

Hidden Figures Study Guide

Hidden Figures by Margot Lee Shetterly

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Summary

The following version of this book was used to create this guide: Shetterly, Margot Lee. *Hidden Figures*. HarperCollins Publishers, 2016. The study guide uses references to African Americans as "blacks" and Caucasians as "whites" to reflect the language used by the author of *Hidden Figures*; this language also reflects usage during the particular moment in history that the book is tracking.

Hidden Figures, by Margot Lee Shetterly, is the story of the contributions made to space flight by the black women who worked at the Langley Research Center in the early days of aeronautical research. It reveals little-known history about the crucial work performed by black women amidst segregation and discrimination that led to America putting a man into space.

The Prologue of the book explained Shetterly's discovery of the work done by black women at Langley and her reasons for writing the book. She believed that the contributions made by black women deserved to be recognized not as a story about black women, or even just women, but as a story that is integral to American history.

In Chapter One, the Langley Research Center was growing rapidly due to demands for increased air power in an effort to defeat the Axis powers during World War II. Because men were involved in the military effort and white women were already working the jobs vacated by men, Melvin Butler turned to hiring black women to do the computing jobs at Langley.

In Chapter Two, Dorothy Vaughan, a highly intelligent black high school teacher, applied for a job at Langley.

In Chapter Three, Dorothy was hired to work at Langley at twice the pay of her teaching job. Dorothy and her husband were friends with the Colemans who had a daughter named Katherine. Katherine would later take a job at Langley as well.

In Chapter Four, Dorothy arrived in Newport News, which was growing increasingly crowded due to people moving there for work. The segregated transit systems made travel difficult for everyone and sometimes led to conflicts between the races. Black soldiers were sometimes the targets of violence from other Americans who believed they had overstepped their boundaries. Black Americans were expected to support the war effort and fight for the rights of Jews when they were not receiving equal rights in America.

In Chapter Five, Dorothy starts her job in West Computing at Langley. West Computing was the black women computers division. Not only was their work area segregated, they were also expected to eat at a table marked "colored computers." Miriam Mann hid the table sign until management gave up and stopped labeling the table.



In Chapter Six, NACA worked toward improving planes for the military. Discoveries occurred rapidly and a course was created for female computers to help them reach the level of junior engineer. Women were responsible for the calculations using raw data from the testing being done, but they were not given credit for their work by the male engineers.

In Chapter Seven, Dorothy signed a lease on an apartment in Newport News, which was difficult because there was a shortage of black housing. When the war ended, many workers were laid off and some employers went back to hiring only whites.

Chapter Eight focused on Katherine Coleman Goble Johnson. Katherine graduated from high school at an early age and attended college on a scholarship. She was extremely bright and charismatic. While at college she was chosen to be one of three black students to integrate a white college. Katherine married Jimmy Goble and dropped out of the graduate program when she became pregnant.

In Chapter Nine Dorothy Vaughan continued to build her life in Newport News. She moved her children to live with her while her husband continued his itinerant hotel job. Although the workforce at Langley was temporarily reduced, there was a defense industry boom that led to more people being hired. Engineering was still male dominated. Researchers worked toward breaking the sound barrier and women were on the ground at the testing site to analyze the data. Several of the women working at Langley began achieving great things, including becoming authors in some of the research reports. Dorothy became the head of West Computing after Blanche Sponsler became ill and died.

Chapter Ten focuses on Mary Jackson. Mary was a math teacher who took a job at the USO during the war. She was humanitarian minded and led a Girl Scout troop where she taught the girls not to put limits on themselves. She started work at Langley in a clerical position and later became a computer. The Rosenberg investigation created racial tension at Langley and one black woman was fired. Black leaders decried the U.S. trying to make allies of black and brown countries while discriminating against its own black citizens. President Truman desegregated the military and called for fair treatment of black government employees.

In Chapter 11, Mary Jackson was sent to work on a project on the East Side. The white computers laughed at her when she asked where the bathroom was. She was angry and told Kaz about it. He invited her to work for him. Later, Mary was given an assignment and when the numbers did not come out as expected, the division chief believed she had made an error. Mary stuck by her numbers and they discovered that the division chief gave her the wrong starting numbers.

In Chapter 12, Katherine Goble attended a wedding and learned about the jobs that were available to black female mathematicians. She and her husband decided to move to Newport News and Katherine began working as a computer. Katherine was assigned to a job in the Flight Research Division. On her first day there she sat down next to a



white engineer who got up and walked away from her. She decided not to let it bother her and the two later become friends.

At the start of Chapter 13, Katherine's job in the Flight Research Division seemed as though it could become permanent. Dorothy Vaughan talked to Katherine's manager and insisted he either give her a raise or send her back to West Computing. Katherine's job was made permanent. She was assigned to research the crash of a small plane and her findings led to changes in air traffic regulations to avoid wake turbulence accidents.

Katherine fit in well with the team and she was well liked. Her experience of segregation was different from some of the other women in part because her coworkers were more progressive and also because she was very light skinned and people sometimes were not sure if she was black.

Katherine's husband died from a brain tumor.

In Chapter 14, Dorothy Vaughan began to see that the job of computers would eventually change due to the use of mechanical computers. She also knew that the work done at Langley would lead to space travel. Dorothy knew that if the West Computers were to keep their jobs they would need to learn to use the calculators and computers.

At Moton High School, where Dorothy once taught, there was a bus accident that was the result of buses in poor condition. The deaths of five students led the students there to start a lawsuit that became part of *Brown v. Board of Education*. Americans began to wonder what they might be losing in terms of brainpower by neglecting black students.

Mary Jackson began an engineer training program, but first had to get permission to attend classes at Hampton High School, which was segregated. She was granted a pass and was shocked to see how shabby the white school was.

Chapter 15 focuses on Christine Mann, who was a high school student at the time schools in Little Rock, Arkansas were in the news because of black students trying to integrate them. The president had to send in the U.S. Army to escort the students to school.

The Russians launched Sputnik and the space race began.

Christine was in high school when *Brown v. Board of Education* was ruled on. She wondered how she and her fellow students would be able to compete with white students.

In Chapter 16 the employees at Langley were being pushed to get an American into space as quickly as possible. Katherine Goble's team began working with the PARD team toward the spaceflight effort. Meanwhile, Dorothy Vaughan's West Computers group was shrinking, as many of the black women were not permanent members of other teams.



While the Civil Rights movement was gaining ground, many were still fighting against integration. The state of Virginia passed laws that would allow schools to be closed rather than to integrate. However, the U.S. was competing with Russia for allies in countries with mainly black and brown citizens, which led to the weakening of the Jim Crow laws.

The U.S. government decided to consolidate all spaceflight research facilities into one organization under the name of NASA. As part of that move, West Computing was disbanded, which meant that Dorothy Vaughan was no longer in a management position.

In Chapter 17, Katherine Goble was not allowed to attend meetings with the engineers because she was a woman. She questioned this until the engineers eventually allowed her to attend the meetings.

In Chapter 18, schools in Virginia were closed to avoid integration. Katherine met a man named James Johnson, whom she later married. She continued to work with her team to calculate the trajectories for Project Mercury and also authored a report on the orbital path.

In Chapter 19, Mary Jackson helped her son build a car for the soap box derby, which he went on to win. She worked toward several humanitarian efforts, including advocating for one council to govern both black and white Girl Scouts. She also partnered with a white colleague to speak to black students at a conference.

In Chapter 20, Nasa tested the Mercury capsule while Christine Mann, a student at the time, who was in college. Dorothy Vaughan was working alongside many of the women from East Computing as a computer programmer.

Russia sent a man into orbit before America, further fueling NASA's mission of getting a man into space. President Kennedy declared that America would send a man to the moon.

In Chapter 21, the launch date for Project Mercury was set. Astronaut John Glenn requested that Katherine double check the numbers generated by the mechanical computer. All of the film footage shot at NASA shows white men even though there were many black people working there as well. Project Mercury was successful and John Glenn was lauded as a hero while Katherine was celebrated by the black community.

In Chapter 22, the government released a brochure celebrating the anniversary of the Emancipation Proclamation. Katherine was the only black woman to appear in it. Dorothy Vaughan celebrated 20 years at Langley.

Few black people were applying at Langley because the area was still segregated. When new black people started at Langley, the other black employees took care to help them adjust to the area.



In Chapter 23, Katherine was at a conference for her sorority during the Apollo 11 launch. Many people objected to the space program as money spent frivolously while the poor struggled to feed their families and there was a shortage of black housing. Even black Americans who supported the space program were upset that the program did not have any black people in key positions.

In the Epilogue, Shetterly concludes the stories of the black women she has written about. Katherine continued working at Langley and had a hand in the Apollo 11 and Apollo 13 missions. Mary Jackson eventually took a job in Human Resources where she championed the advancement of women's careers. Christine Darden started work at NASA as a data analyst and worked her way up through the ranks. Dorothy Vaughan never achieved her final goal, but recognized that the work she did at Langley made it possible for future generations of women to work in science and mathematics.

Prologue and Chapters 1-5

Summary

Hidden Figures, by Margot Lee Shetterly, tells the history of black women working in the space science industry as human computers amidst segregation laws. These women were responsible for the processing of complex mathematical problems, and their work made it possible for the United States to reach the moon.

The author starts the book with a Prologue in which she describes how she became interested in learning about the black women who worked at Langley. Shetterly's father told her that her former Sunday school teacher, Mrs. Kathaleen Land, had been a computer at Langley. He went on to explain that several women in the area had worked on calculating the launch windows for early astronauts.

The author remembers spending days in her father's office at NASA's Langley Research Center where he was a climate scientist. Shetterly grew up around scientists, engineers, and scholars, many of whom were African American.

During the course of her research, Shetterly discovered a long list of black women working at NACA, which later became NASA. She knew that the black women also worked with many white women. She decided the history of all these women needed to be told not "as a separate history, but as a part of the story we all know" (8).

Chapter One, *A Door Opens*, begins in 1943 when Melvin Butler was the personnel officer at Langley. He was responsible for filling the quickly growing need for additional physicists and mathematicians. NACA was growing rapidly due to the need to increase air power in the fight against the Axis powers.

The first female computing pool began in 1935 and was not immediately welcomed by the male staff who believed the "girls" would be unable to run the calculations. They were designated as "subprofessionals," which meant they were paid less.

By 1943, it was more difficult to find women to take the position. Since men were being pressed into the military, women were already in high demand by other employers.

Asa Phillip Randolph, the head of a black labor union, demanded that the president open war jobs to black applicants. Roosevelt signed Executive Order 8802, which desegregated the defense industry.

Black women began applying for jobs at Langley. Though there was no photo required with the applications, the colleges the women attended gave away their ethnicity. Melvin knew if he was to hire black women, he would need a separate space for them and a white woman to lead the new group. The creation of a separate space for them would eventually lead to integration.



In Chapter Two, Mobilization, Dorothy Vaughan worked in the laundry of Camp Pickett during the summer. She was also a high school teacher at a black school. Teaching was considered the most a black woman could expect to achieve.

