

# **Lab Girl Study Guide**

## **Lab Girl by Hope Jahren**

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# Summary

Jahren, Hope. Lab Girl. United States and Canada: Alfred A. Knopf and Alfred A. Knopf Canada, 2016. Kindle AZW file.

When Hope Jahren was a young girl, she regularly visited her father's science lab at a community college in a small town in Minnesota. There, she felt at home and began to decide that she would become a scientist. Most evenings, she and her father spent the evening at the lab. Afterwards, they walked home through the frigid Minnesota evening. They never talked, and Jahren looked back on the things she might have learned from her father if they had. Her mother was equally reticent to communicate feelings. Though she could not fully define what was missing from her family, Jahren grew up missing the warmth of love.

She was a graduate assistant at Berkeley when she met Bill. He was serious and intelligent, and they connected immediately. Jahren set out to secure funding to get Bill a place in the lab where she worked. They soon found themselves planning for their first lab together. When Jahren got her first job, Bill moved with her. They never had a romantic connection, but the two were family to each other in ways that their real families were not. Together, they set out to study various aspects of plant science though Jahren struggled to earn recognition and funding for their work. Their early efforts met with little real success in the academic world, but they remained dedicated. When Jahren felt inclined to give in to her fears of failure, Bill provided encouragement.

Bill was something of a loner. He was missing part of one hand and had a horrible childhood because of it. He confided in Jahren that he did not participate in any group activities, nor did he ever date. He apparently never had any real friends, either. Jahren knew in her heart that Bill would always have a place in her life as her family and in her work as a scientist. Through those early years, Jahren struggled with manic-depression until a doctor recognized her symptoms and helped her get on a medical regimen that helped.

While working at Johns Hopkins, Jahren met and married a mathematician named Clint. When Jahren became pregnant, she had to stop all medications. This sent her spiraling into a serious depression. She was hospitalized for long periods and suffered through the first months after giving birth until she could safely start up some of the medications. She worried that she would not be able to show her son the love that she had missed as a child, but she soon found that she was completely devoted to him. In an effort to end the cycle of silence between parents and children in her family, she showed him her love at every opportunity.

Clint landed a permanent position at the University of Hawaii, which prompted Jahren's family to move. That move included Bill. Together Bill and Jahren set up yet another lab and continued their work.

# Prologue; Part One: Roots and Leaves, Chapters 1-3

## Summary

The book opens with a Prologue. Hope Jahren compares the amount of life in the ocean to the amount of life on land. Then, she challenges the reader to look out his own window. Jahren predicts there are man-made things outside, but asks the reader to look again for anything growing. She says the person who can see a tree is fortunate. She then asks the reader to look at a single leaf from that tree and to realize that people kill trees all the time. She says people should care about that just as they would care whenever “someone” needlessly dies. She then suggests the reader ask a question about the one leaf they've focused on, following by saying that question is the basis for being a scientist. She concludes the Prologue by saying she wants to relate some stories, “one scientist to another.” (Page 4 of the Prologue)

“Part One: Roots and Leaves” opens with Chapter 1. Jahren describes her hometown in Minnesota. Her father taught science at a community college two miles from the family's home. Jahren spent evenings at the lab with her father. There, her father taught her that there was no shame in breaking something, but that she should know how to fix it. She took things apart that were not broken in order to understand how they worked, so she could fix them when they inevitably failed to work properly. After the evening at the lab, Jahren and her father walked home in silence. Her family talked little, just like the other Norwegian families in the community. Jahren describes the town, including the large slaughterhouse that provide direct and indirect employment for most of the town.

Jahren had deep roots in the town and knew most people, but there was little communication within families. Her grandmothers died before she was born and she had no direct communication with her grandfathers who both died when she was young. Her brothers grew up and left home, but Jahren barely noticed because there was so little communication. Jahren was cold by the time she and her father finished the walk home, but she noted that it was “a different kind of cold” that permeated the inside of their home (5). She feared she was the reason her mother was always angry and routinely promised herself to be a better child.

Jahren's mother had a garden each year. The growing season was brief, and she demanded a high level of production from her plants. She chose hardy vegetables, including root crops that “could tend their own needs quietly underground” (7). Jahren remembers the sound of the growing vegetables, including corn that could gain an entire inch of growth in a day. Jahren greatly respected her mother's ability to plan ahead and felt she could do anything. Her mother led a difficult childhood, including hunger, and barely missed out on a college scholarship. As her children grew, she took correspondence courses, and Jahren studied literature with her. Jahren grew up knowing there was something missing from her relationship with her mother, but also

knowing she was supposed to do all the things her mother had missed out on, especially college.

Jahren began by studying literature in college, but knew she wanted to become a scientist, even though she had never heard of a female scientist. She compares her lab with a church, saying it is where she learns what she believes in and that she can never leave it.

What Jahren found surprising was the need to raise money to pay the scientists in her lab. Her salary was usually funded by a university, but her research assistants, equipment, and materials were paid for through grants. There are more scientists than there are grants. One of her grants was for studying the aftermath of bombs. The end result, Jahren hoped, would be the ability to match the residue from an exploded bomb to the residue from its construction site, thereby assigning an identity to the person who constructed it. Jahren said she wanted to be studying plants, but there was more funding for war-related studies.

Jahren and her science partner, Bill, worked on the project. There were setbacks, but they were ultimately successful. When they were finished, they discussed a name for the apparatus but Bill decided to just “grind” Jahren's name onto the device. Jahren notes that she and Bill together made a “complete person” (19).

In Chapter Two, Jahren describes a blue tinged spruce tree outside her childhood home. She says she did not think about it then, but the tree had a childhood and grew into adulthood. One year, it assumed the winter was over before it actually was, and grew leaves just before a spring snowfall. The tree could not bear the weight, and died. Jahren said she has learned that she needs to write things down to ensure she never forgets them, including the story of the spruce tree that died far before it should have.

In Chapter 3, Jahren describes seeds and their patience to wait until the perfect time to try to sprout. Some seeds are tiny. Coconuts are large seeds. She completes the chapter by saying that each tree was once a seed and that seed waited for the perfect chance to begin its life.

## **Analysis**

The narrator of the story is Hope Jahren, a scientist. There are two main points of the Prologue. The first is that people are killing trees at an alarming rate, which may lead the reader to expect a pro-conservation book filled with demands to save trees. That is not the case. Though Jahren obviously is a conservationist, she accepts that plants have a role in our lives. She later describes how her son spent time everyday beating on a tree, leaving scars on the trunk. She asks readers to carve in the trunk of a tree. The Prologue and Epilogue are the only sections of the book in which Jahren directly points out the need for conservation.

The second point is related to the definition and role of a scientist. Jahren said most scientists will declare that no one can be a scientist without the correct education.

Jahren argues that anyone who asks questions and seeks answers about nature is filling the role of a scientist. That seems out of character for some people who have worked for advanced degrees. Jahren compares that attitude to the idea that a housewife has to be able to knit. Some readers may find her analogy unrealistic and her statement that a person is a scientist just because they ask questions. It's left to each reader to interpret and decide for himself.

Jahren describes the situation at home by saying that her mother was always angry. She talks about that relationship several times over the course of the book, and it seems that she resents her mother for the distance that existed between them. She also seems to imply that she and her parents never talk when they are adults, and that there is no bond there. However, the dedication page of the book reads, "Everything I write is for my mother" (Unnumbered dedication page). The reader is left to decide the importance of that dedication with regard to her relationship with her parents.

An important aspect of Jahren's mother is that she seemed to be always angry when Jahren was a child. That may be a sign that she was suffering from depression, which becomes a problem for Jahren in later life.

There is an interesting description of Jahren's bedroom. The room was "designed for twin girls" with two built-in desks and vanities (6). There are two windows and Jahren sometimes sat at one of them and tried "not to look at the vacant seat in front of the other window where a sister should have been" (6). She never mentions a deceased twin and it seems likely that the family purchased the house with the room already built, and that Jahren was merely wishing she had a sister so she could forge the loving relationship she craved.

Jahren describes her relationship with science as something that she became, just as Peter Parker became Spiderman. That comparison seems accurate in that Peter Parker was bitten by a spider and then changed into something else. While Jahren wasn't literally bitten, she was infected with a love of science. Peter Parker's transformation took some time, as did Jahren's.

While modern-day readers may not fully understand Jahren's comment that she didn't know any females who were scientists, the reader should remember that science as a field has only become readily open to women in recent years, and that women were not traditionally accepted as being scientific-minded as recently as two decades ago when Jahren began her career. As an example of that attitude, Jahren describes the box of slide rules that remain in a box in her parents' home. She said those instruments were used as standard scientific equipment twenty years ago, but they have been rendered obsolete by the modern technology. She said she "yearned" for her father to "write my name on the box," which is her way of saying that she wants to be recognized as a scientist (15). She says that box of slide rules "certainly never belonged to me" (15). That seems to indicate that she would never have been accepted as a scientist when those slide rules were used.

## Vocabulary

emitted, unimaginable, supplanted, nefarious, diminishing, recalcitrant, imprecisions, robust, stoicism, stultifying

# Part One: Roots and Leaves, Chapters 4-7

## Summary

In Chapter 4, Jahren describes her four years as an undergraduate student at the University of Minnesota in Minneapolis. She had an array of jobs to supplement her scholarship, working twenty hours a week while class was in session and more during breaks. One of those jobs was at the pharmacy of a local hospital. There, she first worked as a “runner,” carrying drugs to various parts of the hospital. She was also tasked with taking urgent prescription information to the techs who mixed the compounds. She felt that her work was part of saving lives. The early days of the experience prompted her to choose “The Use and Meaning of Heart” in the novel, *David Copperfield*, for a term paper in her English class.

She soon began to realize her first impressions of the job and her idea for the term paper were overrated. She and the other hospital staff were to “trail along behind Death” as he “escorted” the sick people and their families over arduous miles. (28) She and other staff members did not cry because the family members were doing enough crying for everyone. One day, a supervisor asked why Jahren always used an alternate route for deliveries. She said she avoided the elevators to save time, and they accepted that, but she knew her real reason was that she always had energy to burn. Jahren learned an important lesson from her work at the hospital – that people are either sick or they are not sick, and if they are not, they should “shut up and help” (37). She said that lesson stuck with her throughout her life.

Out of the blue, she was moved to another task in the department. There, she was supposed to inject IV bags with the proper medications. She felt the weight of responsibility and feared making a mistake. A woman named Lydia trained her and urged her toward competency. Lydia was talkative and always offered Jahren a ride home after their shift. Lydia was a chain smoker and had been in the department for years. Jahren began working the early morning shift on Tuesdays and Thursdays so that she could be present to deliver the bags of medication to the psychiatric ward. She said she was not expecting the slow pace inside the ward, and realized there was no need to “defend myself from the patients,” but that she instinctively knew she would have to be careful not to become indifferent toward them (43).

Over the months, Jahren discovered that she was not really doing anything worthwhile, and she took a long-term work-study position. Lydia was very friendly toward Jahren until the day Jahren announced that she was taking another job. That night, she ignored Jahren's announcement and did not offer her a ride home.

