Hallucinations Study Guide

Hallucinations by Oliver Sacks

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Contents

Plot Summary

Hallucinations, by Oliver Stacks, is an extraordinary look at the causes and circumstances surrounding one of the most controversial symptoms in today's neurological field. Sacks examines a variety of reasons normal, everyday citizens might have hallucinations, and helps to remove the stigma often associated with these. His book is informative and technical, while giving enough real world context and examples to make it enjoyable for most readers.

Hallucination begins with an Introduction by Oliver Sacks who discusses the stigma often surrounding hallucinations. He opens the book with a discussion of Charles Bonnet Syndrome, a disease in which hallucinations occur in those who are technically blind due to degenerative visual impairment. He continues by looking at sensory deprivation, and the hallucinations that occur for those who are in places of visual or sensory monotony, such as prisoners in confinement. He then examines hallucinatory smells, focusing on scents that may seem to occur, when in reality, they do not. This leads to a discussion in Chapter 4 of auditory hallucinations, including simple noises to full musical compositions. Chapter 5 discusses the hallucinations that often occur in Parkinson's patients, in part due to the drugs that help their physical symptoms. This leads to a discussion in Chapter 6 of altered states, or hallucinations due to drugs, a topic Sacks on which has much information, since he experimented widely. Sacks also has experience with his next topic, migraines, because he had the auras frequently as a child. His next chapter focuses on the hallucinations that occur in epilepsy, and continues into a chapter discussing hallucinations that occur when only one eye is blind. The following chapter focuses on delirium, and hallucinations that occur due to toxic levels of chemicals or brain damage. This leads to a chapter on the pseudo hallucinations of near sleep, and the very real hallucinations on waking. The following chapter examines narcolepsy, and the true meaning of nightmares, or the hallucinations of REM sleep. Sacks' examination of the hallucinations that occur as a result of PTSD follows in Chapter 13, and his discussion includes an interesting take on what may make us see ghosts. Chapter 14 focuses on doppelgangers, or the self hallucinations, and finally, Chapter 15 revolves around the ideas of phantom limbs, and the "other" presence hallucination, which Sacks proposes might explain the feelings of "God."

As a technical piece, this book is filled with ample explanations of research studies and technical neurological explanations for the various hallucinations presented, but more importantly, Sacks writes with both personal experience and experience as the doctor of many patients, giving this book an entertainment value to coincide with its instructional value. It is an entertaining, enlightening, and engaging look into the science of hallucinations.

Introduction

Introduction Summary and Analysis

In the Introduction, Sacks discusses the origins of the term "hallucinations," and notes that, for the sufferer, these images are very real. They are startling in their appearance, and cannot be controlled by conscious effort. Additionally, hallucinations can, at times, overlap with illusions. Because of advances in medical technology, we can now pinpoint where certain hallucinations are occurring in the brain. For example, if the portion of the brain that recognizes faces is abnormally activated, the patient may hallucinate faces. Sacks also presents the question as to how much our culture, folklore, and society is built around hallucinations. For example, did elves, fairies, aboriginal art, and other subjects come from the original artists' hallucinations? Do seizures and out of body experiences help found our belief in the divine? Sacks closes the introduction by noting that his information will focus on "organic" psychosis, and not on those suffered by schizophrenics and other mentally ill patients, since those differ greatly in content, origin, and perception. Finally, he points out that, in Western medicine, hallucinations are frowned on, even though they are quite common, and thus, he hopes the book will allow those who do have hallucinations to have an understanding as to why and how they occur.

Chapter 1: Silent Multitudes: Charles Bonnet Syndrome

Chapter 1: Silent Multitudes: Charles Bonnet Syndrome Summary and Analysis

Sacks opens Chapter One with the story of Rosalie, a blind, 90 year-old nursing home resident who suddenly began seeing hallucinations of grand parties, horses, and other scenes. The images were very real to her, and her eyes even moved with the scene, as though we were watching it. Sacks examined her, and found her to have Charles Bonnet Syndrome (CBS), a disease discovered originally in the late 1600s. Charles Bonnet, a scientist, had a grandfather with the disease, and Bonnet was the first to describe it in full detail. However, his writings were lost until the beginning of the 20th century. The writings detailed floating images of handkerchiefs or balls, young women or men who were not there, and these lasted for days or weeks, but would always come and go. For Rosalie, the hallucinations came on again nearly a year after the first attack, following a highly stressful week.