Dorothy considered education very important and knew her children would have to work harder than white children. She struggled with finding a way to balance her time between her family and working to better her family's situation.

Dorothy was born in 1910. She graduated valedictorian of her class and received a full scholarship to Wilberforce University at the age of 15. She was recommended for graduate studies at Howard University, but chose not to go because she believed it would be economically irresponsible. She began working as a teacher during the Depression when black schools sometimes closed or were unable to pay their teachers.

She married Howard Vaughan, who worked as an itinerant bellman. They settled in Farmville, but Howard's job required him to travel a lot.

Dorothy found a notice on a bulletin board looking for mathematicians. She assumed the notice was meant for white students in the nearby college. Later, she read an article that talked about black women becoming engineers.

Chapter Three, Past Is Prologue, recounts Dorothy's teaching job in Farmville. Dorothy was active in the Farmville chapter of the NAACP. The school she taught at was small and modest, but Dorothy expected a lot from her students nonetheless. She tutored students after school and worked with the school choir.

Dorothy received a letter offering her a job at Langley at twice her salary as a teacher. Dorothy decided to take it even though it would take her away from the town she loved and her children.

Dorothy and Howard were close friends with Joshua and Joylette Coleman who had a granddaughter named Katherine Coleman. Katherine was talented at math and graduated from high school at the age of 14. She worked as a math teacher and had been mentored by William Claytor, a math professor. When West Virginia colleges integrated, Katherine was one of three students chosen to attend West Virginia University's graduate program. She left after one year to marry and have children. Katherine would eventually follow Dorothy to Newport News.

In Chapter Four, The Double V, Dorothy arrived in Newport News. Newport News was rapidly growing as civilians were recruited to assist in the war effort. A federally funded housing development consisting of prefabricated houses, some designated for blacks, sprung up in the Hampton Roads area to accommodate the influx of people.

The Jim Crow laws made using public transit difficult since whites had to enter from the front of the bus and sit in their section while blacks had to enter from the back and stay in their section. However, blacks were expected to give up a seat if none were available for whites. Rather than keeping the races separate, it forced them to intermingle. The overcrowding of the area led to conflicts between the races. White people saw the



conflicts as a product of the war while black people saw them as the same battles they had always fought.

Black soldiers were sometimes looked at as having “stepped beyond their place” (25). This led to violence against them. Black soldiers could not help but see the parallels between the way they were treated and the way the Jews were treated in Europe. Even with new laws, the history of black labor and military opportunities had not changed much since the early 1900s.

One newspaper editor observed that not even the power of the Allied and Axis forces could make Southern whites abandon segregation. The same restaurants that would serve Germans in a prisoner-of-war camp would not serve Dorothy. This caused a contradiction for black people who were willing to die for their country, but were not treated as equals there. They questioned what they were fighting for. Yet, when their country called, they rallied and fought. This double consciousness was labeled the “double V” because it called for victory over enemies outside of America and victory over enemies, like prejudice, inside America.

In Chapter Five, Manifest Destiny, Dorothy took the U.S. Civil Service oath of office and began her new job at West Area. West Area housed the black female computers while East Area housed the white female computers. Margery Hannah and Blanche Sponsler were the white women who led the West Area computers. Virginia Tucker ran the entire computing operation.

The cafeteria at Langley was the one place used by all of the people who worked at Langley. The West Computers were required to sit at a table labeled “colored computers.” There was the only table with a sign. Irritated by the sign, Miriam Mann began stealing it until it was no longer replaced.

Some of Langley’s employees defied the social conventions surrounding the treatment of blacks. Margery Hannah treated the West Area computers as equals. R.T. Jones, an engineer, stood up to officers harassing a black man and went to jail because of it. While most of the white employees would not socialize with blacks outside the office, they were friendly inside the office. The West Computers knew they had to be “equal or better” than their white colleagues to get “half as far” (34). They knew they had to withstand the pressure of their work to pave the way for women who came after them.

Analysis

Shetterly uses the prologue to explain why she felt it was important to write *Hidden Figures*. By telling about how she grew up around black scientists since her father worked at Langley, Shetterly, an African American woman, reveals that even as a member of the black community whose family was involved in the work being done at Langley, she was unaware of the contributions made by black women to the field of aeronautics. This revelation underscores the fact that information about the black



women who worked at NASA in the early days has not been included as a part of American history.

She goes on to explain that she believes that looking at events from the past can provide insight into the current world. Her statement indicates that she wants to show how today's African Americans, women, and scientists have benefited from the groundbreaking work done by the women of the past. Her account of the work done by these women will provide insight into how the space science program and African American scientists reached where they are today.

Another motive that Shetterly discusses for writing the book is that she wants the story of the black women who worked at NASA to be included in history instead of told as a story about women or African Americans. She believes that their contributions are such that they belong in the annals of history not as a separate part, but as an integral part of the events that lead to man's first forays into space.

Shetterly sets the scene for the hiring of black women as computers by explaining the history of the time. World War II was a major reason for the hiring of women into the workforce, which eventually led to the hiring of black women. As a result, the area surrounding the Langley Research Center was rapidly growing due to the influx of people hired to work jobs associated with the military effort.

In addition to World War II making it necessary for the defense industry to hire black women, the president also signed Executive Order 8802, which made it illegal to discriminate against African Americans in the defense industry workplace. This order made the hiring of black women as computers possible. Shetterly uses facts such as these to ground her book in research and historical events, showing the role that the government played in the events surrounding early space flight and the contributions made by black women.

In writing about the hiring of numerous people to the Langley Research Center, Shetterly introduces Melvin Butler, the personnel officer for NACA. She portrays him as a practical man who knew what needed to be done in order to accomplish the goals of NACA. When he ran out of white women to recruit because they were working other jobs left vacant by men going into the military, he turned his focus to recruiting black women with mathematical skills and degrees. However, Shetterly points out that Melvin was aware of the issues that might arise from hiring black women during the time of segregation. He hired them quietly without making a fuss and created a separate facility for them to work in.

Melvin's creation of a separate space for the black computers introduces Shetterly's theme of black Americans having to overcome segregation and discrimination in both the workplace and society. This theme is important to Shetterly's goal of showing how African Americans have gotten to where they are today since it illustrates the hurdles people like Dorothy Vaughan overcame so that the future generations would have an easier time both in society and in finding meaningful work.



When Melvin had a space for West Computing created, he did not staff it entirely with black women. Instead, he felt it necessary to hire white women to be in charge of the group. While this might at first seemed like merely a practical measure since he could draw from the white women who were already familiar with the job, it seems likely that there was also an element of discrimination that initially prevented him from putting a black woman in charge of West Computing. It is also interesting to note that he did not put a man in charge of the group, either. It seems that the work being done by the women, while involving complex mathematical equations, was deemed “women’s work” and beneath the men who worked at NACA.

Segregation also carried over into the more social areas of Langley. Shetterly includes a story about Miriam Mann persistently removing the “colored computers” sign from the table in the cafeteria. Not only does this story show an incidence of segregation, it also indicates how the black women working at Langley felt about it. The sign was a reminder of the fact that their coworkers saw the black computers as being beneath them. Miriam’s act of defiance also indicates the courage of the women since she most certainly could have lost her job if management had discovered she was the culprit.

Shetterly discusses the effects of segregation in society when she writes about Dorothy’s life before Langley and her arrival in Newport News. Prior to working at Langley, Dorothy was a school teacher. Schools, of course, were segregated and Dorothy was only allowed to work at black schools. During the Depression, black schools sometimes closed due to lack of funding or simply stopped paying teachers. Shetterly mentions this fact specifically in connection to black schools, indicating that such things were not happening in white schools or at least were happening far less frequently.

Shetterly also points out that segregation really did not work to keep the races separate as illustrated in her description of the public transit system. She points out that by trying to keep the buses segregated and having blacks enter from the back while whites entered from the front sometimes made the overcrowded buses difficult to navigate. In the end, segregation in public transit, actually caused blacks and whites to have to intermingle more than they might otherwise have if left to their own devices.

This idea of computing being “women’s work” ties into another of Shetterly’s themes, which is that all women, white or black, had to overcome gender stereotypes. The women who worked at NACA were not even referred to as women. Instead, they were called “girls,” a demeaning term to call an adult woman, let alone a woman who was educated and working in the field of mathematics. In addition, the men at Langley were sometimes less than generous in their attitudes toward women since some of them doubted that women were even capable of the analytical thought required to navigate the complex calculations required of them. And, in the event that there was an error, they often pointed out that you could not expect much from “girls.”

Another theme that Shetterly introduces is the theme of black Americans being forced to live a double consciousness. She discusses this when she writes about the idea of the Double V. Shetterly talks about the way that black soldiers were being asked to fight for



the rights of the Jews in Europe when they were not receiving equal rights in their own country. Shetterly returns to this theme often as she points out the ways that black Americans were asked to make contributions to the country while simultaneously being kept down due to segregation and discrimination. She points out other instances of the double consciousness when she writes that some restaurants would serve German prisoners of war, but would not serve black people. She also writes that black soldiers were subjected to violent acts from other Americans because they were seen as overstepping their boundaries, yet they were still expected to fight for America.

In this section, Shetterly introduces the first two women whose careers will be followed throughout the book. The first woman is Dorothy Vaughan. Shetterly shows her to be a sensible woman who was willing to work long hours and make sacrifices so that her children could live a good life. Shetterly informs readers that Dorothy was highly intelligent by writing that she graduated from high school at the age of 15 and received a scholarship to attend college. She also indicates that Dorothy was sensible in that she did not go on to pursue a graduate degree during the Depression because she felt it was irresponsible in an economic sense. Dorothy knew that at the time she could not expect to achieve much more than a position as a teacher since she was a black woman.

Shetterly also briefly introduces Katherine Coleman Goble Johnson as the granddaughter of friends of Dorothy Vaughan's. Shetterly mentions that she was a lot like Dorothy in that she graduated from high school at the age of 14 and was skilled at mathematics. Her importance to the work done at Langley is foreshadowed when Shetterly mentions that she would one day move to Newport News just as Dorothy did.

Vocabulary

discourses, attenuate, alumni, integrated, personnel, procurement, prototype, conscripted, fodder, competitive, esteem, impart, itinerant, subsidizing, consummation, escapism, multitudes, endeavored, confederation, notables



Chapters 6-10

Summary

Chapter Six, War Birds, begins by talking about the Tuskegee airmen, who were closely followed in the black newspapers. Making sure the planes they flew performed well was the job of the people at the Langley laboratories, including Dorothy.

NACA's discoveries were happening so quickly that an entry-level position was considered an excellent graduate school program. A course in engineering physics was created for the female computers in hopes of propelling them to junior engineer status. Dorothy attended the class.

Much of the research that took place at Langley took place in the wind tunnels. One of the concepts Dorothy had to learn was the Reynolds number, which determined how closely a wind tunnel came to actual flight. Langley was unsurpassed in the quality of its wind tunnel research data. The raw data from the research often passed Dorothy's desk.

The computers generally did not know the significance of the equations they worked on. The men of the laboratory sometimes saw them as "living hardware" (39). The engineers often took credit for all the work. When a computer made an error, the men sometimes acted like you could not expect much from a girl anyway.