In Chapter 5, Jahren talks about the function of a root. It waits for exactly the right moment to begin growing, then sets out to become an anchor that will also provide





water for the part of the plant that's above ground. She said the men digging the Suez Canal found living roots of the acacia tree some 100 feet below ground. Jahren can imagine the men taking a moment to be amazed and taking a photo before they chop it out of the way.

In Chapter 6, Jahren explained that a scientist working on a graduate degree can usually find a program that funds them at an “academic subsistence level” (48). Jahren attended Berkeley where she was paid a stipend while she worked on her thesis. She also worked as a “graduate student assistant instructor” for field work (48). One day she noticed a student named Bill who was always working at the edge of the group. He was intelligent, meticulous, and always ahead. They talked about Bill's unique shovel that looked like a harpoon beaten to resemble a plowshare. They soon found other things to talk about, including how slow the other students were. They began to reveal pieces of information about themselves. Bill said he moved out of his parents' home when he was twelve, making himself an underground home in the yard.

After that trip, Jahren approached her adviser about hiring Bill for the lab. He agreed, but left it to Jahren to handle the paperwork and Bill's assignments. She agreed. When she asked Bill if he wanted the job, he asked to see the lab immediately.

In Chapter 7, Jahren says the first leaf of a plant “is a new idea” (57). By the time the plant makes that leaf, it has an anchor root and now must make leaves to capture energy to continue the growing process. She goes on to talk about the process, including that leaves make sugar and that humans must have glucose to the brain, which means plants are ultimately responsible for the ability to think about everything, including leaves. She cites plant evolution, such as the cholla cactus, which had a “new idea” to allow it to survive in the harsh desert climate.

## **Analysis**

Jahren talks about a confrontation with a supervisor at the hospital who asked why she took a specific route to the main hospital. Jahren argued that it was ultimately a faster route because she did not have to wait for the elevators, but she did not explain that she needed to move as much as possible to burn off the extra energy she always seemed to have. Evaluating that, the reader should remember that Jahren was a college student who was working long hours at the hospital pharmacy. Her load in college was likely demanding, including the science classes she was taking. That means that she should have been tired all the time instead of needing to find ways of burning off excess energy. This is the first hint that her emotional state is in trouble. She will later be diagnosed with manic depression, and she is likely dealing with constant manic states at this point in her life.

Jahren also talks about taking on a shift that allowed her to make deliveries to the psychiatric ward. She noted the days the patients were calm and orderly and the days they were so frantic that they dug into their own skin. She does not explain why she was interested in them, but she says that she soon realized that it would be easy to become

indifferent to the patients. Her lack of an explanation may be prompted by her desire to reveal her own manic-depression at a later point in the book, but it may also have been curiosity. She had not been diagnosed or medicated at this time in her life, but she could have recognized the symptoms, even if she did not put a name to them.

Jahren personifies Death as she describes her work in the hospital. This is one of many places in which she turns to literary tools to make her point.

There are many scenes in which Jahren describes the details of her jobs or scientific experiments in minute detail. Her discussion about working as a technician in the hospital pharmacy is one of those instances. She talks about the means of keeping her work space sterile, how she lined up medications, how she used alcohol swabs, and more. It's left to the reader to decide her reasons for going into such detail about something that most readers will skim over.

A plant's root is an analogy for a person's ancestry, childhood, family, or anything else that creates the basis of who they become. The story of the acacia roots in the Suez Canal are a figurative way of demonstrating how some people have their roots chopped away without a thought to the damage that can do.

Bill and Jahren make an almost instant connection when they begin talking, and that conversation leads to a bond that lasts a lifetime. At one point, they have a private joke that makes them laugh. Other students make giggling comments, obviously indicating they believe there is a romantic involvement between Bill and Jahren. She notes that it would not be the last time that happened over the course of their lives as people sought to define that relationship. The important thing is that Jahren and Bill become closer to each other than they are to their own families, but they never feel the need to define the relationship, nor do they ever take it to a romantic or sexual level.

## Vocabulary

idiosyncrasies, immersed, impotent, cryptic, mundane, ruminating, taxonomy, proficient, agronomist, perpetually, perennially

# Part One: Roots and Leaves, Chapters 8-11

## Summary

In Chapter 8, Jahren talks about the work it takes to “establish” oneself as a scientist. She talks about the risks of deciding on research questions and setting out to find the answers. That is a change from the years of doing assigned research, and some scientists do not make it through the dissertation process.

Jahren's dissertation was on the hackberry tree, which had remained impervious to pests and diseases that kill other kinds of trees. The berry of the tree is very hard. Jahren discovered that the hard outer layer is basically an opal. She was thrilled with the discovery, imagining that she was the only person who knew about it. She cried, partly because she finally understood what “real” research was all about. Another reason she cried was because she was lonely. She felt the absence of affection fully at that moment. She did not lose her enthusiasm, even when a professor informed her a short time later that she was not the first to make the discovery. She felt that she had made a small discovery on her own and that she might actually be capable of making bigger ones. Later that day, she found Bill in the lab with an old chair he'd saved from a dumpster. She showed him the x-ray readout. Bill said that he knew he'd been sitting around the lab waiting for something, and that he now knew that readout must be what he'd been waiting for.

Jahren set out to work on the next part of her research, which included watching several trees in Colorado. They did not bloom. When she got back to her lab at Berkeley, Bill suggested they return to the trees and burn one of them to see if that would frighten the others into blooming. Jahren gained no data from her summer of work, but she did come up with the idea to study plants from the inside to try to figure out why they did what they did. She knew the trees were not dormant and that their lack of berries must have been a sign that something else was happening. She voiced her idea as studying “what it's like to be a plant” and briefly worried that people might not consider that a scientific approach (70).

Chapter 9 opens with Jahren describing the parts of a plant – the leaf, stem, and root. She talks about the “stem” of a tree that produces the wood people use for building. The trees rings denote the tree's age. A shallow ring shows that a limb fell from that side of the tree that year and other figures show weather. She cites a monkey pod tree in Honolulu. Orchids grow on its limbs, which stretch high in the air and over an intersection. Tourists and photographers take pictures of it, never once missing the limbs that have fallen during the years.

In Chapter 10, Jahren completed her research in 1995 and set to work writing her dissertation. In May 1996, Bill earned his bachelor's degree and Jahren earned her

doctorate. Neither had family in the audience. They returned to the lab immediately after the ceremony. There, they set to work blowing glass tubes just large enough to hold a small amount of carbon dioxide gas. Jahren went to turn on the radio, though it was not allowed during experiments, and was interrupted by a loud crash. When she recovered enough to figure out what happened, she discovered one of her tubes had exploded. Neither was severely hurt, though there were glass shards everywhere. They went outside and recovered for awhile, then returned and cleaned up the mess. Jahren was upset that she had caused the accident and had mixed feelings about the fact that no one – other than Jahren and Bill – knew what happened.

As Bill and Jahren cleaned up the glass, Jahren invited him to join her in Atlanta to build their own lab. She did not have a clear idea of what she could pay, but was “pretty sure” she could offer him a salary (79). He agreed. Two weeks later, they drove to Southern California. Bill stayed with his parents while Jahren went on to Georgia Tech. She taught freshman geology and junior geochemistry, working long hours on lesson plans and making mistakes along the way. She began ordering equipment for her lab, but did not open any of it until Bill arrived.

At this point, Jahren was struggling. She lost pieces of time and did not sleep. She said she had developed anxiety and was taking lorezapam. Bill noticed that she “looked different,” but did not comment past that. They went directly to the lab. Jahren saw that it was a shabby space but Bill saw the potential and was excited. With his excitement, Jahren realized that the quality didn't really matter because they were “the sole possessors of the key” (83).

In Chapter 11, Jahren says that one tree can “be in two places at once,” though it is uncommon (84). She goes on to talk about DNA and the extreme growth of willow trees, which can reproduce by dropping a twig that then takes root. Sometimes, the twig falls in the water and produces an identical willow tree where ever the water takes it. She compares that to her life. She had earned her doctorate degree and moved across the country. Like all plants moved to a new location, she was going to make the best of it.

## **Analysis**

In Chapter 8, Jahren describes the process she used to collect sample berries from the hackberry trees. She also goes into detail about the way an x-ray works and why it helped her in her analysis during her project. As is the case in several sections of the book, those processes offer minor information about Jahren – including how detail-oriented she is – but are mainly included for their scientific value. The reader who understands how these processes work may be bored or critical of her descriptions. The reader who does not know about the processes may not be sufficiently interested in read through them.

Jahren had mixed emotions when she discovered that the shells of the hackberry fruit were the same composition as opals. She cried, partly because she had made a discovery on her own and that boosted her confidence that she had chosen the right



career path. She also cried because she was lonely, and at that moment she felt she was going to become a good scientist, but that it came at the cost of becoming a wife and mother. Those longings for affection were an important part of Jahren's life, especially at this point in time when she has begun to realize exactly what was missing from her childhood. Bill's role in her life becomes solidified at this moment. He was in the lab a short time after her discovery regarding the opal, and said that he knew he was waiting for something. His interest in Jahren's work put him in a position to be her friend at that moment, and she really needed that.

Jahren's idea of studying "what it's like to be a plant" was her first independent idea that she considered to be a true research project (70). She compared that to having a "new leaf," which is one of many cases in which she compared her life and plant life. These comparisons are one of the book's themes, and the reader should begin to naturally spot them.

Jahren uses foreshadowing as she is revealing the glass accident in the lab. She talks about the fact that undergraduates were not usually assigned jobs such as blowing glass, but that she gave Bill that job because he had been able to handle every task up to that point. That hints at the fact that it will be Bill who makes a mistake in the lab. She then talks about turning on the radio, despite the fact that they were not supposed to have it on because it could distract those working in the lab from their delicate procedures. That also hints that Bill might be the one who makes a mistake. The fact that Jahren made the mistake then feels like a bit of a twist. The fact that she talks openly about that mistake lends more credibility to her as the sole perspective of the book.

Jahren suffered from a fear of failure and from the fear that she really was not good enough to be a research scientist. The episode of exploding gas in the lab was one more reason for her to feel that she wasn't capable. Bill, however, took the event in stride. He urged her to go outside for a few minutes to calm down, but was not at all angry at her. That was typical of his reactions to everything at that time and throughout most of Jahren's story.

## **Vocabulary**

indigenous, prodigious, maudlin, tangential, imperative, audacious, perversity, ostentatious, dreamscape, obsolete

## Part Two: Wood and Knots, Chapters 1-4

### Summary

“Part Two, Wood and Knots,” Chapter 1, opens with Jahren talking about the southern part of the United States. She describes the weather, which is optimal for plant growth. She compared that to her own life, saying that “every kind of growth seemed possible” (90).

In Chapter 2, Jahren and Bill spent many nights in the lab, repeatedly redesigning the “first Jahren Lab” (91). Bill spent most of his time in the lab. Jahren arrived one evening to find Bill there with Reba, Jahren's Chesapeake Bay Retriever. Both Jahren and Bill were in debt from their years in college, and they had recently found hamburgers for 25 cents each. They bought lots and froze them, thawing them as needed.

Bill and Jahren had spent time “doing organic carbon extractions” from rocks (94). Dinosaur bones have been studied extensively, but Bill and Jahren were working on the rocks that contained evidence of the food and oxygen during the dinosaurs' time. They knew they would never know the shape of the plants, but felt they could know its chemistry. They settled in to work through the weekend.