CBS was not well known until the 1990s, since there were few cases in the field, but Sacks believes this is due to low report, and misdiagnoses. One study showed 15 percent of patients in the study had CBS, but this was not reported. Many of these had simple hallucinations, such as seeing colored balls, and often forgot to mention the episode to physicians. Others, however, are more complex, such as seeing entire people who do not exist. Other cases involve musical note hallucinations, math symbols, or other forms of text hallucinations. Some research shows that nearly a quarter of all those suffering from CBS suffer from text-style hallucinations. On occasion, those hallucinations are relevant, in that they resemble something the individual was working on, although they are often nonsensical.

Charles Bonnet Syndrome has been expanded to include not only those hallucinations stemming from ocular issues, but also those stemming from higher up in the visual system, including brain injury to the occipital lobes. One such subject, Zelda, had hallucinations of roses on a theater curtain. Brain scans showed damage to her occipital lobes, presumably causing the hallucinations. Over time, she had both simple and complex hallucinations, and those complex hallucinations were highly detailed. Some included multiplication, where various objects duplicate and triplicate, while others stemmed from watching television. Zelda had dozens, each day, but still managed a full life. Although she has, in the past, been free from hallucinations for short times thanks to medications, they have always come back during times of high stress, as is generally true for patients. Rosalie, for example, began having very dark hallucinations following the death of her friend, when she began to see six men around her bed, presumably harbingers of her own demise. Eventually, as she emerged from her depression, these vanished.

Hallucinations of CBS sufferers are often brilliantly colored, cartoonish, and include a detail that is unrealistic. Sacks points to studies by Dominic ffytche that have shown over the last several years that these variations are due to the area of the brain being abnormally stimulated, and also that hallucinations affect the brain more like visualizations than imagination. Further, Sacks notes, the patient's culture also affects hallucinations, since he or she cannot hallucinate something with which they have no experience, but at the same time, CBS hallucinations are generally not personal, in that one rarely recognizes hallucinated faces or places. Text hallucinations are often not readable, or recognizable. Further, hallucinations in CBS are rarely ever misinterpreted by the patient as anything other than a hallucination. This can be hindered, however, if there is the presence of dementia, where patients may hallucinate people coming after them, and this tendency is worse later in the day. Sacks closes this chapter by pointing out that those with CBS can live completely normal lives, even though they can have dozens of hallucinations a day, because there is nothing inherently wrong with their cognitive functions. The hallucinations can even enhance, since blind CBS patients can be given images to entertain, and can inspire, as in the case of author Virginia Hamilton Adair, who writes frequently of her hallucinations.

Chapter 2: The Prisoner's Cinema: Sensory Deprivation

Chapter 2: The Prisoner's Cinema: Sensory Deprivation Summary and Analysis

In Chapter 2, Sacks discusses the hallucinations experienced by prisoners in the absence of perceptual change. Prisoners or any individual who is isolated in darkness can experience "the prisoner's cinema," or brilliantly colored and varied hallucinations. Even those with adequate light can experience the same, as perceptual monotony can have the same effect as the absence of light. In one of the first studies on sensory deprivation, college students were placed into soundproof and lightproof booths, and given gloves to reduce tactile stimulation. The result was eventual hallucinations, turning from simple to complex, with vivid detail. Later experiments involved water tanks, or sensory deprivation tanks, designed to remove all sense of body position or senses, and these experiments were often combined with hallucinogenic drugs. Further testing, using blindfolded subjects who could move freely about their normal environment, showed even they experienced hallucinations by the second day. Just as in the previous experiments, these hallucinations did not appear when the subject was engaged in challenging tasks, but only when monotony and boredom set in. Brain scans have shown that visual deprivation causes over excitement in the visual cortex, and in another test by Babak Boroojerdi, a subject's brain showed stimulation in the occipital cortex when hallucinating, but in the prefrontal cortex when the subject was asked to recall the hallucinations, showing distinctly different brain activity between hallucinations and imagination.