In Chapter Seven, The Duration, Dorothy decided to sign a lease on an apartment in Newport News. Finding a place to lease had been difficult because there was a shortage of housing for the growing number of blacks. She settled in the Newsome Park area, where blacks from all income levels lived as a result of segregation.

After V-J Day, the government laid off 1,500 shipyard workers and decreased the number of female workers. Many employers returned to their whites only policies. Blacks saw their dreams of integrated workplaces slipping away.

Dorothy signed the lease on her apartment even before her job had been changed to a permanent status. There were attempts to dismantle some of the makeshift black neighborhoods that had been built during the war.

Chapter Eight, Those Who Move Forward, focuses on Katherine Goble who was a teacher in Marion, Virginia. When she first came to Virginia from West Virginia, as the bus crossed the state line, the blacks were required to move to the back of the bus. When the bus reached the black area of town, the blacks were required to get off the bus because service did not continue into the area. Later, Katherine returned to West Virginia to teach for a higher salary because West Virginia had equalized pay for black and white teachers. She always made sure people knew she was from West Virginia and not Virginia.



Katherine came from a family that valued education. Katherine started college at West Virginia State College at the age of 15. William Claytor created advanced classes just for her and mentored her for a career in research mathematics.

Katherine married Jimmy Goble in secret during a break from school. In 1940 she was one of three black students handpicked to attend a graduate program that would integrate West Virginia University. When she arrived at the university most students were cordial and some were friendly. She was treated fairly by professors. When Katherine discovered she was pregnant, she dropped out of the program.

In Chapter Nine, *Breaking Barriers*, Howard Vaughan continued to work at the hotel after the war. He and Dorothy had two more children. Dorothy returned to work after the births because her family relied on her income.

The Vaughan children were adjusting to their new home. They had learned that if they got to the swimming pond before the white kids, they could have it to themselves for the day. However, if they arrived at the same time, the two groups would share the pond.

The workforce at Langley was only temporarily reduced because of a boom in the defense industry. Many of the women who had worked there married their male coworkers and stayed at home. However, the best computers were considered valuable resources. Managers worked to keep them on the job by offering flexible hours so they could still care for their families. Dorothy was made a permanent employee in 1946.

Women found themselves with a new future after the war, but they needed to figure out how to advance themselves in a male dominated field. Men were able to advance fairly easily while women had to prove themselves. Most engineers gave their female coworkers no credit in publications because they did not think it would matter to a woman.

Researchers from Langley began working toward breaking the sound barrier. A group of researchers, including female computers, were sent to the Mojave Desert to establish a center aimed at breaking the sound barrier. Women were on the ground to analyze the data when Chuck Yeager broke the barrier for the first time. Some of the women became junior engineers. Doris Cohen was NACA's first female author and published nine reports as sole author or coauthor.

Virginia Tucker, the lab's Head Computer, ascended to a very powerful position. Between 1942 and 1946 she trained more than 400 computers. However, when the computing pool dissolved, she had nowhere to advance to. She eventually took a job at Northrop Corporation.

Three of the West Computers moved to Cascade Aerodynamics where many of the white employees were surprised to learn that a black computing group existed. The skills of the black computers dispelled any concerns.

Dorothy Hoover, one of the West Computers, was offered a research position because of her exceptional skill with complex equations.



Margery Hannah took a position in the Full-Scale Research Division where she became an author. Blanche Sponsler took Margery's position as head of the West Computing group.

Dorothy Vaughan stepped in as the acting head of West Computing when Blanche suffered a mental break and then died. It was difficult for women to get into management positions since there were only so many positions available to supervise other women and men never reported to women. For black women, it was even more difficult. Two years after being appointed acting head, she received the job on a permanent basis.

Chapter Ten, Home by the Sea, shifts focus to Mary Winston Jackson who began working at Langley in 1951. After graduating from high school with highest honors, Mary attended the Hampton Institute and became a math teacher. When she returned home to care for her ill father she took a job at the USO. She married Levi Jackson, whom she met at the USO. When the USO closed, she took a job as a bookkeeper until her son was born.

Mary lead a Girl Scout troop and provided the girls with an opportunity to try experiences that would show them other possibilities for their lives. One day when the girls were singing "Pick a Bale of Cotton" she realized that the song reinforced stereotypes about blacks and decided they would never sing it again. She worked hard to keep the girls from placing any limits on themselves.

In 1951 Mary took a job at Langley in a clerical position. The job required her to get security clearance. Tensions between the U.S. and the Soviet Union were escalating. NACA was now pressed into service to develop better air power than Russia. More computers were hired and Mary was one of them. NACA's new goal was to develop military planes that could fly faster than the speed of sound before any other nation.

The day that Mary started her new job, the Rosenbergs were sentenced to death for spying for the Russians. Langley was drawn into the event because an engineer who worked there was accused of stealing classified documents for the Rosenbergs. He was later acquitted.

The investigation process revealed anti-Semitism within the laboratory and the progressives who worked in the Stability Research group were called into question for their views on integration, civil rights, and women's equality. Dorothy Vaughan's cousin, Matilda West, was fired from her job and may have been accused of burning loyalty forms required by the president for all civil servants. She was also a leader in the NAACP.

Once again black leaders were forced to walk the line of denouncing foreign enemies and dealing with prejudices in the U.S. Paul Robeson, Josephine Baker, and W.E.B. Du Bois traveled outside the country and gave speeches that drew parallels between the treatment of blacks in America and the treatment of others around the world, such as in



the caste system in India. Newly formed countries began to wonder why they should follow America's example for democracy.

Concerns about the perception of America lead to President Truman desegregating the U.S. military in 1947. He also signed Executive Order 9980 which made department heads within the federal government responsible for ensuring workplaces were free of discrimination. West Computing was battling the Cold War while also shaping race relations.

Analysis

In this section Shetterly begins to explore the theme of women making important contributions to the field of aeronautics. While detailing some of the accomplishments of the women, Shetterly shows that they made these steps through determination and a sense of connection to the work they were doing. For example, Dorothy Vaughan is shown to have been a hardworking woman who gave up a lot to work in a field she was passionate about. She left her children behind in Farmville when she first started her job at Langley. In spite of the hardships she had to endure, Shetterly points out that the black women working at Langley felt a sense of connection to the work they were doing. She does this by writing about the Tuskegee airmen and stating that Dorothy knew that her job was to make certain the planes they flew were functioning properly.

Shetterly also writes about the involvement of some of the women in the important step of breaking the sound barrier for the first time. She mentions that there were women at the test site to analyze the data from the flight. Although *Hidden Figures* focuses mainly on the work done by the black women at Langley, she does not limit this theme only to their accomplishments. Instead, she also writes about the accomplishments of Virginia Tucker and Margery Hannah, both white women.

Shetterly juxtaposes the theme of women's contributions to the theme of the gender stereotypes the women had to overcome. While expounding on their many accomplishments, Shetterly reminds readers that the accomplishments did not come easily in the male dominated field of aeronautics. Some of the men there saw the women as little more than living pieces of machinery. They gave little thought to what women might want from their careers. In fact, they did not think that women even had goals since they felt that women would not care if they were given credit for their work in publications. Instead, the engineers often took full credit for all of the work being done as though the women did not even exist. While classes were created for women to attend in order to further their skills, it appears that initially they were only expected, or even able, to achieve the rank of junior engineers rather than full engineers.

The author also continues to explore the theme of segregation and discrimination being additional challenges for the black women. Because of segregation, black people were only able to live in certain areas. Upon arriving in Newport News, Dorothy Vaughan was given a list of housing available; the list was separated into housing for blacks and housing for whites. Although more focus was being put on hiring black employees, there



did not appear to be much thought given to where these individuals were supposed to live since there was a shortage in black housing that made it difficult for Dorothy to find a house to lease. Then, when World War II ended, there was discussion around dismantling the black neighborhoods.

The notion of dismantling black neighborhoods probably came from the fact that with the war over, many employers went back to hiring only white employees. In addition to making it difficult for black Americans to find good jobs, it also opened the door for making the shortage of black housing even worse. Perhaps the people responsible for housing in Newport News believed that black people would return to their old jobs, and thus their perceived place in society.

Another example of segregation causing problems for black Americans was Katherine's experience with riding a bus from West Virginia into Virginia, a segregated state. When the bus crossed the state line, the black passengers were required to get up and move to the back of the bus, which must have caused some chaos as it would also require white passengers to leave their seats to move to the front of the bus. Then, when the bus reached a black neighborhood, it simply stopped and all of the black passengers were forced to get off because the bus line would not travel into their neighborhood. Clearly, Katherine found such practices ridiculous and backward since the author makes note that she made sure people she met knew she was from West Virginia and not Virginia.

Even black children were not immune to the effects of segregation as is evidenced by a story that Shetterly shares about Dorothy Vaughan's children swimming at the local pond. She writes that the black children could only use the pond if they reached it before the white children did. However, it is interesting to note that the children from both races did not seem opposed to sharing the pond if they reached it at the same time. Shetterly may include this detail as a means of indicating that prejudice is a learned behavior and that the children could overcome it when the circumstances were right. Or, it may indicate that the black children sometimes put limitations on themselves, as Shetterly mentions when she writes about the Girl Scout troop led by Mary Jackson. Perhaps if the black children had just gotten into the pond regardless of having reached it after the white children, they would have been allowed to do so.

Shetterly provides an example of discrimination when she writes about Dorothy Vaughan's promotion to management. Dorothy Vaughan stepped in as acting head computer when Blanche became ill and died. It took two years for upper management to assign her the position permanently. It seems as though they simply gave up finding someone white who was more qualified and finally conceded the position to Dorothy rather than awarding it to her because of her skills.

Another example of discrimination appears during the Rosenberg investigation. Not only does Shetterly write that the investigation revealed anti-Semitism at Langley, but it also showed discrimination toward black people. In fact, some of the more progressive employees were questioned just because they supported integration and equality for women. One black employee was even fired because she allegedly burned loyalty



forms. However, it may have been more than the forms that got her fired since she was also a member of the NAACP, which was a suspect organization at the time because they championed civil rights.

Shetterly again examines the theme of double consciousness when she writes about the Cold War and its effects on America. While the U.S. was looking to gather allies against Russia, there was consternation among countries where the citizens were mainly people of color. There was no hiding that America still treated its own people of color as second-class citizens, yet the U.S. government was asking these black and brown countries to side with America. Civil rights leaders again saw the double consciousness that America was asking its black citizens to live with; they were expected to support America in the Cold War while also continuing to be discriminated against.

The author fulfills the foreshadow of Katherine Coleman becoming an important person in *Hidden Figures*. Katherine is portrayed as an exceptionally bright and outgoing young woman. The author writes of her speaking perfect French as a girl while working at the hotel her father worked at and that her charisma led to her working in the gift shop where she would have constant contact with patrons of the hotel. Katherine, like Dorothy, came from a family where education was important. In fact, Katherine and Dorothy had a great deal in common. Both graduated early from high school and went on to college with scholarships. While in college, Katherine was afforded the opportunity to be mentored by William Claytor, a professor who saw her potential and who created advanced classes just for her.