In Chapter 3, Jahren talks about the many enemies that threaten plants. Fungus is one of those. The fungus takes from the tree though it could live anywhere. Jahren suggests that the fungus might prefer the “rush of pure sweetness” that comes from a tree's root (99). She also suggests that the fungus might recognize that it is joined with a tree, therefore is not alone.

In Chapter 4, Bill and Jahren had decided to take a different approach to teaching the soil class. In the summer of 1997, Bill, Jahren, and five students went into the field. They traveled across the region. Most of the time, Bill and Jahren were the ones to dig the pit the students would then study. Jahren describes herself as a “lumper,” which is a person who tends to lump small details together. Bill is a “splitter” who feels that each subtlety has merit. Together, they argued points until they came up with a satisfactory compromise.

Jahren write about Bill's attitude with students. He is painstakingly patient, going over things until students understand and urging them all to success, even when they are behind the others. Jahren was not overly concerned about how students talked to her, but demanded that they respect Bill.

During each trip, the group stopped somewhere for an “enrichment” activity. One of Bill's favorite stops was to see “a fossilized dog” in a tree, on display at Southern Forest World (105). One of the students complained that he did not want to see it again and they went to an attraction called Monkey Jungle. There, Bill came face-to-face with a monkey that looked remarkably like him.



## Analysis

The relationship between Bill and Jahren has become firmly established by this point in the book. They complement each other well, each accepting the shortcomings of the other and providing support where its needed. That new level of friendship is seen in Chapter 2, when Jahren reveals a typical weekend in the lab. They had nicknames for some of the other people in the department, including the Elf. They had pet words and phrases, such as “airing the beast,” which meant taking the dog for a walk (93). At one point, Jahren found some candy in her purse and they stopped what they were doing to divide, arguing about who should get the ones they both liked and saving another color for Reba. All these things indicate that Bill and Jahren had found a comfortable level of friendship and that they understood each other. It was an important aspect of their relationship and evidence that they were settling in as scientists.

Jahren does not explain her chapter about the symbiotic relationship between trees and fungi, other than in terms of the plants. It seems likely that she is talking about her relationship with Bill, but she never defines which of them is the fungus and which is the plant. It seems reasonable to assume that she is the plant because she had the higher degree and the teaching position that gave them a place for a lab, but it could be that she believes herself to be the fungus because she draws strength from Bill. It's left to the reader to decide.

There is an extensive part of Chapter 4 devoted to the trip to Monkey Jungle, which sounds very much like a typical tourist trap with no real value. They camped outside the attraction. They had very little money. They were on a school-sanctioned trip to study soil but drove hours out of the way to visit the place. Jahren included all these and other details, seemingly just to describe the trip. If anything, it makes her appear immature, considering that she is responsible for the students who have spent several days learning about soil types.

## Vocabulary

profusion, consummately, refurbished, facile, tarnished, posterity, charismatic, exploitation, menace, macabre, symbiotic, panache, protocol



## Part Two: Wood and Knots, Chapters 5-8

### Summary

In Chapter 5, Jahren talks about the “annual budget” of a deciduous tree (114). It has to grow all new leaves between spring and mid-summer. Each leaf has to be the correct size and orientation to make the most of the sunlight. A typical full-grown maple tree may have 35 pounds of leaves. The tree has to process about 8,000 gallons of water from the soil in order to gather the nutrients for the leaves. Jahren says that should make people think about the next rainfall.

Jahren then transfers her conversation to her own life, which is “ruled” by a budget that lasts three years. Every three years, research scientists have to go out in search of new funding from a relatively limited pool of money. The money for Jahren's type of research, which is sometimes termed “curiosity-driven,” is a small part of that (116). The money will not stretch to cover all the paleobiology professors in America. When Jahren managed to have a \$165,000 budget, that translated to \$25,000 a year for Bill's salary and about \$10,000 a year to buy chemicals. Jahren writes that all this information makes most research scientists more worried about money than about their science.

In Chapter 6, Jahren says that a vine “makes it up as it goes along.” The vine does not grow in any specific pattern, but sends tendrils up in search of something to climb. They push their leaves into patches of light left open by the trees above. They do not have evil intentions, but they are “ambitious” in their quest to reach the top of the forest canopy.

Jahren then talks about weeds. She said people do not resent the weed but do resent their incredible growth. Kudzu, an invasive vine, was introduced to America as a gift from the Japanese in 1876. The kudzu does not know how to do anything but be a parasitic plant. It can grow an inch an hour.

In Chapter 7, Jahren found she never had enough time to complete everything she needed to do. She attended conferences and stayed at her office one night a week to catch up on paperwork. She felt out of place at the conferences but reassured herself that she was part of the “in crowd” at her lab.

Jahren lived on the outskirts of town for a short time before moving closer. Bill lived in a shabby apartment until bedbugs drove him out. He began living out of a van that barely ran. The heat usually forced him to leave the van early in the morning. He parked for awhile in a parking lot on campus and was amazed that no one seemed to notice or care. One night, police officers roused him from sleep and called Jahren to verify his identity, but then left him there. Jahren worried about him and apologized for the low salary. She promised she was going to find bigger grants so she could pay him more. She offered him the money to find a place to live but he moved into the lab instead. They fell into a new routine. One evening they were talking about a man they kept





seeing around campus but never identified. Bill handed Jahren his jacket and she accepted, knowing that he had handed it to her before she was even aware she was cold.

In Chapter 8, Jahren talks about the barrel cactus of the desert. Like all plants, it has to make do with very little resources, specifically rain. Some plants can become dormant during times they are without water. They are called “resurrection pants” and they will often appear dead but will revive after a rain.

## Analysis

There are several instances in this section in which Jahren compares plant life with her life. One of the most interesting is her analogy regarding the vines. She says vines just begin growing without any clear direction or set path to cover. That seems to be her comparison to her own life. She has really made remarkable progress in her career, but she does not yet feel the self-confidence to accept that.

In Chapter 8 of this section, Jahren talks about the desert. She says that the desert is like a really poor neighborhood because “nobody there can afford to move.” Jahren is still talking mainly about plant life, which makes this metaphor seem untrue. It seems that plants are unable to move because of their sheer nature. The rest of her comparison seems more realistic. She talks about the suffering that desert plants endure, and the stress they face. That seems to be a metaphor for Jahren's career, though it seems largely unfounded. The reader has to keep in mind that she is suffering from diagnosed anxiety at this point, but also from some undiagnosed mental illnesses.

The desert analogy will make more sense to the reader after Chapter 9. In that chapter, Jahren talks about a severe mental breakdown, but she recovers. This tendency to sometimes include both sides of the analogies in the same chapter and to sometimes split them between two chapters can become confusing for the reader who does not retain the ideas into the following chapters.

## Vocabulary

esoteric, prestigious, optimal, supplant, obsolescence, nonchalance, repatriate, ameliorate, infusion, resurrection

## Part Two: Wood and Knots, Chapters 9-12

### Summary

In Chapter 9, Jahren describes the onset of a manic episode. She talks about ignoring food and water but having the overwhelming need to run. She mentions “the person holding” her during the episode and her efforts to explain, but he did not understand. She grew angry and pushed him away, planning to explain it later. The final phase of the episode was, as always, a sense of euphoria. She voiced her thoughts into a tape recorder. Then the episode grew out of hand and she screamed. The person came back and helped her clean up the blood and snot, and gave her a sleeping pill, then another. Finally, time passed and she pushed out of bed to “assess the damage” and get back to her life.

In the future, she would go to the doctor, planning only to get sleeping pills so she could get through the next episode, but the doctor would listen to her symptoms and announce that other people had the same illness, and that they managed it. Jahren ends the chapter by saying that the doctor and management were far in the future, and that she still had some story to tell about her time in Georgia.

In Chapter 10, Jahren arrived at the lab and Bill asked where she had been. She tried to brush it off, saying only that she'd been “in a funk” (142). In truth, she had cried for a day and a half after a manic episode triggered by a cortisone shot. She and Bill had been in the field when she encountered poison ivy and had an allergic reaction so bad that the doctors asked to photograph her.

Just after her breakout and before the manic episode, Jahren told Bill she wanted to travel to California for a conference. She had pitched the theory that plants in a recent study used “more water to support rapid growth than for cooling” (144). Bill had told her that day to go home and sleep off the poison ivy, which was when she fell into the manic state. When she returned the next time, he announced that he had secured a van for the trip. They wound up going far out of their way because they did not have a Texas map. Jahren and Bill were accompanied by a graduate student named Teri and another student, Noah, who was very quiet. Bill, Jahren and Teri planned to share the driving duties. They had not reached their destination when it began to snow. Teri did not know how to drive on the snow and wrecked the van.

The four went to a motel for the night and a tow truck recovered the van, which was in remarkably good condition. Teri wanted to catch a plane home but Bill shouted at her, saying she had helped create their situation and should stay to help clear it up. Jahren felt guilty and feared that Teri would blame her for the situation. Bill countered, saying that Teri should be grateful that Jahren cared enough about her future to take her to the conference at all. Jahren spent some time being grateful that they were all alive and she

came to realize that teaching would be her life and that Bill would always be her family. They wound up going the rest of the way to the conference. When they got back to the college and turned in the van, Jahren insisted that she was the one driving and refused to show any remorse, saying she was just glad to be alive.

In Chapter 11, Jahren talks about the tent caterpillars that attacked a research forest in King, County, Washington, in 1977. Some trees survived. Researchers later discovered that the caterpillars would die if they ate the leaves of the surviving trees, indicating those trees had developed a way to protect themselves. The amazing thing was that the same kind of tree, a mile away, had also adjusted. Scientists already accepted that plants could communicate through their roots, but these researchers concluded that the affected trees had released “volatile organic compounds” to signal to trees farther away. Jahren ends the chapter by noting that no one will believe them for the next twenty years.

In Chapter 12, Jahren couldn't sleep because she was so stressed over the need to find funding. She recounts past research experiences that were not supported by the scientific community, saying her “early career had all the making of a long, slow academic train wreck” (163). Those experiences now threatened her credibility. Bill was still living in the lab. One night, Jahren called him, frantic with worry. Bill said things could not get much worse. He pointed out that he was not getting paid and that he didn't think anyone would notice if they kept working, even if Jahren was not employed by the college. Bill did suggest that Jahren should see a doctor and she realized that he was unhappy with their situation. Six months later, they set out for Baltimore

## Analysis

Jahren continues to compare the events of her life to the events of the plant world, including through the chapter devoted to her mental breakdown. She talks about the body that “senses the urgency of a new world about to bloom” while her vertebrae stretch, as if “toward the sun's light” (138). The chapter is brief but is stunning in the details of her episode.

Jahren does not identify the person who is holding her during her manic episode, but it seems likely that it is Bill. She notes that he is worried. An interesting aspect of this situation is that Bill and Jahren remain as close as ever after it's over. In some relationships, the person might be upset by the episode and end the connection, but Jahren's descriptions of Bill make it seem likely that he would stand by her. It could also be that the description in this chapter actually occurred years later, in Boston, and that it was another man who held her.

Jahren seems honest and open about her mental illness, but she also indicated that she was ashamed and possibly embarrassed. When she returned to the lab and Bill asked where she had been, she tried to answer without giving any details.