The deprivation tanks of the 1960's enticed hallucinations, but so did the polio crisis, since those in iron lungs, without any ability to move, also experienced hallucinations. Sacks notes he has seen many patients, unable to move, who experience hallucinations. Further, sleep deprivation and dream deprivation can also induce hallucinations, as can exhaustion, as has been seen in marathon athletes.

Chapter 3: A Few Nanograms of Wine: Hallucinatory Smells, and Chapter 4: Hearing Things

Chapter 3: A Few Nanograms of Wine: Hallucinatory Smells, and Chapter 4: Hearing Things Summary and Analysis

According to Sacks, many individuals find it almost impossible to imagine smells. Although some can recall a scent in a given, familiar situation, these scents are often merely imagination, but can also be hallucinations. Sacks points out that some individuals have a highly acute sense of smell, while others have anosmia, or the complete lack of ability to smell. These individuals have some problems, as they cannot smell gas, rotten food, or other scents that indicate problems to most. Sacks writes about one man who, due to injury, suffered from anosmia, and mentions his life was decidedly worse, as he missed scents. He believed himself to be healing months later when he began to smell his pipe and coffee, but tests showed these scents were merely hallucinations. Often, the loss of a sense results in hallucinations, such as in the case of CBS patients, and just as in those patients, those with only partial loss of the sense can still have hallucinations. Sacks writes of Mary B, a woman who began smelling all food as rotten, and almost all smells as rancid or putrid, severely limiting her life. This unnatural perception of putrid smells is called parosmia. However, those with complete anosmia only have hallucinations of smells, many of which appear as combinations of scents. One woman describes the putrid smell of feces, vomit, burning flesh, rotten eggs, smoke, chemicals, and mold. Such hallucinations of vile smells is called cacosmia. Although humans can detect over ten thousand smells, when the brain is released from reality, as in the case of hallucinations, it can combine smells that are not ever present in reality, resulting in trillions of possible combinations.

In Hearing Things, Sacks notes that in the early 70's, a study was done where eight pseudo patients were admitted to various hospitals "hearing voices". In all cases, they were immediately coded as mentally ill, and spent an average of two months in hospitals, when in reality, this was their only supposed symptom. Sacks explains this perception, that hearing things means one is mentally ill, is still prevalent, even though there are many other explanations. In most cases, schizophrenics hear voices directed at them, whereas those without mental illness often hear voices directed elsewhere. Nearly ten percent of the general population heard voices, according to an 1894 study by the Society for Psychical Research. Most hear their name spoken, or hear voices telling them to do unimportant things, like move a glass. Some ignore the voices, and live normal lives, while some are plagued by them, but still completely sane. In some cultures, hearing voices indicates connections with gods. All humans talk to themselves, but at times of great stress, most seem to hear an external voice, urging them forward.

Sometimes, there is a visual hallucination with this voice, as well. Sacks proposes that perhaps those with psychosis simply cannot tell their own internal voice from external voices.

In some cases, auditory hallucinations are merely sounds, instead of voices, such as ringing or thudding. Some include musical tones, but these are often caused by stroke, tumor, aneurysm, infectious disease, or other physiological illness. However, when these musical hallucinations are caused by hearing loss, they can be decisively perpetual. Musical hallucinations tend to seem to be external in nature, and is often a familiar song or style, although not always liked. At times, it can be blaring loud, or soft, and is often highly elaborate. While some are tormented by these, many merely find them an annoyance, and can learn to ignore them.

Brain scans have shown that musical hallucinations affect many areas of the brain, which explains why musical therapy is so effective in many conditions. In most cases, auditory hallucinations are the result of deafness caused by aging, much like CBS is often the result of a loss of sight due to aging. However, the areas of the brain affected are quite different. Where as visual hallucinations are generally singular in nature, such as a face, or hands, auditory hallucinations involve tempo, rhythm, harmony, all as a congruent piece.