When Katherine was handpicked to be one of three students to integrate a white college, the author gives the first hint of the way that Katherine viewed segregation and integration. Katherine was always an upbeat individual who looked for the best in situations. This will become more clear as the book goes on and Katherine begins her job at Langley. The author writes that Katherine did not find integrating the college to be terribly difficult. Instead, she found the white students to be friendly and felt she was treated fairly by professors.

Shetterly also introduces Mary Jackson, another black woman who achieved great things at Langley. Like Katherine, Mary was also a charismatic woman. From the time she first writes about Mary, the author underscores Mary's focus on humanitarian efforts. Mary worked at the USO during the war and went out of her way to help soldiers and their families. As a Girl Scout leader, she made certain that her Scouts saw the many possibilities their lives could hold and that they did not limit themselves because of the color of their skin. The importance of Mary's humanitarian spirit will be revealed later in the book when Mary accepts a position in the Human Resources department.

Vocabulary

intensity, dubbed, oblivious, rigorous, differentiate, inexplicably, oscillation, solicited, exotic, elite, interspersed, unbridled, bespectacled, contrary, dispiriting, interned, rollicking, inevitable, prowess, ramshackle



Chapters 11-15

Summary

In Chapter 11, The Area Rule, Dorothy Vaughan sent Mary Jackson to work on a project on the East Side with white computers. Mary asked a white computer where the bathroom was and the white computers giggled. Their reaction made her feel like she was beneath them. Later, when Mary ran into Kazimierz “Kaz” Czarnecki, an assistant section head, she was still angry and she told him about the incident and how angry she was. He invited her to work with him.

Dorothy Hoover was thriving in the Stability Analysis Division and had become an aeronautical research scientist by 1951. She and three other women published reports with the group.

Mary Jackson met James William, a former Tuskegee airman and engineering grad. Melvin Butler had pursued him to take a job at Langley. He did not tell the rest of the staff that James was black before he arrived. Upon arrival, Williams had to convince the guards at the gate that he was an engineer and some white supervisors refused to allow him to work in their groups.

Mary Jackson was given an assignment. When a division chief reviewed her results something seemed wrong. He believed Mary had made a mistake. However, it turned out that he had given her the wrong numbers to use in her calculations. This earned her respect and a reputation for being able to contribute more than numbers.

Chapter 12, Serendipity, focuses on Katherine Goble. Katherine attended her sister-in-law’s wedding in 1952. Jimmy’s sister and brother-in-law, Eric, worked in Newport News. Eric invited them to move to Newport News and said he could get them both jobs.

Katherine and her family moved to Newsome Park where Katherine took a job as a computer. Katherine immediately recognized Dorothy Vaughan’s skills as a mathematician and a manager. She had the ability to match the temperaments of the women with the groups they were assigned to. Katherine was assigned a subprofessional rating just as most women were upon arriving. They were expected to accept their jobs and be grateful.

Dorothy assigned Katherine to a project in the Flight Research Division. When Katherine arrived she sat at an empty desk and smiled at the man next to her. He got up and walked away. The boundaries between whites and blacks in Langley were not as clear as they were in the outside world. In addition, black people were often insecure due to prejudice. Katherine knew her interactions with whites would have an impact on the entire black community. She decided not to let the episode bother her and within a few weeks she and the man were friends.



In Chapter 13, Turbulence, Katherine's work in the Flight Research Division was beginning to look permanent. Dorothy needed to clarify Katherine's position as part of West Computing or as a permanent part of Flight Research. She had a meeting with Katherine's manager, a white man, and told him that he either needed to give Katherine a raise and hire her permanently or send her back to West Computing. Katherine was offered a permanent position in Flight Research.

Katherine was assigned to examine the crash of a small plane. She spent days analyzing the data. The results led researchers to recommend a change in air traffic regulations to avoid wake turbulence accidents.

Katherine grew to like her colleagues. They were extremely smart people who spent time building model airplanes and playing bridge together. Katherine so enjoyed her job that not even the segregation there bothered her. She did not even know the bathrooms were segregated when she started. By the time she realized it, she was used to using the bathroom she did and refused to change. No one challenged her.

Katherine was well-liked by her colleagues who enjoyed her intelligence and confidence. Katherine was light skinned, which may have made it easier for her white coworkers to accept her. Sometimes people were not sure she was black upon meeting her. Because she was accepted by her coworkers and because of her light skin, she did not experience racism in the same way as other blacks.

Jimmy was diagnosed with a brain tumor and died. Katherine refused to give in to her grief and told the principal at her children's school that he was not to give them any breaks because of their father's death.

Katherine lived by her father's adage "You are no better than anyone else, and no one is better than you" (80). She refused to act in any way that went against that belief. She was comfortable with her white male coworkers and did not wear a mask around them. When the Brown v. Board of Education verdict was in the news, she spoke openly with her white coworkers about it. She also treated her coworkers as equals.

At the start of Chapter 14, Angle of Attack, Dorothy Vaughan was expecting the job of the computers to change with the increasing use of inanimate computers. She could also see that the research being done at Langley would eventually lead to space.

Langley purchased a Bell calculator that worked faster and could work overnight. Langley also bought its first IBM computer and used it to calculate the trajectory for an experimental plane designed to leave the atmosphere. However, the early machines were not reliable and the women computers had to watch the numbers for accuracy.

Dorothy knew that the women who worked under her would have to master the new machines to ensure job security. She told her employees that integration was coming and that they might be able to get better jobs if they could use the machines.

Moton High School, where Dorothy had taught, experienced a bus accident as a result of the poor condition of their buses. The accident killed five students and the suit started



by students there became part of *Brown v. Board of Education*. After the decision was handed down, Senator Byrd urged Southern States to resist integration.

Americans began to question what they might be losing in terms of brainpower by neglecting black schools. They were concerned about how American students measured up to Russian students.

A woman named Helen Willey advocated for having the status of every female computer with a math degree upgraded to mathematician. Though she was successful, almost all of them still worked for male engineers. Most of the top engineering schools in the country did not accept women.

When Mary Jackson began an engineer training program she first had to get permission to go to the classes held at Hampton High School, which was not integrated. On her first day there Mary was shocked by how run down the school was. She wondered why the black schools and white schools did not pool their resources and make one nice school.

One black engineer, Thomas Byrdson, experienced an act of sabotage from a white mechanic when he started working at Langley. The mechanic was reprimanded, but Thomas knew he could not show his anger in front of white people. Black men were more likely to meet with issues due to race than black women.

In Chapter 15, *Young, Gifted, and Black*, Christine Mann was a high school student working in the school's library. Part of her job was setting out the newspapers, which were full of news about black teenagers trying to integrate a school in Little Rock, Arkansas. The Arkansas National Guard tried to prevent them from entering, so President Eisenhower sent the U.S. Army to escort them. The world watched as the event played out.

The Russians launched Sputnik, kicking off the space age. The U.S. again found itself behind in technology. Black newspapers drew a correlation between America being behind in space travel and the treatment of blacks in the South. They questioned if the Russians had spent the time educating their students while America had fought over integrating schools.

Three years earlier Christine had been in school when the principal announced the ruling on *Brown v. Board of Education*. She and her classmates wondered how they could compete with white students. They had only ever known segregation and they wondered if they would be smart enough to go to school with whites.

Christine's father had a car and taught Christine some of the mechanics of it. When she learned to ride a bike, she also learned to fix her own bike. Her mother was a teacher and she had gone to the classroom with her as a toddler. By the time she was five, Christine was a second grader. Because of her academic prowess, her parents decided to send her to the Allen School for girls, which was one of the best black schools in the country. There, she discovered her knack for math. After high school, Christine attended college at Hampton with a scholarship.

President Eisenhower enacted the National Defense Education Act in an attempt to catch up to Russia. However, while the Soviet Union's engineering schools were comprised of one-third women, the U.S. still had very few women or blacks working in science.

Analysis

Shetterly again explores the theme of women making major contributions to the field of aeronautics by highlighting Dorothy Hoover's accomplishments as an author of research reports and Katherine Goble Johnson's work that reduced accidents caused by wake turbulence. However, Shetterly does not only focus on the technical accomplishments of the women, but of their accomplishments in other areas in the workplace as well. She writes, too, about Dorothy's skill and accomplishments as a manager. Dorothy's position required her to not only know the job being performed by the West Computers, but also required that she be able to match personalities with research groups to ensure projects progressed smoothly. This work was essential to the success of the women in their jobs and allowed teams to work effectively toward making discoveries.

Dorothy was also an astute observer of the direction that the Langley Research Center was moving in. Dorothy recognized early on that the work being done there was headed toward space travel. More importantly, at least to the future of the women, was that she saw that mechanical computers would eventually play a greater role at Langley and could mean the elimination of the jobs of the female computers. In addition, she knew that integration would one day mean that black women would have access to better jobs. To that end, she advised the women she worked with to learn to use the computers so that they could transition into the future.

At the same time that women were making great strides forward, they were still being held back by gender stereotypes. Shetterly continues the exploration of this theme when she includes a story concerning Mary Jackson and a male division chief who was certain Mary had made a mistake when numbers came up wrong. This story goes back to the idea that some of the men had little faith in the skills of the women and expected them to make errors since they were only "girls." Mary, however, proved that the mistake was not hers, but the division chief's. It must have taken great courage for women, particularly black women, to stand up to their male superiors in situations like this.

In another act of courage, Helen Willey stood up against gender discrimination when she fights to have the title of all women with math degrees upgraded to mathematicians. Her advocacy helped to give the women at Langley some of the respect they deserved and brought them one step closer to being able to achieve the rank of engineer. However, Shetterly points out that at the time the women were still working under male engineers and that most of the best engineering schools still were not accepting female students.



The theme of black Americans overcoming segregation and discrimination continues. In this section Shetterly makes the incidents more personal as she writes about specific experiences of the individuals she writes about. For example, she shares the story of Mary Jackson asking a group of white computers where the bathroom was. When they reacted by laughing because they did not know where the bathroom for black women was, Mary was angry. The author explains that while many black Americans felt anger at segregation in the workplace, they were forced to stifle it because they had to maintain a mask of sorts around their white colleagues. In this instance, though, Mary could not set her anger aside and she let the mask slip when she ran into Kaz. While the author does not specifically state Kaz's reason for hiring Mary, it seems he was one of the more progressive men that worked at Langley and perhaps he, too, was angered by the substandard treatment of talented people like Mary.

Shetterly also recounts the stories of James Williams and Thomas Byrdsong, two black men who worked at Langley. Shetterly informs the reader that black men sometimes had a more difficult time with discrimination in the workplace because they did not have the support system that was inherent in the computer pool the black women were placed in when they started at Langley. They were also more likely to run into more malicious incidences of discrimination, such as the sabotage that Thomas experienced, than the women were.

Shetterly points out that segregation and discrimination not only adversely affected black people, but also white people. She does this through describing Mary's experience upon being granted access to the segregated Hampton High School to attend an engineer training program. Mary was shocked to find that the white school was just as shabby as the black school. This led Mary to question why the government did not pool the resources for both black and white students and create one good school for all students.