At one point after the wreck, Jahren began to feel guilty about her role in it. She was not driving when they turned over, but she was ultimately responsible for the students. She was sure Teri blamed her for the situation. Bill was furious with Jahren's guilt. He said that it was amazing that Jahren cared enough about Teri's future to take her to the conference where she could meet potential employers. This conversation is typical of Bill's personality and of Jahren's insecurities. Both are predictable to a degree, which is why their friendship works on such a fundamental level.

## **Vocabulary**

transcended, existential, exalted, veracity, contemplated, exorbitant, innate, simper, thwart, bantering

# Part Three: Flowers and Fruit, Chapters 1-4

## Summary

In “Part Three: Flowers and Fruit,” Chapter 1, Jahren explains that the oceans were populated some sixty million years before there was significant life on land. Then life flourished until urbanization cut into green space. Jahren saw a huge difference in the green of the south and the sprawl of Baltimore. In some ways, she hated leaving Georgia but said she and Bill had matured during their time there and needed a place to “spread out” (172). They decided Baltimore could be it.

In Chapter 2, Bill and Jahren had a chance encounter with a professor who was a colleague of Jahren's dissertation advisor, which prompted her to call this professor Uncle Ed. Ed had been involved in a project that evolved into the theory that it was possible to tell the history of global ice by studying fossil shells. Ed was in his 70s by the time he and Jahren encountered each other at a conference. He had stood up for her often and faithfully, a fact that Jahren appreciated. He told Jahren he was retiring and that his lab equipment would be thrown away. He offered to let Jahren and Bill take anything they wanted from the lab. They drove Jahren's car to Ohio and rented a truck to take the equipment back to their own lab.

Ed showed them around the lab. He said some of the equipment was homemade because his lab assistant had only one hand, necessitating the need to make or modulate much of the equipment. Bill erupted at that comment, yelling about a “gimp” in the lab (177). Jahren reveals at this point that Bill has part of one hand missing, though he is capable of performing tasks that most people could not do with two complete hands.

There was a great deal of outdated equipment at the lab, but there was also plenty of usable items. Bill packed the truck multiple times to take as much of it as possible. They found a homemade mass spectrometer but knew they could not take it, partly because of its size but mainly because of the mercury inside it. They also found a board with all the screws normally used in the lab embedded on one side. The purpose was to easily decide what size screws and nuts were needed when working on equipment. Neither Jahren nor Bill had seen one before, but both thought it was genius. Jahren wanted to take it, but Bill refused, saying it should stay with Ed.

Ed, Jahren, and Bill talked briefly as they prepared to part ways, Jahren saw the situation for what it was – transferring equipment from his lab at the end of his career to her lab at the beginning of her career. She wanted to make sure he understood that she appreciated the equipment, but also that she appreciated his faith in her. She could only manage to say “thank you.”



In Chapter 3, Jahren talks about the trees that become dormant over the winter months. She relates an animal's ability to withstand freezing temperatures for short periods because of its ability to produce energy. Trees that live in the north rarely die in the winter because they are prepared for the freezing weather. Weather patterns change and plants are attuned to the changing light to tell them when to prepare for winter.

In Chapter 4, Jahren and Bill spent a summer on Axel Heiberg Island with other scientists. They were studying the former forests that survived on the island, which is hundreds of miles north of Alaska. During their summer, the sun never set and the scientists all fell into their own routines of sleeping and working whatever hours they chose. Bill and Jahren were usually working, while the others were sleeping. Jahren said that the other scientists looked at her as “a grubby little girl with a weirdo in tow,” and she counted on that image to make them leave her to her own devices (191).

Most of the scientists were digging up entire trees to study. Bill and Jahren decided to dig through layers of soil to examine how the forest had sustained itself for so long. They hoped to find changes in the different layers that would give them a broader set of data. Over three summers of work there, they did find evidence of one major climate change event that the forest survived.

The landscape was completely flat. They could see for miles in any direction, and they seldom saw any life except the other scientists. One day, they saw a hare and followed it for an hour, excited about the chance to see some life form in the barren place. They eventually stopped and looked at a glacier for a long time. Bill said it was strange to be sitting still instead of working and that the other scientists were going to think badly of them. Jahren countered, saying they would never accept her as a real scientist. Bill said that at least no one was staring at Jahren's hand. They talked then about the effect his hand had on Bill's childhood. He said his peers had made fun of him as a child, which was why he had never had friends, joined clubs, or gone on a date. Jahren was upset that he'd had such a brutal childhood. When he said he had not attended prom in high school, she suggested that he should dance on the ice. She was surprised when he did, and even more surprised that he did not make a joke out of it.

## Analysis

Jahren and Bill reacted as expected to their discovery of the board with screws in Ed's lab. Jahren treated it like an amazing invention. While there was no doubt it would make their lives easier, it would not be difficult to make one of their own. Bill's reaction was also typical. He said that one had to remain with Ed and that he would make one for their lab. Like the slide rules, that board was completely low-technology, but it was a brilliant idea. Unlike the slide rules, there was no technology to take its place. Their reactions to the gadget are one of hundreds of glimpses into their overall character.

Bill's hand is never explained. At one point, he told Jahren that he lost that part of his hand as a youngster, that he did not remember what happened, and that his mother refused to talk about it. That mystery remains unsolved throughout the book.

Jahren accepts Bill, without trying to change him and without reservation. She closely examines that acceptance when she and Bill are on Axel Heiberg Island. There, they talk a little about Bill's childhood and Jahren becomes angry at the idea of how he had been treated as a child, all because of his hand. When she suggests that he dance, Bill says he does not know how, but Jahren says that he does know. She went on to say that their bigger reason for being on Axel Heiberg Island was so that Bill could finally have the chance to dance that he had missed out on in high school. While Bill dances, Jahren realizes that she accepted him fully, without reservation. That realization is one more step in her effort at self-acceptance.

## **Vocabulary**

urbanization, decolonizing, mull, serendipitous, heist, quirky, oblique, poignancy, incessantly, potency

## Part Three: Flowers and Fruit, Chapters 5-8

### Summary

In Chapter 5, Jahren talks about sex and reproduction. In all aspects of the natural world, reproduction requires tough. The plant, which cannot move, depends on nature – including animals – to transfer pollen. She cites a specific kind of fig that cannot reproduce without the help of a specific wasp, and that wasp can only reproduce within the flower of that kind of fig bloom. Together, they have survived for millions of years.

In Chapter 6, Jahren was 32 years old when she met Clint. They were attending a social event and Jahren got Clint's email address from a friend. She invited him for dinner, and he accepted. When they were leaving a bar to go to Clint's house, he asked if she wanted to walk or take a taxi. She was enamored with the idea of a taxi, having grown up in a place where taxis were only seen in the movies. He hailed a cab and Jahren was captivated by the fact that he did so just to please her. They continued to date but within two weeks, Clint moved from D.C. to Jahren's house in Baltimore. He quickly got a job at Johns Hopkins, working in the building that housed Jahren's lab.

That summer, Jahren and Clint travel to Norway together. They stopped at a city hall in Oslo and got married. By that point, Bill had lived in Jahren's attic for a period of time before buying a four-story row house nearby. When Jahren and Bill returned from Norway, they stopped by Bill's house and Jahren announced their marriage. Bill's first question was whether he had to buy them a present. At the same time, Jahren said "yes" while Clint said "no." They then insisted that Bill join them for an outing. Jahren said they spent the day participating in the events related to a Civil War reenactment. They got in at a discount because it was "family day."

In Chapter 7, Jahren talks about the growth chart of plants. Most have a slowing period in the middle of the growth phase that is really a signal of a new kind of growth. Just as the plants are nearing maturity, "some of their nutrients at pulled back and repurposed toward flowers and seeds" (206). She ends the chapter by pointing out that the parent plant pays a high price for producing the next generation.

Jahren opens Chapter 8 by saying that her pregnancy was the "hardest thing I have ever done" (207). She has the usual problems. She had trouble taking a deep breath and was physically uncomfortable. She walked around the neighborhood with her Chesapeake Bay Retriever, Reba, because the baby was only quiet and still when Jahren was walking. But the deeper problems were related to her mental illness. She was unable to take any of her medications during the first six months of pregnancy. She had morning sickness that prompted violent episodes in which she tried to knock herself out. Clint stood by her, frantic but supportive. She fell so deeply into her robems that



she could only recognize Clint and Reba by name. She spent weeks in the hospital, strapped to the bed because there was nothing they could do for her.

At 26 weeks, she was cleared to begin a new drug regimen. She began to recover, slowly, to the point that she could return to the lab. She didn't handle chemicals or even really do any work, but found comfort in being there. One day, she had to sit down in a visitor's chair to recover her breath. She was there when Walter, the department head, entered. She quickly stood up but became dizzy and had to sit back down. The following day, Clint announced that Walter had been to see him. Walter told Clint to tell Jahren that she was not allowed back in the lab until her medical leave was finished. Jahren was heartbroken and Clint was on her side, but pointed out that they could not do anything about the situation.

Jahren says that they would examine the situation again two years later. Then, Clint would say that he lost his affection for Johns Hopkins on the day Walter ordered Jahren out of the lab. They would also be able to accept that it probably was a matter of liability.

Jahren struggled through the days, knowing she should be excited but unable to find the excitement. She worried that she would be an inadequate parent because of her own childhood. During the final weeks of pregnancy, some people asked when Jahren and Clint plan to have another child. The doctor asked if she had plans for contraceptives after the baby's birth. When one female doctor talked kindly to Jahren, she had to force herself to remember that this woman was not a stand-in for her mother, but was only doing what her profession required of her.

One night, Jahren slipped into the lab after hours. Bill was there. He did not really know what was going on with Jahren for the weeks of absence. She said that her family had been "hiding the crazy for so many generations" that she had instinctively kept the facts from everyone she knew, even Bill (212). Bill was obviously concerned but upset as well. Jahren said she was hungry and they went to Bill's house for food and television.

Jahren and Clint were at home when her water broke. She was reassured when they reached the hospital, knowing from her time working in the hospital pharmacy that there was a team of people who were focused on taking care of her. During the course of events, a doctor arrived with a group of students. They discussed Jahren's case, including the possibility of post-partum psychosis. Jahren notes that his statement had given voice to the fears everyone had, but that no one had named until that moment. The students had looked bored up until the teacher's announcement, but then stared at Jahren with more interest. She considered faking a hallucination, just to stir them up. She and Clint locked eyes and she laughed. Jahren felt good at that moment, reassured by the fact that she was in the hospital and happy that the baby would soon be born.

Jahren's doctor arrived. Jahren admitted that she was frightened. She could not imagine herself as a mother and she suspected that her grandmother might have died in childbirth, which combined to fuel her fears that she might die. The doctor reassured her that she could be in the operating room in a matter of minutes if anything went wrong. The doctor then told Clint that they would simply kick him out of the way if he fainted.



During the delivery, the doctor announced that the cord was around the baby's neck. She performed a vacuum extraction. Moments later, Jahren and her son were lying together. For the next few days, Jahren was allowed to remain in the hospital, recovering and proving that she had not encountered a psychotic episode. There were moments of new fear for Jahren, including one day when she bled profusely. The doctor assured her that they were monitoring her situation.