Chapter 5: The Illusions of Parkinsonism and Chapter 6: Altered States

Chapter 5: The Illusions of Parkinsonism and Chapter 6: Altered States Summary and Analysis

In Chapter 5, Sacks discusses Parkinson's disease, originally discussed in 1817 as a solely physical disease. Sacks notes the hallucinations and perceptual disorders involved were rarely discussed until the 1980s. Sacks, in his treatment of encephalitis patients, notes that L-dopa treated patients of all types, including Parkinson patients, are often afflicted with hallucinations. Some are geometric, while others are complex. Unfortunately, many also develop paranoid hallucinations, such as people following them, or people in their homes, watching them. Lowering the dose of medications sometimes reduces these hallucinations. One woman, Agnes, sees a host of hallucinations every day, due to Parkinson's, and has learned to adjust. For Agnes, they help her pass the time as she is immobile because of the disease. Others have "companion" hallucinations, or those beings they feel with them all the time, or musical hallucinations. Still others experience tactile hallucinations, such as feeling everything is fuzzy. Sacks notes that although L-dopa seems to trigger the hallucinations in Parkinson's patients, it is used without hallucination in other patients. He questions what might cause these two attributes to result in such varied hallucinations, and suggests the sleep issues associated with Parkinson's also plays a role.

Sacks points out that researchers have shown through autopsy that individuals with mid-brain damage due to Parkinson's or any other disease often suffer hallucinations, but these vary from CBS patients in that they are almost always complex, often multisensory, and can lead to delusions. The abnormalities in the brain, combined with drugs such as L-dopa, may solve the issue as to why Parkinson's patients are so affected by the drug. There is one type of Parkinson's, Lewy Body dementia, where the brain contains an excess of proteins, which result in visual hallucinations. One such subject had horrific hallucinations, and was often terrified. With other forms of dementia, these hallucinations often lead to delusions, where the patient believes loved ones are plotting against him or her. Again, unlike CBS, these hallucinations are very real to the patient, and often involve various senses, making the experience much more realistic. On the other hand, Sacks notes, those with Parkinson's often have benign hallucinations, such as Gertie, who hallucinated a gentleman caller night after night.

In Chapter 6, Sacks notes that human beings require a break from day to day, and often turn to substances that produce altered states to relax, break away from reality, or become uninhibited. Many plants have developed characteristics to deter predators that appeal to humans as hallucinogenic drugs. Sacks traces the literature of mescaline through several authors as far back as the 1890s, and the reports of the 1950s intrigued Sacks, since they discussed in depth hallucinations. Some experienced them as

spiritual while others examined the abnormal activations of the visual system, but Sacks notes both were limited in their scope, as was shown when LSD and mushrooms became available widespread in the 60s. These drugs, according to some experimenters, could make the senses come together so one could smell a B flat and taste green. Hallucinogenic drugs also tend to make colors more vivid, involve hallucinations of small creatures such as elves or giantism, and involve depth perception issues. Time elements also exist, in that time seems to move too slowly or faster than usual. Sacks himself tried hallucinogens in the 50s, but used too little to have an effect. As he studied to be a doctor, he knew he wanted to study the brain, and how drugs and other factors influenced the brain's activities. As he learned more and questioned more, he decided to experiment more.

Sacks began with cannabis, and escalated to LSD, and finally, to artane, a drug used to treat Parkinson's, but one that, in large doses, could cause delirium. At first, Sacks believed nothing happened with the artane, but he soon realized he had an entire hallucinatory gathering at his home, complete with two friends who were not there. He then hallucinated a helicopter landing with his parents, and finally, a conversation with a spider. Every weekend, he tried different drugs, recording their effects on his brain. At one point, he sought to see the color indigo, and after many drugs, he succeeded. However, he was only able to see the beautiful color one other time in his life, when he was transported by music. Sacks admits he soon began taking too many hallucinogenic drugs, and had a family friend accuse him of having a drug issue. When his schooling was over, he spent a summer of nothingness, using intravenous drugs, and one evening, in a morphia stupor, he spent twelve hours staring at a coat, hallucinating a battle scene. When he began his residency, he found himself depressed and taking fifteen times the recommended amount of sleeping medication. When he ran out of his stolen supply, he found himself hallucinating horribly. Unable to work, he made it home despite severe and terrifying hallucinations. Once home, he called Carol Burnett, family friend, who advised he was having the DTs, as a result of withdrawal. Surviving this, Sacks began using amphetamines as a way to deal with his boredom in his career. One evening, he read about migraines, since he was working in a migraine clinic, and the book roused him in his state. Even when he came down, he realized that writing was what his passion was, and from that moment, he began writing, and never took another amphetamine. By taking the amphetamine and reading the book, Sacks discovered what he had been looking for in himself.