Mary was not the only one to see the segregation of schools as detrimental to all races. The author also states that black civil rights leaders also spoke about America being behind Russia in space travel because time and effort was spent on keeping schools segregated rather than being spent on educating students. This is also an example of Shetterly's theme of blacks living a double consciousness. Blacks were expected to get an education and even to work in capacities that advanced the country, but they were not afforded the same access to education as whites were.

Shetterly's focus on individual experiences allows her to talk about the way that not all black Americans experienced or approached discrimination in the same manner. She does this through writing about Katherine's experiences with an outlook on discrimination. Shetterly does acknowledge that Katherine's experience may have been, at least in part, different from that of other black Americans because she was quite fair skinned. In fact, sometimes people were not even sure she was black upon meeting her. However, Shetterly attributes much of Katherine's easier experience with discrimination to her attitude. Katherine was raised to believe that all people were equals and that was how she approached everyone she met. She also knew that how she treated the white people she came in contact with would reflect upon the entire



black community. Her personal beliefs undoubtedly helped Katherine to not become angry or hurt when people, like the male engineer she sat down next to, ignored her or walked away.

The author introduces Christine Mann in this section of the book. By introducing new women to the book periodically, Shetterly moves the book forward into the future since Mann was part of the next generation of women at NASA. Christine, like Dorothy Vaughan and Katherine Goble Johnson, was a gifted student who was in high school at the time of the Little Rock, Arkansas integration debacle. In telling her story, Shetterly again brings up the idea of black people placing limitations on themselves because of discrimination in that Christine wondered if she and her fellow black students were good enough to compete with the white students.

Christine is portrayed as inquisitive and intelligent. She had a knack for mechanical things as well as mathematics as the author indicates by writing about how she liked working with her dad on his car and fixed her own bicycle regularly.

Vocabulary

intense, humiliated, blatantly, eddies, ratio, patrons, deft, platform, temperaments, beeline, promotion, timidity, spectrum, monotonous, rigmarole, transonic, proliferated, threshold, internalized, phalanx



Chapters 16-20

Summary

In Chapter 16, What a Difference a Day Makes, Americans were watching the sky wondering about the Russian satellite. Americans also felt humiliated by lagging behind the Russians.

Katherine Goble and her colleagues saw Sputnik as the next step for Langley. In the past, they had been admonished by congress not to spend time and money on spaceflight. Now, they were being pressured to find the fastest way to get to space. The Pilotless Aircraft Research Division, PARD, had been working with rockets and were confident they could get a satellite with a human passenger into space. Katherine and her colleagues in the Flight Research Division worked with PARD on the spaceflight effort.

Dorothy Vaughan's West Computers now worked on the fringes of the important work being done. There were now more black women working in other areas than in West Computing because they had been offered permanent jobs on other teams. East Computing was disbanded and Dorothy knew West Computing would be, too. She knew that the West Computers needed expertise in a subfield. Women would have to find a way to get closer to the real work going on to be promoted.

Over the years the women of West Computing had proven themselves and had gone from being "the colored girls" to just "the girls." There was still little socialization between the races outside the workplace, but inside the workplace many of the coworkers had grown to respect one another and had even forged friendships. The white and black employees got together for extracurricular activities at the laboratory, which allowed them all to avoid the awkwardness of socializing at a venue in town.

Civil rights movements continued to gain ground. However, Virginia continued to fight for Jim Crow laws rather than against them. Senator Byrd called for Massive Resistance to integration. Those in power in Virginia passed laws giving legislature the right to close schools that tried to integrate.

Langley management was able to avoid being active in integration by the West Computers being offered positions on various teams. The colored signs for the bathrooms and lunchrooms were now being neglected and the rules were no longer enforced.

The U.S.'s need to compete with Russia for the allegiance of brown and black countries was resulting in the weakening of the Jim Crow laws. Many believed that brown and black countries should not see a double standard in the U.S. However, many segregationists believed that there was little difference between integration and Communism.



In October 1958, the U.S. government consolidated all spaceflight research facilities, including NACA, to create NASA. As part of creating NASA, West Computing was dissolved. The history of West Computing and the women who worked there would barely leave a mark on history.

Dorothy Vaughan was 48 when West Computing was disbanded, so she still had many years of work ahead of her. The dissolution of West Computing meant a step backward for Dorothy since it meant she was no longer a manager.

Chapter 17, Outer Space, began with an explanation of the Introduction to Outer Space document created to explain space exploration to the American people in laymen's terms. Katherine Goble and her colleagues threw themselves into figuring out how they would achieve space travel. As they strove to learn more, Katherine began receiving additional assignments as part of her job on the team. However, she still was not allowed to attend the meetings with the men.

Katherine began asking the engineers why she could not go to the editorial meetings where their research was reviewed. She was told girls do not attend meetings. Although there was no rule against women in the meetings, whether or not a woman was given such opportunities was up to the men she worked with.

One woman, Dorothy Lee, was a computer with PARD. She authored and coauthored several reports. When she was interviewed for a newspaper article, she was asked if she believed that "women working with men have to think like a man, work like a dog, and act like a lady" (102). After agreeing, she was bothered by her response since she worried about the idea of acting like a lady meaning that women were asked to wait for assignments and take orders, mostly remaining unseen.

Katherine Goble was able to set aside the low expectations set for women as well as racism. She continued to ask why she could not go to meetings and was eventually given access.

In Chapter 18, With All Deliberate Speed, NACA completed its transition to NASA. The first manned space program was named Project Mercury.

Virginia's governor Lindsay Almond closed and chained schools that tried to integrate leaving thousands of students - black and white - with no schools to attend. Katherine's daughters were zoned to attend Hampton High School, but the school board paid "school fees" to families to keep black students in black schools.

Blacks were aware that it often took society time to catch up to the laws. Many black parents just focused on pushing their children to succeed so they could go to college rather than trying to fight segregation.

Katherine Goble, met James Johnson at a choir practice. The two fell in love. Because he was devoted to the military, he understood Katherine's dedication to her job, the long hours, and the secretive nature of her work.



NASA worked toward quickly getting a man into space. Dorothy Lee's boss was responsible for the design of the spacecraft. The rockets would come from the Marshall Space Center. The trajectories were to come from the team Katherine Goble worked on. By this time, there was no aspect of the country's defense technology that had not been worked on by women.

Katherine requested the task of calculating the trajectory. She was given the responsibility of completing a research report describing Project Mercury's orbit. Her report was subjected to the same rigorous process as any other report. When it was completed, she signed it with her new name since she had married James.

In Chapter 19, Model Behavior, Mary Jackson helped her son Levi build a soap box derby car to enter the peninsula's competition. Many NASA engineers helped their children build models, but Mary was one of the only mothers involved. She saw the building of the car as a way for Levi to learn about engineering.

Black students sometimes did not hear about the All-American Soap Box Derby since it was not advertised in places they would normally see. Even if they did see it, many blacks did not enter because they were so used to segregation that they disqualified themselves because they were not white.

Mary was used to being involved in humanitarian efforts since she had been raised that way. She often enlisted her coworkers, both black and white, to assist in various projects. She once asked a white woman named Emma Jean to join her in presenting to the local chapter of the National Council of Negro Women. Their joint presentation made an impression on the black students in attendance. Mary was also a Girl Scout leader and was impatient with the segregation of black scouts who were governed under a separate council from the white scouts. She lobbied for her co-leader to take a place on the national conclave.

Levi competed in the soap box derby and finished first. He told reporters he wanted to be an engineer like his mother. He was the first black boy to win the peninsula's derby.

In Chapter 20, Degrees of Freedom, Nasa continued to test the Mercury capsule while protests to integrate lunch counters were occurring in North Carolina. Hampton Institute students also organized sit-ins. Christine Mann was a student at Hampton Institute at the time of the sit-ins. She participated in the voter registration drives during the Kennedy election.

Despite the efforts to integrate, Virginia continued to resist. Schools were defunded to avoid integration. Black families were forced to send their children to live with family outside the state so that they could receive an education. Schools in Prince Edward County were closed for five years.

Dorothy Vaughan found herself working in a new area at Langley. She now worked side-by-side with white women who had been part of East Computing. Men were now accepting jobs in computing as well. Dorothy became a computer programmer.



President Kennedy enacted Executive Order 10925 calling for affirmative action to ensure all employees received equal opportunities.

Russia beat the U.S. in sending a man into orbit. NASA decided to broadcast the launch of Project Mercury's first manned mission. The launch was successful and President Kennedy pledged to send a man to the moon. Engineers estimated that it would take thousands of people to achieve a trip to the moon, a number that Langley could not accommodate. NASA moved to Houston. Katherine did not transfer to Houston because her husband wanted them to stay close to family. Like Dorothy, Katherine knew her future depended on being able to use the mechanical computers.

Analysis

In this section the author deals with the theme of black Americans overcoming segregation and discrimination. While the black women working at Langley were advancing toward being seen for their skills rather than their race, the world outside of Langley struggled greatly with issues of segregation and discrimination. Shetterly states that the black women working at Langley were increasingly being viewed as just "the girls" rather than as "the colored girls," which indicates the color of their skin had become less important to their coworkers as they proved their skills and value to the work being done there. The people who worked at Langley were not immune to the segregation laws, but it seems as though they simply began to ignore them. This may have been in part, as Shetterly suggests, because of the fact that the black women who worked there had become such integral parts of so many teams that there were fewer of them working in West Computing than in other areas of the facility. White people became used to seeing them and interacting with them, which may have led to their skin color becoming less important than when they first began working at Langley. In fact, Shetterly indicates that the people who worked at Langley became friends with one another regardless of race and socialized together at events held at Langley. However, the author also notes that the employees there knew that they would still be unable to socialize with their coworkers who were of different races outside of Langley since there was still little mixing of the races in the outside world.

Shetterly focuses on the problems black Americans faced in receiving an education due to the Jim Crow laws. The state of Virginia was particularly difficult to integrate since the government there was very anti-integration. Shetterly writes about the closing of schools to avoid integration. This led black families to send their children out of state to live with family members so that they could attend school. Shetterly points out that it was not just the black students who suffered because of the resistance to integrating schools, but also white students since the school closings affected them as well.

The events occurring at Langley were integral in the eventual abolishment of Jim Crow laws. Because the U.S. was involved in trying to garner alliances with countries where the citizens were mostly black or brown in order to remain stronger than Russia, the Jim Crow laws were made weaker. Americans began to realize that they could not hope to win these countries over as allies if they were not treating people who looked like them



as equals. Langley was indirectly involved in this since one of the reasons the U.S. was trying to gain allies was because there was concern about Russia launching an attack after Sputnik was sent into orbit. When people began to wonder if they were missing out on some bright minds by not ensuring that all U.S. citizens, black and white alike, were receiving a good education, the Jim Crow laws began to lose some of their footing.