Jahren began bonding with her son and considered him the second opal of her life, comparing him to that moment she found that the hackberry shell was made up of an opal. She realized that she might be able to be a good parent after all.

## Analysis

In some ways, Jahren and Clint are very similar, but they have different approaches in their work. If this book was a novel, the contrasts in their characters might seem contrived. They are both scientists and very intelligent, but Jahren performs hands-on experiments while Clint's work is based on math and models.

When Clint and Jahren went to tell Bill about their marriage and invite him to the Civil War reenactment, Bill refused. Clint then said, "You're with us now" (203). The wording seems to be Clint's way of saying that they want Bill in their lives, but it could also be interpreted to mean that Clint is now part of the life Bill and Jahren share. The use of the word "us" almost seems to be intended to make Bill realize that Clint and Jahren are going to be a united part of Bill's life. Regardless of what the reader makes of the wording, Bill apparently accepted it and the three spent the day together.

Bill was obviously not thrilled with Jahren's marriage. That may seem selfish until the reader remembers that Bill has literally built his career around Jahren's career at this point. He has no real friends other than Jahren. Most of his life he had no friends, which makes it understandable that he is highly dependent on Jahren. Another question is whether Bill had romantic feelings toward Jahren that she did not return. Jahren never hints that there was any sign of that from Bill, but the limited perspective means the reader will never know for certain. It seems reasonable to expect that there might be some level of jealousy involved.

Some of Jahren's chapters about plants seem almost random until the reader examines the following chapter. The chapter about reproduction is followed by the chapter of how Jahren met and fell in love with Clint. The chapter about plants bearing flowers and fruit is followed by the chapter about Jahren's pregnancy. It is an interesting type of foreshadowing, but most readers will likely begin to understand and expect these only about the time the book comes to a close.

The majority of the book is in past tense but Jahren switches to present tense in Chapter 8 as she describes her pregnancy. That shift is never explained, but it seems to be Jahren's way of bringing focus to the importance of that period of her life.

An interesting aspect of her pregnancy is that Jähren never talks about the timing of it or whether it was planned. In some ways, it seems that Jähren is open about her life, but it seems more likely that she talks only superficially about her personal life, focusing more on her relationship with Bill and her science. For example, she talks about her mental illness but it may be that she only scratches the surface of her situation and her feelings. She also never mentions whether she and Clint talked about her illness or whether they planned to have a child. That evaluation seems to affect the legitimacy of her perspective, but that is left for the reader to decide.

## **Vocabulary**

specificity, stipulated, superfluous, girth, wretchedly, incongruously, surreal, litany

## Part Three: Flowers and Fruit, Chapters 9-11

### Summary

In Chapter 9, Jahren talks about the vast amount of water trees need to survive. She explains that saplings seldom survive their first year. As an example, she talks about maple trees. The seedlings are usually within a few feet of the parent tree, meaning the offspring have to find a way to survive while still in the parent tree's shadow. The offspring is at a disadvantage because the parent shades them from the vital light needed to survive, but the parent tree also sends out water through its roots to help the seedling survive. Jahren says that all parents do what they can for their offspring.

In Chapter 10, Jahren cites research that indicates a tree "remembers" its early life through "complex biochemical reactions and interactions," which is the same way human memory works (226). Jahren earned a Fulbright Scholarship and spent a year in Norway with her son and Clint. She goes into detail about the tree memory experiment.

Bill was not with Jahren in Norway, but they talked about her work. Jahren had discovered that her science life was easier after her son's birth, though she could not explain how or why. She found more funding which gave her more patience for teaching. Jahren says she loved the year they spent in Norway, except that she missed Bill. However, she felt it was time for them to act more like adult co-workers than "12-year-old fraternal twins" (232).

During Jahren's year in Norway, Bill's father died. He took the death hard, and Jahren worried about his lack of communication with her. Jahren wanted to tell Bill how much he meant to his father, but he did not. She sent him a ticket to Ireland, saying they would meet there for a work trip. Bill arrived on time with lots of equipment. They rented a car and went into the countryside, after Jahren had a minor accident that broke a mirror and the passenger-side window. They continued on their way to the Pheonix, an organic farm and bed-and-breakfast where they camped when they were in the area.

Bill and Jahren had stopped making detailed plans for these trips. They had general ideas but then went to a high point and took time to look around, deciding if their plans could be improved. During this trip, they talked about Bill's dad. He was 97, but Bill said the death was still unexpected. Jahren said that was because a person who had reached 95 had "lulled" people into thinking he was immortal. Bill said that losing a parent made a person realize they were alone. Jahren wanted to tell Bill that she would always be there for him and that he would always have a place to be himself within her world. She did not say them aloud.

Jahren stomped her foot and looked carefully at the water and moss on the ground where she was standing. That gave her an idea and they spent their trip gathering data

about the amount of water in the higher elevations compared to the amount in lower places. Their question was whether the moss was growing because the conditions were perfect for it, or if the moss had changed the area so that it became a perfect place. When their trip was over, they packed up their samples and headed to the airport. They carried their samples in their carry on bags, fearful that they might be lost if they went with the luggage. They were stopped for lack of permits for the organic matter, and the security guard threw all their samples away.

In Chapter 11, Jahren, Clint, their son, and Bill moved to Hawaii. Jahren opens the chapter by talking about a tree that her son beat on regularly. He began with a sledgehammer when he was four and pretending to be Thor, then moved on to a golf club and then a baseball bat. The family moved to Hawaii after Clint was offered a job “in perpetuity” at the University of Hawaii (249). He received more than half his annual pay from the college and Jahren searched for grants to cover the rest.

Jahren talks about the evolution of plants, then talks about her son, who was growing into a person different from Jahren. He was self-confident and had Clint's emotional stability. She kissed him and felt a healing for the lack of affection in her own childhood. She knew she could feel the same about a daughter, but that will never happen. She decided that the family's pain, passed down through its women, should skip a generation. She also decided that she would love a granddaughter someday.

## Analysis

There is a level of humor in several places in the book, and Jahren seems to have a natural tendency to laugh at herself and at situations. That humor is seen as Bill and Jahren arrives in Ireland to pick up a rental car. The rental agent asks if they are married, hinting at the discount that would be available if they are married. Jahren says they are, which prompts a series of funny moments throughout the trip. At one point, they announce to a stranger that they are married. In later years, Jahren calls that trip “the honeymoon.”

Some of Jahren's humor seems unorthodox. She jokes about being 11 months into her pregnancy and about pretending to have hallucinations for the medical students. She and Bill also joke about his father's age, saying that they had not expected Bill's father to die even though he was 97. They think that his father had “lulled” people into thinking he would never die. These are important looks at Jahren's character and give the reader a deeper understanding about what she thinks and feels.

There is yet another look at the relationship between Bill and Jahren in this section as Bill struggles to deal with his father's death. Bill says that he felt very alone after losing his father. That seems like a perfect time for Jahren to express her devotion to Bill. She thinks about the fact that she will always make a place for him in her life, but she does not say it aloud. On the surface that seems selfish of Jahren because Bill's comment seems like a plea for reassurance. In fact, Jahren would likely have made both of them uncomfortable if she had tried to voice her commitment to Bill. There is no doubt by this

point in their lives that Jahren and Bill have a firmly established relationship and that both are comfortable in their roles. They accept their status without having to talk about it.

Jahren makes the comment that she would love to shower her affection on a daughter, but that she would never have the opportunity. That seems to indicate she has decided never to have another child, which is not surprising considering the horrors of her pregnancy.

## **Vocabulary**

exploit, embellished, pervasive, proxy, pungent, wan, petulant, purported

## Part Three: Flowers and Fruit, Chapters 12-14

### Summary

In Chapter 12, Jahren arrived at the lab to find Bill already there. She can tell at a glance that he was there all night and that he had something important to tell her. He told her about a specific plant in their current experiment. The plant was dubbed C-6. As part of their experiment, a video camera was set up to capture the movement of plants as lights were turned on at specific hours. All the plants “stretched smoothly and gracefully toward the light,” while C-6 “jerked” as if it was trying to free itself. Jahren and Bill had moved the plant to different spots under the light with different plants nearby. But, it always reacted the same.

They named the plant “Twist and Shout” and altered their experiment. The plant died an early death when Bill suffered a migraine and did not water it. They never wrote up a paper on C-6, and Jahren could find no textbook information about the plant's actions. It still changed things for Jahren.

One day, Jahren invited Bill to go to a Whole Foods store at lunch time where she bought wheat grass. They splurged on all kinds of food with Jahren spending about 200 dollars and talking about the kind of people who bought those types of food all the time. They returned to the lab for a while, then Jahren left to pick up her son. They spent the afternoon together as usual, including a trip to the beach. At home, Jahren cooked dinner while her son played with Cocoa. Cocoa was a Chesapeake Bay Retriever, just as Reba had been.

Jahren presented her son with a glass of wheat grass juice, telling him she had made it in her lab and that it would eventually turn him into a tiger. He asked why it would take so long and she responded that “it takes a long time to turn into what you're supposed to be” (259). To demonstrate that it would eventually work, she cited the case of the Hadrocodium, a mammal that changed its diet and, after 150 million years, the species evolved into tigers.

Jahren goes through the usual bedtime ritual with her son, then puts him to bed. She talks briefly with Clint and heads back to the lab where she will work through the night, “using the other half of my heart” (261).

In Chapter 13, Jahren talks about the beginnings and endings of plants. She says trees have to be pruned in order to keep them at their maximum productivity within their environment.

In Chapter 14, Jahren says she was sad at the end of each plant experiment. At this point in her life, she still found new research ideas but they came to her in more

reasonable manners and were likely to prove successful. In one experiment, Jahren proved that potatoes would grow bigger in environments with increased carbon dioxide, but they will have lower levels of nutrients.

One day, Bill urged Jahren to step outside to see a double rainbow. They talked about their lives with Bill saying he never expected to live in Hawaii. Jahren worried that Bill might have had a different life if he hadn't centered himself on Jahren's work. He had made a lot of money when he sold his fixer-upper in Boston, which he had fully renovated by the time he sold it.

The lab had been funded for a short term in the future, meaning they could do whatever they wanted now that their experiment was complete. They piled equipment together, thinking about what to do next. Jahren was shocked to realize that they had been working together for 20 years. Together, they'd earned three degrees during those years. They had also "worked six jobs, lived in four countries, and traveled through 16 more countries. They ended up in the hospital five times, owned eight old cars, driven at least 25,000 miles, put a dog to sleep, and produced roughly 65,000 carbon stable isotope measurements." The measurements had been their ultimate goal, but Jahren pointed out that it was impossible for them to reach that conclusion without the steps that led them there.

Jahren talks about the things she has learned and that she has been told, including that she was successful because she was a woman or that she was successful despite that fact. She came to accept that there are things she did not know and that she learned many things along the way. She concludes the book by saying that she had spent many nights wishing she could tell someone what she had learned.

## Analysis

Jahren includes a lengthy sentence summing up the things that happened to her and Bill over the twenty years of their relationship. The things she found to be important included their degrees, putting Reba to sleep, and their scientific exploration of the isotope. None of those are surprising. What some readers may find surprising is that she includes the number of cars they'd had during those years and the countries they'd visited. Those things are important to Jahren and Bill.