Chapter 7: Patterns: Visual Migraines and Chapter 8: The Sacred Disease

Chapter 7: Patterns: Visual Migraines and Chapter 8: The Sacred Disease Summary and Analysis

In Chapter 7, Sacks discusses his own experiences with migraines as a child, from the age of about 6. His mother, a doctor and fellow migraine sufferer, was able to detect what Sacks saw as "auras," or a flash of brightness that came in a wave pattern, as the aura that generally proceeds a migraine. However, Sacks was blessed not to have the physical headache, but merely the precursors, which are caused by electrical impulses in the brain. Sufferers often see a kidney shaped mass moving into their field of vision, and within this mass, called a scintillating scotoma, is a blind spot. Some hallucinate geometric shapes within this scotoma, as well, and these may become black and white, or vividly colorful. One may also experience feelings of changing body sizes, hear loud sounds or voices and music, or have distorted sense of time. Some also experience olfactory hallucinations, or smells, right before the aura, as well. Although most hallucinations are simple, there are rare instances of complex hallucinations, such as figures or complete scenes, or lexical or lilliputian hallucinations, as well. Sacks notes his own experiences with these auras promoted him to neuroscience. Sacks points out that as early as the 1800s, scientists were speculating that the auras seen were direct results of the electrical excitement of the brain, and this was proven by the 1960s, as scientists showed the patterns seen in the aura often mimic the wave of electric impulse traveling across the cortex. Sacks also suggests that it is the brain's tendency for self organizing visual neurons that causes the geometric hallucinations within the aura.

In Chapter 8, Sacks focuses on epilepsy, known in history as the "sacred disease," named by Hippocrates as a divine inspiration. There are several types of seizures, including grand mal, which is the most violent, general, which is somewhat milder, and petite grand mal, where an individual merely goes blank for a few moments. Whereas general seizures affect the entire brain, partial seizures stem from damage or sensitivity in one part of the brain, or epileptic focus. Symptoms of this type of seizure depend on the areas of the brain affected. Hughlings Jackson, a neurologist, spent much time analyzing epileptics, and saw their sights and symptoms as direct insight into how the brain functioned. Sacks discusses Jen W, a patient who suffered epilepsy with an epileptic focus that caused horrible visual seizures, including spinning balls, bright lights, and blindness. Although her physical symptoms were controlled with medication, her visual seizures continued until they removed the damaged part of the brain, the occipital lobe. Although it certainly helped, Jen's visual seizures did not disappear, and she has to struggle with these hallucinations every day.

When the epileptic focus is in a higher area of the brain, such as the parietal or temporal lobe, the visual hallucinations are much more complex. Valerie L had such

hallucinations with her epileptic seizures, as she saw faces, multiplication of glasses of water, and other complex shapes. Although her seizures have stopped physically with medication, she still suffers the visual hallucinations of epilepsy. She at times can look in a mirror and not see herself, or see various objects in the room multiply. Sacks notes that in both Jen and Valerie's cases, they were originally diagnosed with migraines, because the symptoms are so similar, prior to the actual seizure. On the other hand, Sacks notes, migraine patients generally suffer simply hallucinations, while epileptics suffer complex hallucinations. One patient, Laura M, believed she saw remnants of vivid dreams she had during her visual seizures.

Sacks notes hallucinations may also be of taste or sounds prior to a seizure. He gives the story of Mrs. B, who experienced double consciousness and olfactory seizures. During an attack, she would feel as though she were outside herself, and would become highly scattered in her activities, all the while experiencing an expectation of smelling something. Eventually, she would feel more and more outside herself, and at that time, she would suddenly smell an explosion, and with that, would come back to consciousness. She would then hear a voice, and when she turned toward it, she would convulse. Sacks points out this highly complex series of hallucinations shows how the current in the brain of an epileptic runs through the various parts of the brain. While some, like Mrs. B, experience the same hallucinations every time, others, like Amy Tan, experience highly varied complex hallucinations with each seizure. Stephen L, another patient, suffered severe deja vu, or the feeling he had done something before, even when he hadn't. He also began to have olfactory symptoms, and see auras. Eventually, he had a seizure, and was placed on medication, but to no avail. Then he had surgery, but another car accident caused symptoms to again appear. Steven feels his seizures have changed his personality, causing him to become more right brained.