The U.S. government's desire to beat Russia into space created opportunities for women at Langley to advance their careers. Shetterly uses the opportunities created by the space race to emphasize her theme of women making great contributions to the field of aeronautics. More and more women were becoming members of research teams where their mathematical skills and talents for analytical thinking were being used to make important steps toward putting a man into space. Dorothy Lee worked on a team that designed the spacecraft. Katherine Goble worked on the trajectories and even authored a report on the orbital path of Project Mercury.

Shetterly also continues to explore the theme of women overcoming gender stereotypes. She relates the story of Dorothy Lee having been interviewed regarding her work. She regretted having said that women had to act like ladies in the workplace because it implied that women had to remain passive in their careers. As Shetterly pointed out in a past section, women were expected to be grateful for whatever job they were given. Lee seemed to be bothered by the idea that women were viewed as needing to wait for a man to tell them what to do and to remain in the shadows until they were called upon. This view of women in the workplace at the time probably contributed to the fact that the women who worked at Langley were effectively written out of history. They were, as Shetterly suggests in her title, meant to be the "hidden figures" behind the work being done while the men took the credit.

Katherine Goble Johnson's eventual admittance into meetings with the male engineers is another example of the theme of women overcoming gender stereotypes. Katherine asked her male teammates why she could not attend the meetings with them and was told that it just was not something that women did. Perhaps the men of the time thought the women would have little to contribute, or perhaps as was the case with receiving credit on reports, they simply thought attending such meetings would not matter to women. Katherine broke through that barrier by continuously asking why she could not attend until her coworkers gave in and allowed her access to the meetings.

Shetterly includes a chapter devoted to Mary Jackson's son entering a soap box derby. The purpose of this chapter seems to be to illustrate the ways in which the women who worked at Langley were trying to model a better way of life for the generations that came after them, as is indicated by the chapter title "Model Behavior." The title refers not only to the soap box model car that Mary and her son build, but also to the way that many of the women who worked at Langley were also role models. Mary wanted her son to see that he could one day pursue a career in science, too, and she saw the derby as a sort of apprenticeship for her son to give him a peek into the world of engineering. In addition, Mary was also a role model to the Girl Scouts she worked with as is evidenced by the way she lobbied to have both black and white Girl Scouts governed by the same body as well as to have her coleader placed on the council. Mary



was also a role model for the classes she spoke to. Choosing Emma Jean, a white woman, to speak to black students with her showed that Mary wanted young black people to know that both races could work together and that there were opportunities for black women in the field of science.

Shetterly also provides further insight into Dorothy Vaughan and her career. Dorothy was an insightful woman who knew early on that women would have to learn to use computers to continue working at Langley. While she had accomplished a great deal as a black woman placed into a management position, she lost her management ranking when West Computing was disbanded. However, Dorothy did not let her demotion end her career. Instead, she became a computer programmer. Since computers were a relatively new development, it is likely that Dorothy was among the first female computer programmers in the country.

Vocabulary

vividly, trajectories, retaliation, viability, unprecedented, alleviation, brusque, leeway, erudite, incentive, unflappable, suborbital, humdinger, circumscribed, barrier, reliability, aflame, improbable, salvage, organically

Chapters 21-23, Epilogue

Summary

In Chapter 21, *Out of the Past, the Future*, Katherine Johnson worked on the problem of bringing a man safely home from space. The Russians put a man into orbit for nearly a full day. Finally, the launch date for the Mercury Project was set at February 12, 1962.

John Glenn requested one more check of the trajectory that was generated by the IBM computer. He requested that the numbers be checked by Katherine. He trusted that if she was confident the numbers were right, they were.

Film footage shot at NASA for television showed rooms full of white male scientists. However, behind the scenes, black employees were working diligently toward the launch. Dorothy Vaughan was working on calculations for Project Scout, which was testing a solid-fuel rocket. Miriam Mann worked on the data that would allow two ships to dock while in space. Mary Jackson was involved in testing the Apollo capsule.

Katherine Johnson had the most direct role in the Mercury Project. She ran through the calculations and determined that the numbers produced by the computer were correct. On the day of the launch, Katherine watched from the office. The mission was a complete success and John Glenn had restored America's pride. John Glenn was lauded as a hero, but Katherine Johnson was also cheered by the black community.

In Chapter 22, *America Is for Everybody*, Katherine received a brochure created by the U.S. Department of Labor that celebrated the 100th anniversary of the Emancipation Proclamation. Katherine was the only black woman to appear in the brochure.

Dorothy Vaughan received a pin commemorating her 20 years of service at Langley. She and the other women of West Computing had managed to turn temporary wartime jobs into careers. However, there were still issues to overcome. There were still only five black engineers and 16 blacks with the title of mathematician.

Few black people were applying at Langley in the 1960s because the community was still segregated. Langley doubled its efforts to recruit black scientists and mathematicians. Mary Jackson and the other black employees took care to help the new recruits to adjust.

Katherine Johnson met Christine Mann Darden at church. Christine applied for a job at Langley and was hired as a data analyst. Christine knew Katherine well outside of work but did not know what Katherine's work was until years later because Katherine was very modest about her role in Project Mercury.

The Apollo 1 accident shook NASA. The leaders of the Space Task Group set a standard of a 99.9% success rate for testing as they prepared to take a man to the moon. Katherine Johnson worked long hours to help achieve those goals.



In Chapter 23, *To Boldly Go*, over 100 black women, including Katherine Johnson, gathered at a leadership conference held by Katherine's sorority during the Apollo 11 launch. The goal of the leadership conference was to learn from people like Katherine how to organize the missions and activities of the sorority. They stayed at the Hillside Inn in the Poconos because it was the only resort with black owners, so they were able to stay there.

Many people felt that the money spent on the space program was frivolous. The mission took a few white men to the moon while black women and men could hardly travel to the next state without worrying about segregation. Once, the space program and the civil rights movement had both been optimistic, but now advancements in society seemed to be stuck.

Protestors led by Rev. Ralph Abernathy gathered at Cape Kennedy to protest the money spent on the space program when the poor could hardly feed their families and the lack of housing for blacks due to discrimination. Even those in the black community who supported the mission recognized that there were no black astronauts, administrators, or black personnel in Mission Control.

With segregation ended at NASA, the black employees had actually become less visible. In their communities, they were better known for their involvement in community organizations than they were for their professional lives because the public face of NASA was white.

When the television show *Star Trek* premiered, a black woman, played by Nichelle Nichols, was part of the crew. She wanted to quit, but after meeting Martin Luther King, Jr., who was a huge fan, she was convinced to stay. He told her that she had to remain on the show because she showed that black people were a part of the future and that a black woman could hold a powerful position. Katherine Johnson was also a fan of the show. She believed science and space were ideal places for talented people of any race because if you got the numbers right "it didn't matter what color you were" (136).

While the astronauts of Apollo 11 had only given the mission a moderate chance of success, Katherine knew it would be successful because of all the hard work that had been put into the project. Even as the astronauts landed on the moon, Katherine knew there were still more challenges to meet.

In the Epilogue, the author reflects on the book as a story of hope and a testament to the fact that hard work can change things.

Katherine Johnson continued to work at Langley following the Apollo 11 mission. Her calculations were also used during the Apollo 13 crisis. She went on to coauthor a series of reports on navigating by the stars in the event that a ship's computer systems malfunctioned. She also helped to develop parts of the space shuttle and Earth resources satellite programs. She is "the most recognized of all the NASA human computers, black or white" (139).



In 1966 the space program began to decline as President Johnson viewed it as an organization he could draw money away from to bolster the budget. Programs aimed at space travel were cancelled as the focus shifted to making planes more efficient. Thousands of people lost their jobs at Langley. However, Mary Jackson continued to work there in her partnership with Kaz. She took programming classes and spoke in schools about careers available in science and engineering. She eventually took a job in Human Resources where she worked toward helping women advance in their careers. During her time at Langley, Mary Jackson worked with Gloria Champine, a white woman, to champion women working at NASA.

Christine Darden started at NASA as a data analyst. When she learned her job was in jeopardy during the layoffs because a man was promoted over her, she questioned why men were being moved into engineering pools while women were sent to computing pools. The response she received was that was how things were and no one had ever complained. Two weeks later, she was assigned to a research group. She went on to author a report and her ideas are still used today. When Christine was passed over for promotions, Gloria made a case to the head of the directorate showing that women were being excluded from the upper echelons. Christine was promoted shortly afterward.

Dorothy Vaughan never achieved her final career ambitions, though her children never knew what those ambitions were. She had influenced the careers of many women during her time. At her retirement party, a picture was taken of some of the women who started in West Computing. Although Langley kept strict records of its employees over the years, the author was never able to find another picture of the West Computers. Dorothy's legacy remained at NASA in the form of the women, like Christine Darden, whose careers stood on Dorothy's shoulders.

Analysis

The final section of the book continues to highlight the theme of contributions made by women. Shetterly mainly focuses on the contributions of Katherine Goble Johnson, even mentioning that she is the most well-known of all of the women who worked as computers at NASA. Katherine played an integral role in the successful launch and return of Project Mercury. The fact that John Glenn requested that she double check the numbers generated by the mechanical computer indicates that she had become increasingly well thought of at NASA and was respected for her knowledge. Katherine also worked on the Apollo 11 and Apollo 13 missions. In addition to Katherine's contributions, Shetterly also mentions contributions made by Dorothy Vaughan on Project Scout and Miriam Mann on data used for docking ships in space.

In further exploring the theme of black Americans overcoming segregation and discrimination, Shetterly juxtaposes the rapid advancements in the space race against the advancements in the civil rights movement, which had become sluggish at the time of Project Mercury. She writes that many black leaders were opposed to the space program because it did not include black people in key roles like Mission Control,



administration, or astronauts. In fact, the public face of NASA was overwhelmingly white in spite of the fact that there were many black Americans working in the background without whom the space program would not have been a success. Shetterly reminds readers that the television footage that was shot at NASA on the day of the launch of Project Mercury showed only white men. In fact, Shetterly points out that the number of black engineers and mathematicians were still incredibly low.

Even as men were on their way to the moon Katherine and her sorority sisters were meeting to talk about how they could organize projects to help future generations of black women make their way in the world. It is interesting to note that while they were talking about the advancement of their race, they were doing so at one of the only inns that would accept a group of black women as customers. In fact, Shetterly makes note that some black leaders were upset that the space program was sending white men to the moon when black people had a difficult time traveling to the next state because of segregation.

Segregation was not just a problem when travelling, it was also a problem that made it difficult for Langley to hire additional black employees. There was a shortage of housing designated for black people and the fact that the area was still segregated made Langley an uninviting place for black Americans to work regardless of the fact that NASA was offering good job opportunities not available elsewhere.

Though the government was trying to make steps toward equal rights, they missed the mark in publishing a brochure that celebrated the Emancipation Proclamation. The brochure may have been designed to feature the accomplishments made by black Americans, but it included only one black woman, Katherine Goble Johnson.