The work on the isotopes was a main focus of Jahren's research and that information is readily available on Jahren's social media and blog pages.

Jahren kept Bill working for the years after they met. She provided him employment, though it was sometimes tenuous, and provided him support and friendship. The reader may look at their relationship only from that perspective, imagining that Bill owes Jahren a great deal for her years of support. However, Jahren presents a different perspective of their relationship. She says she has worried that Bill may have had a different life – a better life – if he had not spent his life focused on her work and her research. With that in mind, it becomes clear that Bill kept the labs running while Jahren was out of the



country and while she was on medical leave during her pregnancy. It is also clear that Jahren always knew Bill had done more for her than she had a right to expect. That puts a new perspective on their relationship that was not evident before this chapter.

## **Vocabulary**

festering, flouted, munificence, homeopathic, mantra, canopy, profoundly, culminated, stochastic, prominently, ambiance, flourish, enthusiast

# Important People

## Hope Jahren

Jahren became a scientist during an era when females were generally unwelcome in the realm. She was the product of a traditional Mid-West family, though they had Norwegian ancestry. She credited that ancestry with their reticence to talk about things of importance. Her father was a science teacher at a small community college. Her mother was a housewife who was brutal in her effort to care for her home and family. She spent a great deal of time in the garden and Jahren often joined her mother there, working to raise the produce for their family but also learning the basics of plants. She would combine the love of science and the love of growing things into a career that eventually landed her in Hawaii with her husband, son, and long-time science partner, Bill.

Jahren and Bill met when she was a graduate student. She noticed that he was steady and determined. Those traits, coupled with his high intelligence, prompted their initial connection that grew into a lifetime commitment. They became family to each other in ways that Jahren had never connected with her biological brothers and parents.

As Jahren became a scientist in her own right, she discovered that she was not always welcome in the scientific community, partly because of her sex but also because of her youth. She pushed herself to excel, burning off excess energy by working throughout the night in the lab or on her teaching assignments. Though she hated that part of the job, she constantly worked to secure funding for her projects and for Bill's salary.

As she sought to further her career, she struggled with manic-depression. She was an adult before she found a doctor who said her condition was common and prescribed medications to help her manage those. She did manage them until she became pregnant and spent months off the medication.

Jahren dealt with fears and setbacks along the way, including the fear that she will fail as a mother and experiments that do not yield the needed information. But she persevered and the book ends as she and her family have settled into a stable life in Hawaii.

## Bill

Bill was a student at Berkeley when Jahren was working there as a graduate assistant. Jahren noted that she did not really meet Bill, but “identified” him by his quick precision during field work. They began talking, and she found a way to put him to work in the lab. That was the beginning of their lifetime commitment to each other in the science field.

Bill was highly intelligent academically, but he lacked social skills. He tended to look the part of an unkempt hippie, which kept some people away. He made inappropriate jokes,

such as his reaction to the news that a lab assistant had only one hand. Bill, who had lost part of his own hand when he was very young, yelled out the word “gimp.” However, he was completely devoted to Jahren and continued to focus on furthering their science, even when his own pay was very low and he literally lived for awhile in his car.

Bill followed Jahren to her various teaching and research facilities, helping establish labs each time and often handling the details of their work. He had an optimism that never failed to appear, even in dire situations, and was determined to follow through on any scientific research idea he and Jahren came up with.

Bill was never romantically interested in Jahren, at least in Jahren's narrative. He took some time to accept her marriage to Clint, but he continued to work with Jahren and followed her to Hawaii. Jahren sometimes wished she could voice to him that he was an important part of her life, but she was never able to do so. She did note that her son talked about Bill and their future plans, indicating that Bill had become part of his life as well.

## **Clint**

Clint and Hope Jahren married, apparently on an impulse, during a trip only a short time into their romance. Jahren describes Clint as a steady person who stood by her as she struggled through the problematic pregnancy. Clint is a mathematician, and Jahren describes his work as being done through formulas and equations while she always needed to touch her science.

## **Jahren's Son**

Jahren gave birth to her son after her career was firmly established. Jahren worried that she would not be able to give her son the love she craved as a child, but she bonded with him immediately. She carried out the duties of motherhood by sharing them with Clint. She talks about their ability to hand the child off to each other, giving each time to perform the tasks required by their jobs. It is noteworthy that Jahren never gives his name.

## **Jahren's Father**

Jahren's father was science teacher. Jahren learned to love science and the science labs from the time she spent in his lab as a child. They talked very little and Jahren noted that they walked home after locking up the science building in total silence, though there were things she might have been curious to ask him. She pointed out this silence between the members of her family repeatedly, and it was not just her father who avoided talking, especially about anything of importance.

## **Bill's Father**

Bill's father died at age 97, but his death was still a shock to Bill and to Jahren. He was an important person in Bill's life, and it seems that Bill was an important person in his. Bill was born late in his father's life. Bill's reaction to his father's death indicates his bond with his father, despite the fact that they were separated by long distances as Bill worked on his career.

## **Teri**

Teri is the graduate student who went with Bill and Jahren on their trip to California. She was driving when they hit ice, and she wrecked the van. Teri was obviously upset about the accident and her first instinct was to fly home, thereby avoiding any further contact with Jahren and Bill. Bill opposed the plan, saying he had helped create the mess and should remain to help clean it up. She did finish the trip, and everything seemed fine between them by the time they returned home.

## **Jahren's Mother**

Jahren's mother was likely suffering from depression or some related mental illness during Jahren's childhood. Jahren remembers that her mother was always angry, but Jahren never knew why. Since the relationship between the mother and daughter was quiet and strained, Jahren felt she missed out on the demonstrative love that should have been part of her childhood. However, Jahren dedicated this book to her mother, indicating their relationship may have recovered somewhat over the years.

## **Ed**

Ed was a professor who was intensely loyal to Jahren and saw her ability, even when others did not. He had apparently told his colleagues stories about Jahren, though some of them did not readily reconcile Jahren's appearance with Ed's stories. As he was about to retire, he gave Jahren and Bill a lot of equipment from his lab. There is a metaphor in his final meeting with Jahren, as he closes down his career just as hers is kicking off.

## **Lydia**

Lydia was a technician in the hospital pharmacy where Jahren worked during her early college career. She had been working there for years, and it seemed she saw no other future for herself but to continue that work. She seemed angry when Jahren left to work in a more scientific setting at college.

# Objects/Places

## Jahren's Labs

Jahren and Bill put together their first lab together shortly after Jahren finished her graduate degree, and they put together others over the years. The lab at Johns Hopkins was important to Jahren because she went there to help cope with the emotional terror during her pregnancy. She was devastated when a department head said she could not be there at all until her medical leave was over.

## Jahren's Father's Lab

Jahren's father was a teacher at a community college in Minnesota, the town where Jahren grew up. Jahren and her brothers spent a lot of time in their father's lab and Jahren described the things she learned there, including how to take things apart while they were still working so that she could fix them when they broken down. These early years of working in the lab was one of the main catalysts for her career in science.

## Minnesota

Minnesota was where Jahren grew up, along with her brothers. Her father taught at a community college for 42 years and her mother was a homemaker who gardened. The small town where they lived included a large slaughterhouse that provided employment, both directly and indirectly, for most of the town. She does not name the town, but describes a lot of it, including passing her doctor's office on the way home from her father's lab each night.

## The Opal

Jahren discovered that the outer shell of the fruit from a hackberry tree has the same composition as an opal. She was thrilled with the discovery, even when another scientist told her a few hours later that she had not been the first to make the discovery. Jahren describes her son as "my second opal," indicating that she is discovering him, just as she discovered the opal in the lab all those years earlier (222).

## C-6

This was the designation given to a plant that Jahren and Bill observed as part of an experiment. The plant was one of many involved, but it was the only one that reacted differently to the artificial light that came on at specific times each day. Through time delay photography, Jahren and Bill observed that plant as it pushed its leaves over and above its neighbors, out of proportion to the other plants in the experiment.

## **Reba and Coco**

Reba was the Chesapeake Bay Retriever Jahren bought soon after she graduated college. Coco was another dog of the same breed the family owned when they lived in Hawaii. The first dog was important to both Jahren and Bill during their early years of work together, and the second was apparently a beloved family pet.

## **John Hopkins**

Johns Hopkins was where Jahren and Bill established their second lab together and where they were working when Jahren met and married Clint. Jahren was devastated when a department head said she could not be in the building while she was on medical leave during her pregnancy.

## **Hawaii**

Jahren, Clint, their son, and Bill moved to Hawaii when Clint was offered a permanent position at the University of Hawaii. Jahren and Bill established a lab there, and Jahren settled into a more stable life than she had during her early years as a scientist.

## **Norway**

Jahren's ancestors were Norwegian, and she went to Norway several times. She and Clint visited Norway and got married there. She worked there for a year as a Fulbright Scholar.

## **Axel Heiburg Island**

Jahren and Bill spent time for each of three summers at Axel Heiburg Island where they studied the plant life of centuries past. It was there that Bill confided in Jahren that his childhood had been brutal, mainly because his peers made fun of his missing hand. It was also there that Bill danced on an iceberg to make up for the prom he had missed in high school.

# Themes

## Coming of Age

Hope Jahren's story stretches all the way back to her childhood and ends when she is in her 30s, living with her husband and son in Hawaii. Over the course of the book, she ages by decades, but she also matures through a series of experiences and discoveries about herself.

One of the most important examples of this theme is seen in Jahren's relationships. As a child, she felt there was something missing from her relationship with her parents and brothers, especially with regard to her mother. She could never put a name on what was missing until she became an adult. It was only then that she knew she had needed contact and declarations of love. When she was pregnant, she worried that she would never be able to give her son the love he needed, but she found that was not the case. Jahren came to realize what was missing from her childhood and to ensure that her son never felt that love missing from his childhood. That fact is an indication that she matured enough to be a good mother and to allow her childhood scars to begin healing through the process.

Though none of the other examples are as dramatic as that one, the theme is seen repeatedly throughout Jahren's story. An early event occurs at the hospital where Jahren worked as a runner and then as a technician in the hospital's pharmacy. She was initially filled with a sense of purpose. She felt she was a vital part of the effort to save lives and to make people better. While that much was true, she inflated her importance to the point that she expected to save people. She filled bags of fluids with various drugs with those ideas in mind until she found that a patient had died. She had filled bags for that patient for days and the death drove home the fact that she was not really doing anything of importance. From that event, she became certain that her work was not important. That feeling is not entirely accurate because the patients who did recover were undoubtedly grateful that someone had provided the medications they needed. However, Jahren was correct in her discovery that she was not personally making a big difference. Undoubtedly, when she left the job, the hospital hired someone else to take her place. Jahren was looking to do something special with her life and briefly thought her work at the hospital was that something.

Another important aspect of this theme is seen as she brings the book to a close. She talks about her work at that point in her life, which has settled into routines that produce results without the constant fear of failure and worry over funding. That change came largely because Jahren had become an established scientist, recognized to the point that funding was easier to find and that she had more experience with choosing projects. But another side of that is that she had matured and moved past her youthful ideas and roadblocks.



## Family Relationships

Hope Jahren's family relationships ranged from those with no outward signs of affection to those with an abundance of affection. These relationships included her biological family members, her husband, and Bill. Bill was not biologically related, but he was closer to her in some ways than her family.