Historically, patients could only be treated minimally, but with the advancement of brain surgical techniques, many with complex or focal seizures can now be helped. Wilder Penfield, in the 1930s, developed a procedure which allowed the physician to remove the part of the temporal cortex that was causing experiential seizures, a process called the "Montreal procedure." This helped alleviate the hallucinations, which are bursts of recalled memories. Sacks also notes there are ecstatic seizures, or seizures that induce feelings of euphoria or religious experiences, such as those described by Fyodor Dostoyevsky, Russian novelist. Authors since have noted Fyodor Dostoyevsky's personality changes as a result of these experiences, as his work shifted from realism to mystical pieces. In studies, those with ecstatic seizures actually wish for them to occur again, and even find ways to induce them. In some cases, patients hear the voice of god, commanding them to do terrible things, making some ecstatic seizures dangerous. Sacks also notes there is discussion that Joan of Arc, crusader, may have suffered from ecstatic seizures, explaining her "visions" and "missions." Finally, Sacks notes that ecstatic seizures can make or break one's faith in their religion, and can cause frequent changes in faith.

Chapter 9: Bisected: Hallucinations in the Half Field, and Chapter 10: Delirious

Chapter 9: Bisected: Hallucinations in the Half Field, and Chapter 10: Delirious Summary and Analysis

In Chapter 9, Sacks discusses hallucinations that occur when only one eye, or one occipital lobe, has been damaged. The result of this damage is called hemianopia. Unlike hallucinations in migraines or epilepsy, hemianopia hallucinations last days or weeks, and are ever changing. Ellen O had surgery to correct her right occipital lobe, and soon after, began seeing afterimages of things up to a week following her initial viewing of them (for example, she saw a flower, and continued to see the flower in her left eye for a week). These soon made way for complex hallucinations involving grotesque faces or cartoon figures. Although they diminished in size, these hallucinations never completely disappeared. Marlene H experienced migraines for years, but her symptoms began to increase to where she was seeing very complex hallucinations. When she completely lost sight in her right eye, she underwent testing, which found a hemorrhage in the occipital lobe. Marlene continued to have fairly severe hallucinations in her left eye throughout her life, making it difficult for her to process what she saw. One older woman, Dot, had a sudden small blot clot dislodged in the brain, and for several days had hemianopia with simple hallucinations. These led to a day of complex hallucinations of leaves, flowers, sailors, and other complex images. These diminished back into simple hallucinations, which then also diminished to nothing. Dot knew she was hallucinating due to a stroke, and never believed the images were real. In another case, however, a man suffering a stroke seemed to hallucinate very probable objects, such as a bowl at the end of a table. When he turned with his good eye, however, the bowl would disappear, since it was not really there. These types of hallucinations, Sacks notes, are highly believable, because they are in context. Sacks believes this individual may suffer from a rare form of Anton's syndrome, where a fully blind individual believes they have sight. They will walk into things, declaring someone has moved the furniture, because their brains do not accept their loss of sight. These individuals will give completely inaccurate descriptive accounts of any given visual situation, all the while believing them to be completely accurate.

In Chapter 10, Sacks notes that delirium, in his context, refers to a medical condition causing the brain to malfunction, and not to psychosis. In one case, a patient dying of kidney failure, experienced a mix of hallucination and memory, resulting in highly believable contextual situations in his delirium. In another case, a man with a damaged liver ate too much protein, which immediately resulted in hallucinations and delirium. Children often experience delirium with high fevers, often resulting in the feeling of their bodies expanding or shrinking, or auditory hallucinations. Some believe delirium can bring moments of deep emotional or spiritual truth to the patient, such as Alfred Wallace's revelation about evolution during malarial fever, which eventually led to

Darwinian theory. Delusion may also produce musical hallucinations, either visually, as notes, or through sounds, such as hearing a melody, or can also produce tactile hallucinations, such as feelings of pine needles or slime. Toxic levels of substances in the body can also produce delirium.