Shetterly continues the theme of women overcoming gender stereotypes by telling the story of Christine Mann, one of the next generation of black women at NASA. Christine nearly lost her job due to a man being promoted over her. The response she received when she questioned why women were sent to a computing pool while men were promoted to engineers was indicative of the continuing attitude that women should be grateful for the job they were given. In fact, it suggests that women were at least in part responsible for this perception since they had not questioned the problem in the past. Christine's questioning led to a promotion for her. As her career progressed and men were again promoted over her, Gloria Champine stepped in to show management that women were being passed over while men were advancing in their careers. Champine's intervention undoubtedly made it easier for women to be promoted in the future.

Mary Jackson was also a woman working toward overcoming gender stereotypes and helping women to advance at NASA. She and Gloria Champine worked together to promote equal rights for women. She also continued to speak at schools about jobs available in science and engineering for women.

Shetterly also devotes several pages to discussing the television show Star Trek because of Nichelle Nichols' role as a black woman on the bridge of the ship. Nichols' role helped to break gender barriers as well as barriers for black people. Shetterly



points out that her role was important because it showed that black people had a future in science and in the space program.

Shetterly uses the Epilogue to draw a conclusion to the stories of several of the women in the book. While most of the women achieved their career goals, Shetterly states that Dorothy Vaughan did not achieve her final goal, though the actual goal is not revealed. Dorothy's inability to reach her final goal indicates that there are still barriers for women, particularly black women, to overcome. However, she shows that Dorothy's inability to reach that goal does not make her a failure. On the contrary, it was the work done by Dorothy and the women she worked with that made it possible for future generations of black women, like Christine Darden, to build meaningful careers in science and mathematics.

Vocabulary

myriad, whiff, catastrophic, venturesome, dithering, propaganda, dissonances, extent, accolades, literally, betterment, waned, solitary, expansive, commentary, meritocracy, protagonists, navigate, inkling, scarcity



Important People

Dorothy Vaughan

Dorothy Vaughan was an African American woman who began working at NACA as a computer in West Computing. She was promoted to acting head of West Computing when Blanche Sponsler became ill. Quite some time after Blanche passed away, Dorothy was finally made the official head of West Computing. When NACA began using IBM computers, Dorothy could see the need for the women to learn how to use the machines in order to keep their jobs. When West Computing was disbanded as computers were used more and the women were assigned permanent places on various teams, Dorothy worked as a programmer. She eventually retired from NASA.

Katherine Goble Johnson

Katherine Goble Johnson was an African American mathematician who was later promoted to engineer. Her inquisitive nature and bright mind helped propel her forward in her career. She was respected for her analytical mind and was responsible for calculating the trajectory for the Project Mercury mission. Prior to the mission, astronaut John Glenn requested that Katherine double check the numbers produced by the IBM computer because he trusted that if she agreed with the numbers, they were correct.

Virginia Tucker

Virginia Tucker was a white woman who was Langley's Head Computer. She also worked as a recruiter and traveled the country looking for women who were qualified to work at Langley as computers. More than 400 women received training as computers while she was the Head Computer. When East Computing was disbanded, Virginia left NACA and took a job at the Northrop Corporation.

Melvin Butler

Melvin Butler was the personnel officer at Langley. He was responsible for ensuring the employment positions at Langley, which was rapidly expanding in the 1940s, were filled. It was Butler's idea to quietly hire black women to work as computers. He determined that hiring black women would mean the need for a segregated space for them as well as a white woman to oversee their pool.

Margery Hannah

Margery Hannah was a white female computer who served as the first boss of West Computing, the all-black computing department at Langley. She respected the black



women she worked with and treated them as equals. She later moved on to the Full-Scale Research Division and authored reports.

Blanche Sponsler

Blanche Sponsler was Margery Hannah's assistant until Margery moved on. Blanche then became the head of West Computing. Blanche suffered a mental break and was institutionalized. Her illness and death led to Dorothy Vaughan becoming the head of West Computing.

Miriam Mann

Miriam Mann was an African American woman who worked as a computer. She took umbrage to the sign in the cafeteria that denoted the table for the black computers. Theirs was the only table that had a sign on it. Miriam began removing the sign until management finally gave up and stopped replacing it.

Mary Winston Jackson

Mary Winston Jackson is an African American woman who worked as a computer and later an engineer. Later in her career she worked in Human Resources and worked to advance the careers of women and minorities. When Christine Mann Darden was overlooked for a promotion while men with the same or lesser qualifications were promoted above her, Mary made the argument to upper management to prove that women were being passed over. Shortly afterward, Christine was promoted.

Dorothy Hoover

Dorothy Hoover was an African American woman who worked as a computer and was promoted to shift supervisor. She later became an engineer and authored reports. She resigned from Langley and went on to pursue a master's degree in mathematics. Later, she returned to work at NASA and achieved a senior ranking of GS-13.

Christine Mann Darden

Christine Mann Darden began working at Langley as a data analyst. She became an engineer and worked her way up through the rating system. When she had trouble breaking through the upper barriers when men were being promoted ahead of her, Mary Jackson challenged management and Christine was promoted shortly afterward.



Objects/Places

Langley Research Center

The Langley Research Center was the home of West Computing, the black women computers division. It is located in Hampton, Virginia. A great deal of early aeronautical research took place at Langley under NACA, which later became NASA. During World War II, the Langley Research Center was rapidly hiring employees to keep up with the demands for advances in air power as part of the war effort. Later, when Russia launched Sputnik and Americans felt a sense of damaged pride at being beaten into space, Langley again geared up to meet the needs of the space program.

The location of the Langley Research Center in Virginia is significant because government of the state of Virginia was resistant to integration. As a result, Langley was something of a social experiment in terms of integration since they employed black women and men in the field of science where many of them worked side-by-side with white employees. While Langley did conform to segregation laws, the black employees felt the effects of segregation more outside of their workplace as they struggled with segregated transportation and housing.

"Colored Computers" Sign

The "Colored Computers" sign that hung by the cafeteria table designated for the black women computers at Langley was a reminder to the women of West Computing that they were still employed at a segregated workplace. While there were also black men working at Langley, theirs was the only table that was labeled. The sign so bothered Miriam Mann that she began removing it. Each time she did, management would have the sign replaced. Miriam persisted in removing the sign until management finally gave up and the table was no longer labeled.

Executive Order 8802

Executive Order 8802 was signed by President Eisenhower. It desegregated the defense industry. The signing of the order gave the black community hope that things were beginning to change. However, they learned that society does not always move at the same pace as the law. While Langley became desegregated as a result of the order, it did not mean that black employees would immediately receive the same opportunities as their white coworkers. On the contrary, it would take years for a black woman to be promoted to engineer regardless of her qualifications.



West Area

West Area was the home of West Computing, which was where the black female computers worked. Employees at Langley joked that West Area was akin to a far-off land in the wilderness. The white female computers worked in the East Area, so the two groups were kept separate even though they performed the same job. During the war effort, West Area grew and developed rapidly to accommodate the demands of the defense industry.

Brown v. Board of Education

Brown v. Board of Education was the Supreme Court case whose ruling desegregated schools. Though the ruling had been handed down, many states were slow to integrate. Schools in Little Rock, Arkansas refused to integrate and sent in state forces to bar black students from entering. However, the president sent U.S. army forces to escort the students into the building. Virginia schools were also reluctant to integrate. Rather than integrate, some schools closed and black families were forced to send their children to live with family out of state to ensure they would receive an education.

Executive Order 10925

Executive Order 10925 was signed by President Kennedy and called for affirmative action to ensure that minorities were not discriminated against in government workplaces. The order was signed during the time that NASA was working toward putting a man in space.

Project Mercury

Project Mercury was the program that first put an American into space. The objectives of the project were to orbit a manned spacecraft, learn about how man would function in space, and to get both the man and the spacecraft back to Earth safely. Many black women worked on the project in various capacities. Katherine Goble Johnson calculated the trajectory for the project. When John Glenn was uncertain of the reliability of the data produced by the IBM computer, he requested that Katherine double check the numbers.

Soap Box Derby

Mary Jackson's son Levi competed in the peninsula's soap box derby competition. Mary helped him to build his derby car and saw the project as a way of introducing him to engineering. While many of the men who worked at Langley helped their sons to build derby cars, Mary was one of very few mothers who did so. Levi went on to be the first black boy to win the derby.

Bell Calculator

The Bell calculator was the first machine used to calculate data at Langley. When they were introduced, Dorothy Vaughan saw that the women of West Computing would eventually have to learn to use the machines (and later the IBM computers), or they would lose their jobs.

Sputnik

Sputnik was a Russian satellite launched in 1957. Its launch started the space race as Americans were incensed to have been beaten into space and feared that Russia might be planning an attack.

Themes

Women Made Important Contributions in Aeronautics

Shetterly's main theme in *Hidden Figures* is that women made some very important contributions in the field of aeronautics. Shetterly makes a point in the Prologue of saying that while this book focuses on black women, there were many other women who made advancements in aeronautics possible. She set out to tell the history of the women who worked at NACA and then NASA not as the history of women, but as a part of the larger story of the history of America.

Through her book, Shetterly shows that before computers were a part of everyday life, women performed the complex calculations that were necessary to the research and advancements in airplanes and eventually in space travel that took place at Langley. It was necessary to hire women to perform this work because there was a great demand for advancements in air power during World War II when there was a shortage in men to perform the work because they were in the military. Women proved that they were capable of analytical thinking and advanced mathematics.

The women who worked in the West Computing pool were overseen by Virginia Tucker, a white woman who also played a role in recruiting black women as computers. Later, Blanche Sponsler took over the position, and finally Dorothy Vaughan, a black woman, stepped into the role. Dorothy's contributions included becoming the first black female manager at Langley. Dorothy helped more than 400 women start their careers at Langley and encouraged the women who worked under her to learn other tasks such as how to work the new computers so that they could continue to move forward.

As more and more women began working at Langley, many of them were eventually assigned permanently to various research teams. This led to women becoming engineers and computer programmers. Katherine Goble Johnson was the most well-known woman to have worked at NASA. She was responsible for calculating the trajectory for the Project Mercury mission. She was so respected in her field that astronaut John Glenn requested that she double check the numbers produced by the mechanical computer before he launched.

Black Americans Had to Overcome Segregation and Discrimination in Society and at Work

At the time this book takes place segregation laws were still in effect. This means that the black women and men who worked at Langley had to overcome segregation and discrimination to get and keep their jobs. The segregation laws affected them both at work and in their personal lives as they tried to navigate the segregated community surrounding Langley.



When the West Computing pool was started at Langley, Melvin Butler was required to set up a separate area for the black women to work in. They could not work in the same area as the white women. They also had to use bathrooms and lunch tables designated for “colored women” or “colored computers.” Miriam Mann, a black woman, was so bothered by the constant reminder of their status as second-class citizens that the “colored computers” sign on their lunch table provided that she began removing and hiding it on a daily basis. Management eventually gave up on replacing the sign and the table remained unlabeled. Mary Jackson was humiliated one day when she asked a group of white women where the bathroom was and they laughed at her because they did not know where the bathroom for “colored women” was.

Black men who worked at Langley were subjected to discrimination as well. One engineer had to convince the guards at the gate that he was an engineer and not a janitor or other lower level employee. Another engineer was the target of sabotage by a white mechanic.

