "Rad" lab, the director of Standard Oil, Project scientists James Conant and Arthur Compton, and the slight-of-build, large-of-brain J. Robert Oppenheimer, a scientist with a penchant for broad-rimmed hats and Eastern philosophy.

Soon-to-be District Engineer Kenneth Nichols attended—then an Army lieutenant colonel. The bespectacled engineer was emerging as the General's right-hand man and was learning, as best he could, how to manage and maneuver the General's seemingly unreasonable—bordering-on-unrealistic expectations, without which the impossible goals of the Project might not become reality.

He had news for the group gathered among the redwoods: Edgar Sengier, a Belgian businessman, had a tremendous supply of high-quality Tubealloy his company was willing to sell.

Decision made: Buy it. All of it. Secure more if possible. Lock it down.

Also up for discussion among the men was the location of Site X. It appeared that a spot

in Tennessee held the winning lottery ticket, but this needed to be finalized.

Decision made: Buy it. Do whatever necessary to secure the land. Prepare to break ground as soon as possible.

Virtually no one in East Tennessee knew their region was even under consideration as part of any groundbreaking wartime venture, including those who would come to inhabit and work on the soon-to-be-built Reservation. Another version of this story, one perhaps steeped more in lore than location, holds that Site X was selected in a backroom deal in Washington, DC. In the story goes, Secretary of War Henry Stimson had approached Tennessee senator Kennebec McKellar, chair of the Senate Appropriations Committee, asking if he might figure out a way to "hide" \$2 billion for the funding of a secret war project. The dapper and oft-bow-tied McKellar had served longer in both houses than anyone else in Tennessee history—heck, practically anyone in the United States. McKellar wanted to help, but so much money. McKellar took his concerns directly to President Roosevelt and met with him at the White House. The request was the same: This project could bring a speedy end to the war. So when Roosevelt reiterated, "Can you hide \$2 billion for a secret project that we hope will end the war?" Senator McKellar deftly replied, "Well, Mr. President, of course I can. And when in Tennessee do you want me to hide it?"

Regardless of how it happened, more than half of the \$2 billion eventually appropriated for the Project would go to Site X, whose primary function would be enriching Tubealloy to serve as fuel for the Gadget that this group gathered at the Bohemian Grove hoped would end the war.

The man at the center of the Project, the General, did not attend the Bohemian Grove meeting but would officially take over the Project mere days later, on September 17, 1941. The bright star of the Army Corps of Engineers, the General had been the mastermind behind the speedy construction of the Pentagon. He was also known to have a personality and management style that strained the bounds of polite discourse much the way his expanding midsection was straining the bounds of the belt on his always perfectly pressed, Army-issue khakis.

Within days of taking the helm of the Project, the General finalized movement on the Tennessee site and dispatched the Engineer to meet with a polite yet somewhat reticent Edgard Sengier at his offices in the Cunard Building at 25 Broadway in New York City.

Did this man have authority to deal? wondered the cool, dapper Belgian with the thinning hair and impeccable styling.

This was not the first visit Sengier had had from a military man curious about his holdings. And this man, though professing to be with the military, was dressed in civilian garb. The meeting was brief and to the point. The Engineer was pleasantly surprised to learn that Sengier's mining company, Union Minière du Haut Katanga, had roughly 1,200 tons of high-grade Tubealloy ore sitting that very moment on Staten Island and much more where that came from: the Belgian Congo. Sengier had left Brussels for New York in 1939, shortly before the Germans invaded Belgium and Hitler's shadow looked as though it might fall on Africa. Sengier moved not only himself but his ore as well to the United States, shipping containers after container across the Atlantic to New York. This material, once considered handy for dyeing Fiesta ware, regarded by some as mere garbage, a geological nuisance that got in the way of mining more important materials like silver, now was the sun at the center of the Project's secretive solar system.

Roughly 30 minutes and an eight-sentence scribbling on a yellow legal pad later—with a carbon copy left behind for Sengier's files—the Engineer walked out onto the noisy Manhattan streets carrying a piece of paper that gave the US government access to the richest Tubealloy ore ever tapped on planet Earth, a geological freak of nature, really, boasting nearly 65 percent purity. It was from deep in the mines of Shinkolobwe, a name that means "fruit that scalds."

Within days, the Project arranged for the purchase of Sengier's Staten Island stash and another 3,000 tons still waiting in Africa. The price was \$1.60 per pound, of which \$1.00 went to Sengier and another \$0.60 going to initial processing at Eldorado in Canada. Offices, buildings, the shipping containers, the storage facilities: All were now hidden in plain sight, shrouded by the asphalt chaos of New York City and its environs, all right under the noses of millions of Americans.

The ore score was a real boon for the Project. The materials were coming together, but the scale was about to expand drastically. A month later, in November 1942, the Project chose Site Y, a spot 35 miles northwest of Santa Fe, New Mexico, for development of the Gadget.

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