Jahren was the youngest child and only daughter of a family with Norwegian ancestry. She felt that ancestry prompted the family's reluctance to show any outward displays of affection. As a young child, she spent a lot of time with her father in his science lab. They had a two-mile walk home from the lab almost every evening, but they never used that time to talk about anything at all. She said they had fallen into a habit of silence, just as other families did. She does not say the silence in her relationship with her father hurt her, but she did note that there were things she might have learned from him during those walks, such as the names of the constellations. While that kind of conversation might have been superfluous, she and her father might also have gotten to know each other on a deeper level, if they had ever opened a dialogue.

Jahren's mother is another person who was mostly silent during Jahren's childhood. Jahren often heard her mother's anger in the form of slammed doors and drawers, and she feared that she was the cause of that anger. Jahren seemed to feel close to her mother when they gardened together, but she felt that there was something missing from their relationship even then. She could not identify the outward signs of affection because she had never been exposed to it, but she felt its absence.

Jahren also had older brothers who left home while she was relatively young. She said she never really noticed when they left because they never talked when they were all in the same house together.

While Bill is not biologically related, his connection to Jahren was stronger than her relationships with her parents and siblings. She talks about her ability to be in almost constant contact with him over the months of work in Axel Heiburg Island and their ability to communicate what was necessary without talking all the time. Interestingly, she does not seem to feel that their lack of outward affection and communication is a negative, whereas she talks about her mother's lack of affection as having a negative effect on her childhood.

Jahren's relationship with Clint seems to be very different from the relationship with her family. There seems to be more affection between them, and they fall into a habit of easy banter about work and their lives. From her descriptions of her childhood, her parents never found that level of happiness and communication together.

Finally, Jahren's relationship with her son is the exact opposite of her relationship with her parents. She writes that she began to heal from her childhood hurts only when she showered affection on her son. As a child, she worried about what was missing from her relationship with her parents. As a parent, she worried that her love for her son might be too big.



## Mental Illness

Hope Jahren suffers from manic-depressive illness, but she is not diagnosed for years. The years of trying to cope, a pregnancy during which she was unable to take medications, and her family history all play a role in this theme.

The first real information about Jahren's mental illness is seen as she struggles through a major breakdown. She describes the deep psychosis that engulfed her. She was unable to think coherently or to hold her emotions together. She described a feeling of unreality where she did not really hurt or feel depression. That uncaring attitude could easily have been the end of her career, but the mania side of the illness seemed to rule more often than the depression side. That mania kept her buoyed up, often to an unhealthy level, but others did not really see how much she was struggling.

Jahren's pregnancy prompted a months-long episode because she was forced off her medications for the first two trimesters of her pregnancy. She describes slamming her face on the floor or wall, hoping to knock herself out so she could escape the misery. She spent extended periods in the hospital, sometimes strapped to the bed because there was nothing else to do except wait for the time when she could return to a medical regimen to control her illness.

The first clue that Jahren might have a problem is seen when she is working at the hospital pharmacy. She never uses the elevators but takes the stairs when she is delivering medications from the pharmacy to the hospital. She explains herself to a supervisor, saying she was merely trying to save time. However, she was also trying to burn off excess energy. At this point in her life, Jahren was a college student who was probably carrying a heavy load of coursework, which probably necessitated a lot of study time. She was also working long hours at the pharmacy. That all adds up and indicates that she should have been tired. Instead, she dealt with the excess energy on a daily basis and sought any opportunity to run it off. That behavior suggests a manic personality. However, at that point in the story, Jahren had not yet given any sign that it was an abnormal manic state.

Jahren arranged her work schedule so that she could take medications to the psychiatric ward of the hospital. She never explains her fascination with that ward, but does say that she would have to guard against becoming indifferent to the patients, if she was near them for extended periods. It seems that she was interested in how the patients coped and, more importantly, wanted to feel compassion for them.

While there is only anecdotal evidence, it seems possible that Jahren's mother suffered a similar illness. Jahren said her mother often slammed doors and drawers closed, indicating a constant state of anger. It may not have been anger as much as it was her efforts to deal with depression or a similar mental illness.

## Jahren's Relationship with Bill

Jahren says she did not really meet Bill, but it was more like she identified him during a field trip when she was a graduate student serving as a teaching assistant. She noticed that he was always working at the edge of the group and that he was intelligent and hard-working. She does not say whether she noticed his deformed hand at that point, but there was something about him that attracted her, especially on a scientific and intellectual level. Jahren soon secured him a position in the lab where she was working and that began their decades-long working relationship.

Jahren says the other students on that first field trip made comments that indicated they believed Jahren and Bill were becoming romantically involved. Those students were mistaken. Jahren said they were not the last to try to put a label on that relationship. At one point, Jahren said they sometimes acted like juvenile fraternal twins, indicating that they were silly to the point of being extreme and closely connected.

Jahren's relationship with Bill was similar in some ways to her relationship with her family. Jahren and Bill did converse about their shared love of science and only occasionally opened up to each other about their families and childhoods. They also fell into periods of silence or near-silence, talking only when it was necessary. While Jahren had felt the constant silence with her family as a stifling presence, she and Bill were not avoiding communication. They were comfortable with their relationship and did not always feel the need to talk.

An important similarity between Jahren's relationship with her family and her relationship with Bill is seen shortly after his father died. He confided that the death of a parent had made him feel alone like nothing else ever could have. Jahren wanted to tell him that he would never be alone as long as she was alive. However, as was the case during her childhood, she did not know how to express that love.

Bill's deformed hand was a major source of concern for him and he admitted to Jahren that he had been ostracized as a child. His peers teased him about it, apparently in cruel ways, and Bill removed himself from their social circles in order to avoid further torment. He also told Jahren that he had never had a date. Jahren felt fiercely protective toward Bill, as seen in her reaction to his story. She also demanded that the students they taught be respectful toward Bill, regardless of how they acted toward her.

An important aspect of their relationship is seen in how they work together. Jahren literally goes after funding to pay for Bill's salary. On the surface, that seems to indicate that Bill owes Jahren a great deal. However, there were gaps in the funding, but Bill continued to follow Jahren's lead, working by her side through all the various research plans she made. Jahren said she always felt bad that she made more money than Bill because the two of them were part of a whole. She also worried that Bill might have had a fuller life if he hadn't been focused on her work, helping her set up labs, and following her to various cities over the course of their careers.

## Comparisons of Science and Life

Jahren's focus on science as a career path prompts her to look at life in terms of science. Her understanding of plants means she is perfectly equipped to compare life's major events to situations in the plant world.

The most obvious example of this theme is seen in the titles of the three sections of the book. The first is titled "Roots and Leaves." The reference to roots is obvious as Jahren begins the story by talking about her childhood and her ancestry. She includes the time she spent in her father's science lab as one of the driving factors in her decision to become a scientist. Jahren talks about a leaf as an idea. She had several ideas over the course of her lifetime, including the decision to include Bill on her research team. Each of these small decisions can add up to a major impact in a person's life, just as each leaf on a tree can add up to create an impressive tree.

The second section of the book is titled "Wood and Knots." In this section, Jahren talks about the problems of life, including her own struggles with manic-depressive disorder. She details the struggles to find funding and to be accepted in her chosen field. These "knots" of her life created obstacles, but she worked around them, emerging as a full-fledged scientist.

The final section is titled "Flowers and Fruit." The obvious objective in this title is to make the reader think about the "fruits" of Jahren's life. On the professional front, she has established herself as a respected researcher. On the personal front, her illness is in check and she has a loving family, including Bill.

There are other examples of this theme scattered throughout the sections. Jahren compares earning her Ph.D and moving from California to Georgia to the willow tree that propagates by dropping limbs that float away and take root in some other place. She compares her attitude to that of a transplanted plant, saying the only option was to make the best of the situation. She also describes the conditions in the Southern states, including Georgia. The plants grew in abundance. Jahren compares that to her own situation, saying that she felt "every kind of growth seemed possible." (90) She says a vine "makes it up as it goes along," which is similar to her efforts to keep herself and Bill paid and working. (120)

Later in the book, Jahren writes about the "annual budget" of an average tree, including the need to plan the placement of every single leaf in order to ensure another year's growth. She compares that to the funding available to research scientists, who are constantly searching for project ideas (which she earlier compared to leaves) and the resources to pay for them.

# Styles

## Structure

The book opens with a Prologue in which Jahren challenges the reader to become a scientist by considering a leaf and asking questions about it. She directly addresses the reader in that section by saying, “Humor me for a minute, and look out your window” (Page 2 of the Prologue). The Kindle version of the book also includes an Epilogue in which she addresses the reader again, challenging readers to plant a tree and even encouraging them to carve Bill's name on the trunk. Other than these two sections, she does not depend on the direct address.

The book is divided into three sections. The first is titled, “Part One: Roots and Leaves.” There are 11 chapters in this section. Each is titled by number only. The next section is titled, “Part Two: Wood and Knots.” There are 12 chapters in this section. They are titled, “Chapter 1” through “Chapter 12,” rather than picking up the numbering from the previous section. The final section is titled, “Part Three: Flowers and Fruit.” Chapters 1-14 appear in this section. Each section relates to segments of Jahren's life. For example, in the first section she talks about her own roots, relating information about her ancestry and parents. She also talks about the “leaves” in her own life, which is a metaphor for the events that happen during her early life. In the final section, she talks about the “fruit” of her marriage – her son – and his impact on her life as well as the “fruit” of her career, which is a stable position with Bill at her side.

The overall structure of the book is chronological in order. There are a few instances of foreshadowing. Some past events presented as memories or conversations, but the book basically follows Jahren's life from childhood through her education and turbulent 20s, to her established life in Hawaii.

## Perspective

The story is written in first person from Hope Jahren's perspective. She was an established scientist with time on her hands when she wrote the book. For the most part, she appears to present a believable and honest account of her life up to that point. For example, the story seems brutally honest as she describes her bout of depression. She seems to hold nothing back in her description of the manic period and the depressed periods. However, it seems reasonable that a person who has experience those kinds of episodes may not fully remember their actions and may remember the periods either worse or better than they actually were. A person who looks back on them as very dark periods may exaggerate the situations while those who try to gloss them over may remember them as less intense than they actually were. With that in mind, the reader must judge each passage to decide if Jahren is fully honest. Those passages seem believable and explain some other pieces of her life, such as the periods when she barely slept.

An important aspect of the perspective is that Jahren presents dialogue. These are sometimes lengthy passages that are presented as true accounts of what the various people said at given points in time. It seems unlikely that Jahren kept accurate accounts of those conversations all those years, which means she worked from memory. She likely inserted her versions of the conversations, using words and phrases that were typical for that person at that time.

Overall, Jahren seems to be a reliable writer who wants only to tell the truth about her life. She does not write about her purpose for writing other than to say she had always loved to write and that the book was something Bill encouraged her to do.

## Tone

Throughout the book, Jahren describes a life of turmoil and fear punctuated by bouts of depression and manic episodes that kept her awake for days on end. Under that, there is a line of determination that seems almost too good to be true at times. If this book were a novel, the reader would expect some horrific life-changing event as the book draws to a close. However, Jahren points out that any story about plants will not come to a full closure ending, simply because of the nature of her area of scientific study. With the understanding that the book is Jahren's true story, it seems reasonable that there are no big events at the end and that Jahren and Bill simply settle into this new phase of their lives.