Outside of Langley, the black employees had to find housing available to black Americans and manage the segregated transit system. Upon arriving at Langley, new employees were given a list of housing separated by blacks and whites. Housing for black Americans was short and constantly in danger of being dismantled. Public transit was also a problem since blacks were required to enter and sit in the back of buses. They were also expected to give up their seats to white people if necessary. The segregated community surrounding Langley eventually made it difficult for the research laboratory to attract new employees who did not want to live in such an area.

Segregation was also an issue in education for black Americans. The Civil Rights movement was working toward desegregating schools. Black high schools were underfunded and many colleges that offered engineering degrees would not accept black students. Mary Jackson encountered this issue when she wanted to take an engineering course that was held at Hampton High School, a white high school. She had to petition for a pass to allow her access to the class. The state of Virginia even closed schools for years rather than allow them to be integrated. This led to black families having to send their children to live with other family members outside of the state just so they could receive an education.

Women Had to Overcome Gender Stereotypes to Work in the Field of Science

When women began working at Langley they had to overcome gender stereotypes to prove to their male coworkers that they were capable of higher level thinking and thus advance into careers in the scientific field. When the female computers were first hired, they were referred to as “girls” instead of women. When they first began working at Langley, men wondered if they could even perform the calculations and had an attitude of errors were to be expected from “girls.” When Mary Jackson worked on a project and the numbers produced from her calculation did not come out as expected, it was assumed that she had made an error. However, Mary stuck by her numbers and it



turned out that the division head had given her incorrect data to start with. It was the hard work and dedication of these women that eventually gained the trust and respect of the men that allowed women to later pursue advanced careers.

Women also did not receive credit for the work they did on research projects. Their male coworkers either knowingly took all of the credit or simply assumed that receiving credit would not matter to a woman anyway. Women were expected to accept the jobs they were given and to be grateful for them, but not to want credit for their work. It took years for women to be credited as coauthors or authors on reports.

Even after women began working on research teams, they were still not treated as equals. Women were not allowed to attend the engineer's meetings. When Katherine Goble Johnson questioned the practice, she was told that was simply how things were done and no one had ever questioned it before. Katherine's persistent requests to join the meetings eventually wore down her male coworkers and she was allowed to attend.

Black Americans Were Forced to Live a Double Consciousness

Shetterly writes about black leaders acknowledging that black Americans had to take on the "Double V." This Double V stood for the victory that they had to achieve against enemies overseas and the victory that they had to achieve against oppression in America. This double consciousness way of living was one of the themes Shetterly explored in *Hidden Figures*.

When black men were expected to join the military, they stepped forward to support their country. However, at first they were not allowed to fight alongside white soldiers. Instead, they were often assigned to perform manual duties such as cooking.

Black soldiers during World War II were expected to fight for the rights of the Jewish people in Europe while not being given equal rights in their own country. Black leaders drew a correlation between the treatment of the Jews and the treatment of blacks in America.

Later, during the Cold War, America was trying to gain the support of countries whose citizens were mainly black and brown peoples. Yet, at the same time, black Americans who looked like the people of these countries were still facing segregation and discrimination. It was this realization that helped to abolish some of the Jim Crow laws.

Styles

Structure

Hidden Figures consists of a prologue, 23 chapters, and an epilogue. The epilogue and prologue provide insight from the author on the reasons for writing the book and a bit about the process of researching the topic. The chapters are both numbered and titled.

The timeline of the book primarily moves forward from the early 1940s to the 1960s. However, there is some backward movement in time when the author provides information regarding the background of one of the individuals she writes about. For example, Shetterly writes about the childhood and education of several of the African American women she focuses on.

Perspective

Hidden Figures is written in third person and in the past tense. The style is of a reporting nature that provides a great deal of information about the time period and the historical events that impacted the lives of the women who worked at Langley. There is a small amount of speculation as to what an individual may have been thinking at certain times and the motives for the actions of some individuals. There is virtually no dialogue throughout the book.

Tone

The book was written with a factual and direct tone like that of a historical report. The author writes about the women in the book in a respectful manner that indicates she admires them for the work they did and their courage for working in a field dominated by white men during the time of segregation.



Quotes

Not told as a separate history, but as a part of the story we all know. Not at the margins, but at the very center, the protagonists of the drama. And not just because they are black, or because they are women, but because they are part of the American epic.
-- Narrator (Prologue)

Importance: This is Shetterly's explanation of why she felt it was important to write this book. She wanted to recognize the black women who worked in the early days of aeronautical research and space flight for their talent, not just because they were black women. She wanted readers to understand the importance of their contribution to science and the difficulties they overcame to be a part of the world of science and mathematics.

With men being absorbed into the military services, with women already in demand by eager employers, the labor market was as exhausted as the war workers themselves.
-- Narrator (chapter 1)

Importance: This quote explains how the war opened the door for black women to enter the workforce at Langley. They were selected as a last resort since men were in the military and white women were already doing the jobs that men used to do. With a great need to fill positions at Langley to support the demands of the defense industries desire to increase America's air power, black women were recruited to fill the computer positions.

What would it be like to work with white people? Would she sit side by side with young women like the ones at the State Teachers College?
-- Narrator (chapter 3)

Importance: This quote describes the questions that may have been running through Dorothy Vaughan's head as she rode the bus to Hampton to begin her new job at Langley. She previously worked as a teacher in a black school and saw the white female students at the State Teachers College. When she first saw the ad looking for women to work as computers, she assumed the ad meant the white students at the college. Dorothy very likely felt a sense of apprehension at what her new life would be like.

From the fissure of their ever-present double consciousness sprang the idea of the double victory, articulated by James Thompson in his letter to the Pittsburgh Courier: 'Let colored Americans adopt the double VV for double victory; the first V for victory over our enemies from without, the second V for victory over our enemies within.'
-- Narrator (chapter 4)

Importance: This quote describes the way that many black Americans felt during World War II. They were called upon to fight the Axis forces that were imprisoning and killing thousands of Jews while their own country was still exhibiting its own prejudices through



segregation. While they believed that joining the military and fighting such prejudices overseas was the right thing to do, they also recognized that there were a lot of challenges to overcome within America as well.

A white cardboard sign on a table in the back of the cafeteria beckoned them, its crisply stenciled black letters spelling out lunchroom hierarchy: COLORED COMPUTERS.

-- Narrator (chapter 5)

Importance: The table for the black computers was the only table in the cafeteria that was labeled. It was a reminder to the black women that they worked in a segregated building and gave them the feeling that they were less valuable than their white coworkers. Miriam Mann began taking the sign and hiding it. Each day the sign was replaced, but she persisted until management finally gave up and the table remained unlabeled.

Women, on the other hand, had to wield their intellects like a scythe, hacking away against the stubborn underbrush of low expectations.

-- Narrator (chapter 9)

Importance: This quote explains that while men were welcomed into Langley by the male researchers who mentored them, the women at Langley had a harder time. They were only accepted to research teams after meticulously proving their skills as mathematicians and making themselves indispensable.

But the West Computers' competence silenced most of the dissent; up close, it was difficult to object to good educations and mild middle-class manners, even if they came wrapped in brown skin.

-- Narrator (chapter 9)

Importance: When some of the black computers were made part of a research group, many white employees who worked on the East Side were shocked to learn that there was an all-black computing group at Langley. However, the black computers proved themselves to be highly educated and skilled. Shetterly often wrote about the way the West Computers launched a "charm offensive" by dressing very professionally and performing their jobs meticulously so that their actions positively reflected on the rest of the black community.

Headlines like 'Untouchability Banished in India: Worshipped in America,' which appeared in a Bombay newspaper in 1951, mortified the US diplomatic corps. Through its inability to solve its racial problems, the United States handed the Soviet Union one of the most effective propaganda weapons in their arsenal.

-- Narrator (chapter 10)

Importance: After World War II, America and Russia competed for countries like India, where the population was comprised mainly of black and brown peoples, to be their allies. The pressure the U.S. felt from outside countries due to their own policies toward



minorities helped to push the government toward passing laws to desegregate the military and government workplaces.

She had a choice: either she could decide it was her presence that provoked the engineer to leave, or she could assume that the fellow had simply finished his work and moved on.

-- Narrator (chapter 12)

Importance: This quote exemplifies the way that Katherine Goble Johnson lived her life and approached those she worked with. Katherine lived by her father's adage that she was no better than anyone else and no one was better than her. She knew that how she approached situations would impact their outcome, so rather than letting difficult situations fluster her, Katherine remained calm and continued about her day. This ability to remain calm and avoid panicking served Katherine well in her work since it allowed her to withstand the pressures she faced at Langley.

By the 1950s, Dorothy Vaughan was also looking forward to a time of change, imagining an era when she and other computers who wore skirts would be forced to concede ground to the inanimate computers that were redefining the technological frontier.

-- Narrator (chapter 14)

Importance: As computers were introduced at Langley, Dorothy Vaughan understood that the West Computers would either need to learn to use the machines or they would eventually lose their jobs. She encouraged the women she worked with to take classes in programming and eventually became a programmer herself.

The morning of October 5 was the official dawn of the space age, the public debut of man's competition to break free of the bonds of terrestrial gravity and travel, along with all his belligerent tendencies, beyond Earth's atmosphere.

-- Narrator (chapter 15)

Importance: When Russia launched Sputnik, Americans were humiliated by the fact that Russia had beat them to space. The launching of Sputnik started the space race and work at Langley intensified again as it had during World War II. The researchers at Langley were tasked with finding a way to put an American into space as quickly as possible.

The greatest part of her legacy—Christine Darden and the generation of younger women who were standing on the shoulders of the West Computers—was still in the office.

-- Narrator (Epilogue)

Importance: This is the final line of the book. Shetterly wrote this of Dorothy Vaughan's accomplishments at Langley. Dorothy never dwelled on her past and the difficulties of working in a segregated workplace. She also did not want accolades for her accomplishments and only reluctantly allowed a party upon her retirement. She was most proud of the fact that her work and the work of the other black women in the early

days of Langley opened the doors for black women to pursue careers in science and mathematics.



Topics for Discussion

Segregation and Public Transit

How did segregation affect the public transit system in the area surrounding Langley? Was it successful in keeping the races separated?

Black Women in the Workplace

Why did the black women have to work harder than their white colleagues?

Segregation and Labor Laws

What laws helped shape the way blacks became a part of the Langley workforce?

The Cold War

How did the Cold War affect racial relations at Langley and in the U.S. in general?

Katherine Goble Johnson

How did Katherine Goble Johnson's experience of racism and segregation differ from the other women at Langley? Why was her experience different?

Barriers for Women in Science

What barriers did women have to overcome to become engineers? What additional barriers were there for black women?

Effects of Segregation

What does the author mean when she talks about blacks disqualifying themselves from opportunities because they were used to segregation?

Katherine Goble Johnson

How did Katherine Goble Johnson move from being an entry-level computer to becoming an author of reports and figuring the trajectory for Project Mercury? What qualities did she have that helped her to do so?



Mary Jackson

What contributions did Mary Jackson make toward equality in the workplace for women?

The Civil Rights Movement and the Space Program

Why did some civil rights leaders object to the space program?