Delirium tremors, or DTs, are a common problem among alcoholics, as their bodies suffer withdrawal from alcohol, and these hallucinations tend to fade over time, and tend to be nonsensical. Some delirium, particularly from fevers, however, tends to have a "journey" quality about them. Some remain only when the patient's eyes are open, while others remain part of the existing scenery. Sacks himself experienced delirium with a bout of gastroenteritis in the Amazon, and his dreams for several weeks thereafter strongly resembled delirium more than a dream state. He discovered Larium, the antimalarial drug he had been taking, was the cause. Another man had delusions for several days following back surgery, and was convinced they were real, regardless of their illogical context. DTs, as mentioned, are a problem among alcoholics, but DTs tend to be more of a toxic psychosis than a delirium. Evelyn Waugh, in his writings, discusses his own DTs, as he heard auditory hallucinations, often directed at him, ordering him to commit suicide, although there is another voice, sweet and consoling. In another case, a patient heard Sacks himself ordering the patient to jump off the roof, a hallucination resulting from L-dopa.

Chapter 11: On the Threshold of Sleep and Chapter 12: Narcolepsy and Night Hags

Chapter 11: On the Threshold of Sleep and Chapter 12: Narcolepsy and Night Hags Summary and Analysis

In Chapter 11, Sacks explains that many people, on the verge of sleep, have quasi-hallucinations, or hypnagogic hallucinations. These hallucinations are vibrant in color and appear without cognitive thought, and they vary from simple geometric patterns to complex images and scenes. These hallucinations can range from visual, behind closed eyelids, to auditory, including phones ringing, dogs barking, and sentences. Some experience small animals or faces. Some are even lexical in nature. In most cases, these images are highly detailed, with impossible clarity, and in some cases, the images appear other worldly, as something the patient has never seen or imagined. Sacks notes, however, these hypnagogic hallucinations are not real hallucinations, because they are rarely projected into external space. In all other aspects, however, they resemble true hallucinations. Some neurologists believe these images are the brain's way of "playing" by itself; with no external stimuli, it creates its own images, but they are unlike dreams in that they are not sequential, but instead are quite random. Dreams are top down creations, often employing higher level brain function, whereas hypnagogic hallucinations are bottom up, relying only on the basal brain functions.

Hypnopompic hallucinations, appearing on waking as opposed to right before sleep, differ greatly from hypnagogic hallucinations. Hypnopompic hallucinations occur with open eyes, and are often projected into external space and believed to be quite real. Often, these images are terrifying and believed to carry threat. One man's list of hallucinations on waking includes highly frightening animals and creatures, or frightening circumstances, while others may feel an evil presence in the room. Sacks himself experiences mostly auditory hypnopompic hallucinations, such as scratching sounds or musical sounds. Dreams, Sacks points out, are often remembered only in fragments whereas these hypnopompic hallucinations are often vividly recalled. Sacks points out there are many scientists who believe these hypnopompic hallucinations are the causes of beliefs in devils, angels, and spirits, since these are commonly hallucinated on waking, and their realistic presence is difficult to deny. In some cases, such hallucinations can lead to severe fear or sense of dread, particularly in young individuals.

In Chapter 12, Sacks discusses narcolepsy, and the hallucinations that can, at times, follow an attack. Narcolepsy is a disease where the individual suddenly falls asleep while completely conscious, thereby falling to the ground, or simply slumping in a deep sleep for a few minutes. At times, these attacks also show cataplexy, or muscle loss,