The book is written in modern-day English by an educated, intelligent woman. Some readers may encounter unfamiliar words and phrases. There are also scientific terms and phrases, though Jahren adequately defines most of these. Overall, most readers will be able to understand the story without the aid of a dictionary, even though the meanings of some words and phrases will have to be discovered from the context.

The book includes dialogue. Some readers may decide that lends an air of unreliability, since the dialogue comes from Jahren's memory and cannot be completely accurate. It seems she uses the dialogue as a means of furthering the story and of giving life to the people. Some of the dialogue includes curse words that some readers may find offensive.

Jahren weaves her own story into the science that dominated most of her life. She talks about scientific truths and events as a means of explaining what is happening in her own life. Some of those connections seem obvious. The section that discusses fruits and flowers also includes information about her son, which readers will clearly see is the "fruit" of her marriage. Others are less obvious, and readers may find themselves searching for the connections and meanings.

## Quotes

It must be a survival skill left over from the old Viking days, when long silences were required to prevent unnecessary homicides during the long, dark winters when quarters were close and supplies were dwindling.”

-- Hope Jahren (Part One: Roots and Leaves, Chapter 1 paragraph 16)

**Importance:** Jahren is talking about the silences that stretched for long periods in her home and within the homes of other Norwegian families she knew. This lack of communication is part of a bigger theme related to the relationship between Jahren and members of her family. The fact that she was not close with any of them made her fear that she would not be a good mother to her son, but that fear turned out to be unfounded.

Well into the night and deeper in my brain, it came to me that as hospital workers, we were being paid to trail along behind Death as he escorted frail, wasted bodies over difficult miles, dragging their loved ones along with them.”

-- Hope Jahren (Part One: Roots and Leaves, Chapter 4 paragraph 10)

**Importance:** Jahren personifies Death in this passage, one of many places where she uses personification. She is working as a runner, or delivery person, in a hospital pharmacy. She has begun to see an incredible level of suffering. She notes that the staff members do not cry because the sick person's family cries enough for everyone. This is an important part of Jahren's coming-of-age, as she learns that she is not changing the world through her work there.

Establishing yourself as a scientist takes an awfully long time. The riskiest part is learning what a scientist is, and then taking the first shaky steps down that path, which will become a road, which will become a highway, which will maybe someday lead you home.”

-- Hope Jahren (Part One: Roots and Leaves, Chapter 8 paragraph 1)

**Importance:** Jahren is writing about the day she discovered that the berry from a hackberry tree has a shell that is identical to an opal. She also talks about the risks of doing one's own experiments and creating hypotheses, all toward learning something new instead of repeating already-proven experiments. That idea of the risks involved with being a scientist is repeated several times in Jahren's book.

On August 1, 1996, I officially became an assistant professor at Georgia Tech, and I was expected to look and act like one, even though I was only twenty-six years old and I had no concrete idea how one does either of those things.”

-- Hope Jahren (Part One: Roots and Leaves, Chapter 10 paragraph 36)

**Importance:** Jahren was very young to have already completed her doctorate degree. In order to make her mark in the scientific community, she had to overcome the stereotype of a science teacher always being an older male. In addition, she was



uncertain of her own abilities, especially considering the accident in the lab at her previous position.

Bill and I spent night after night of those first years designing and redesigning the first Jahren Lab, the same way that a little girl never tires of dressing and redressing her favorite doll."

-- Hope Jahren (Part Two: Wood and Knots, Chapter 2 paragraph 1)

**Importance:** The fact that Jahren compares their first lab to a little girl who dresses up dolls is a reminder that Jahren is not following the stereotypical course of women during that time period, and that there were few women in science. The fact that they now have their own lab is an indication that she has taken an important step in her career.

A vine makes it up as it goes along. The copious vine seeds that rain down from the top of the forest spout easily, but only rarely take root."

-- Hope Jahren (Part Two: Wood and Knots, Chapter 6 paragraph 1)

**Importance:** The opening sentence of this quote is an analogy for Jahren's life as a research scientist who has to constantly come up with new theories and ideas in order to find grants to fund her research. The second sentence is a reference to the number of ideas that fail to catch the interest of funding agencies, meaning they "sprouted" in the scientist's mind but then died from lack of funding.

Any by luck, by stupid luck, or time or chance or Providence or Jesus or who cares, your appointment happens to be at the best hospital in the world and a doctor looks at you hard and he says, 'You don't have to live this way.' And he asks questions until you've told him everything and he's not horrified or disgusted or even surprised; he says people have this and they manage."

-- Hope Jahren (Part Two: Wood and Knots, Chapter 9 paragraph 10)

**Importance:** In the opening of this chapter, Jahren describes a manic episode that left her drained and confused and her own inability to control the swirls of emotions that were creating havoc in her life. The incredible part of this is that she has managed to hold herself together to earn degrees and to hold jobs. The nearly unbelievable point is that she was well-educated but had never sought help before this. That could be explained by her family's natural inclination to avoid talking about anything personal.

As I spent those early years repeatedly smashing against a brick wall of scholarly skepticism, my bewilderment ripened into the realization that it would take me many conferences, much correspondence, and a great deal of intellectual soul-searching to successfully convince a critical mass of other scientists that I knew what I was doing. The trouble was, I didn't have years."

-- Hope Jahren (Part Two: Wood and Knots, Chapter 12 paragraph 6)

**Importance:** Again, Jahren was dealing with the problems of finding funding to keep her lab operating and to pay Bill's salary. That was a burden she faced during all the years of their work together. However, apparently she took it on willingly from their first year of

working together. She never considered eliminating Bill as her partner in the work she did, even though she cited the pressure of finding the money for his salary.

His oblique recognition of my years of effort amplified the poignancy of the situation and suddenly, a big lump gathered in my throat. There in the parking lot, we two scientists conducted a homely ceremony that transferred the tools of his life – his career – to mine.”

-- Hope Jahren (Part Three: Flowers and Fruit, Chapter 2 paragraph 62)

**Importance:** Jahren had just taken items from the lab of her former teacher and friend, Ed. He was retiring and gave her all the equipment, saying it was going to be thrown away. He mentioned the years of work, which was an acknowledgment Jahren sorely needed. Nevertheless, she recognized that she was gaining that lab equipment only because Ed's career was at an end.

When you are supremely isolated among just a handful of people, those few people can quickly begin to seem suffocating. And they did – except for Bill, I had discovered.

-- Hope Jahren (Part Three: Flowers and Fruit, Chapter 4 paragraph 19)

**Importance:** Bill and Jahren were part of a group of scientists studying the plant life buried under the snow about 700 miles north of Alaska at Axel Heiburg Island. Their time together became a time of bonding for them as Bill revealed some details about his childhood. He was missing part of one hand since very early in his childhood. He did not know how or what happened. What he did reveal to Jahren was that he had been tormented by his peers and never joined any group activity, nor did he ever date or have friends.

A manic-depressive woman cannot take Depakote or Tegretol or Serequel or lithium or Risperdal or any of the other things that she's been taking on a daily basis for years to keep herself from hearing voices and banging her head against the wall. Once her pregnancy is confirmed, she must cease all medications quickly (another known trigger) and stand on the train tracks just waiting for the locomotive to hit.”

-- Hope Jahren (Part Three: Flowers and Fruit, Chapter 8 paragraph 1)

**Importance:** Jahren describes the months of her pregnancy in detail, including the weeks in the hospital when there was nothing to do but strap her down and wait for her pregnancy to advance to the point that she could resume a drug regimen. This is the first time the reader sees the seriousness of her illness. She does not, however, address the pregnancy by saying whether it was planned.

Every kiss that I give my child also heals one that I had ached for but was not given – indeed, it has turned out to be the only thing that could.”

-- Hope Jahren (Part Three: Flowers and Fruit, Chapter 11 paragraph 11)

**Importance:** Jahren again talks about the lack of demonstrations of love in her childhood home and the impact that had on her life. She goes on to say that she had



worried during pregnancy about her ability to love her child but now worried that her love was “too vast for him to understand.”

## Topics for Discussion

### **Describe Hope Jahren's childhood, including her relationship with her parents.**

The student should use this question to talk about the lack of demonstrative love in the house, the fact that her mother seemed angry all the time and that they did not communicate. She should also talk about the time spent in her father's science lab, including the effect that time had on her career choice.

### **Describe the relationship between Jahren and Bill.**

They were friends, colleagues, and science partners. The reader should also talk about the voids Jahren and Bill had in their lives, such as his lack of friends and her longing for a loving family, and how their relationship filled at least some of those voids.

### **What were some of the challenges Jahren faced in her career?**

There is a lengthy list of challenges that should be explored, including the stereotype that meant women were not readily welcomed into the science community during Jahren's early life. There was limited funding for research scientists, meaning she had to constantly look for funding to pay her expenses and Bill's salary. The reader could touch on her health, though that will be further explored in another question.

### **What were the challenges Jahren faced in her personal life?**

The health issues should top this list, including discussion on how Jahren finally got a grip on her mental illness and the setback during her pregnancy. Her desire for a loving connection with her mother as a child should also make this list.

### **List at least three examples of Jahren's comparisons between plant life and her life.**

There are many more than three, but readers can use this to explore the three they choose. The plant that bears fruit is an analogy for her pregnancy and the fruit represents her son. The roots in the first section are a comparison to her childhood. Other possibilities are leaves, pollination, vines, and life cycles.



## **What did Jahren learn during her brief employment at a hospital pharmacy?**

She did learn some details about the work and about sterilization, but her more important lessons were about human suffering and her reaction to the patients of the psychiatric ward. She also thought the job was vitally important at first, but discovered that she was not going to save any lives with her work there. That is one example of how she matured over the course of the book.

## **How did Jahren feel about her lab, regardless of where that lab was located?**

She compared her lab to a church, saying she learned about the things she believed in while working in her lab. She found comfort there, evidenced by the fact that she went there when she was sick during her pregnancy, mainly because it was somewhere she felt safe. The reader can give other examples of her feelings, including her first experiences in her father's lab.

## **Who is Bill and what are some of the challenges he faced?**

Bill was a science student when Jahren was working on her graduate degree and they became partners in their life-long dedication to plant-related research. The reader should talk about Bill's hand. His peers teased him about the missing piece of his hand, which made his childhood miserable. He was awkward in social situations and desperately needed to feel loved, but he was unable to let others get close to him. Other pieces of this discussion could focus on his intelligence and his caring nature toward other students, and on his love of science.

## **Describe how Jahren matures over the course of the book.**

The reader could include examples of Jahren's immaturity and self-doubt during her early career, including the fear that she would not find new grant opportunities and the mistakes in judgment.

## **What was the significance of the opal in Jahren's research and in her personal life?**

Jahren was studying the berries from the hackberry tree and found that the shell had the same makeup as an opal. Though she quickly found out she was not the first to

make the discovery, it was her first real discovery from her own research, and it made her feel that she had made the right career move. That feeling was echoed with her son. This question should prompt comparisons of Jahren's self-doubts on both the personal and professional fronts and how she eventually found she was capable on both fronts.