and paralysis. It is during the paralysis phase of a narcoleptic fit that hallucinations can be seen, or on waking. The narcoleptic has many sleep cycles during the day, and all contain moments of dreams and hallucinations, delirium, or all three. Additionally, narcoleptic individuals may have auditory or tactile hallucinations, as well, at times in combination with visual hallucinations. One patient hallucinated being sat on by a large man, who then laid next to her, and began screaming random numbers at her. Others have reported huge caterpillars on their chests, or out of body experiences. Studies have shown that dreaming happens during REM sleep, when the body is immobilized. Those with narcolepsy enter REM sleep immediately, explaining their paralysis and cataplexy. Also, even non-narcoleptic individuals can experience this same phenomenon, if woken from REM sleep. Often, these hallucinations are real life night-mares, and can cause severe trauma. The original term night-mare was meant to depict these paralysis states, as the "mare" refers to the "old hag" in Newfoundland who sat on the chests of sleepers, killing them. Night-mares, then are truly representative of sleep paralysis state, where the patient has shallow breathing and slow heartbeat as a result of REM sleep, resulting in a feeling of doom, fear, and distress. Such fear can actually be fatal, as was shown in the deaths of hundreds Hmong immigrants whose culture noted that the nocebo, or evil, could kill them, which prompted them, during sleep paralysis, to actually perish. Sacks reminds readers that hallucinations, more than anything else, seem to direct any given culture.

Chapter 13: The Haunted Mind

Chapter 13: The Haunted Mind Summary and Analysis

In Chapter 13, Sacks notes that most hallucinations discussed thus far are nonsensical in terms of their relevance to the patient's life experiences. Some hallucinations, however, prey on one's past experiences, essentially haunting the individual with anguish, grief, horror, guilt, or other powerful emotions. Sacks himself notes a tendency with the loss of his mother to "see" her in crowds, when she wasn't really there. He notes bereavement hallucinations are common, sometimes appearing as ghosts, voices, or simply noises that "feel" as though one's loved one is near. Sacks notes these are much like the "phantom limb" syndrome, where one hallucinates a limb where one has been removed. Often, bereavement hallucinations are comforting, and are thought to be the brain's way of dealing with the powerful emotion of guilt, although at times, the hallucination may be accusatory, if guilt is involved.

High levels of stress can also result in hallucinations, as is the case in PTSD, or post traumatic stress disorder. Violent crashes, war, sexual assault, or any violent or highly disturbing situation can result in PTSD. Among the anxiety, depression, and autonomic disorders in PTSD, there are also often "flashbacks," or hallucinations that reenact the original situation. Flashbacks often carry with them strong hallucinations and delusions, to the point where the patient does not know he or she is in the present. The original emotions are just as strong as they were at the time, and the body's response is just as strong, as well. One case mentioned included a woman who, fifty years earlier, had been forced to watch her parents in sexual acts, and then forced to have sexual intercourse with her father. The woman suffered a lifetime of flashbacks and hearing voices, and was misdiagnosed as schizophrenic. PTSD patients are also often plagued by recurring night-mares, most of which are forms of flashbacks, as well. Survivors of concentration camps or war zones often smell burning flesh or explosives long after the smells have diminished, an olfactory hallucination. Sacks notes that natural or "God made" tragedies often result in fewer cases of PTSD than man made, or violent tragedies.

Sacks notes that for those in war, PTSD may be both biological as well as psychological. For those who endure endless concussions due to shells and bombs, there may likely be actual brain damage that contributes to the already stressful conditions of PTSD, which explains why some soldiers have such a more profound disease pattern than others. Traumatic memories are locked away, unlike other memories, and thus, there is a dissociative quality about them. Often, treatment involves efforts to being these memories into consciousness, to better deal with them, but this can be nearly impossible. Studies have shown, however, that those who deal with these highly emotional memories are much less prone to PTSD.

An already existing delusional atmosphere can be blamed for some hallucinations, Sacks notes, such as in the case of hallucinations and delusions amidst entire

communities, such as in the case of demonic possession in Loudun in 1634. What began as one nun's religious obsession soon became a situation of mass hysteria and hallucination, brought on by exorcists and an already supernatural culture. The same occurred during the Salem Witch Trials. In some cases, a tormented mind or inner conflict can arouse hallucinations, as well. Anna O, originally studied by Freud, became nearly two different people, one placed in the here and now, while the other lived almost exclusively within a hallucination world. With help, she recovered, but only when she was able to address both sides of her personality. Hypnosis, too, can bring about hallucinations, and many believe mediums, or those who claim to speak with the dead, self hypnotize themselves to produce an altered state that brings about hallucinations relevant to the questions they are asked. Hallucination states are also achieved through meditation and many tribal dances, similarly through self hypnosis. T.M. Luhrmann did several studies on both magicians in modern day Britain and on evangelicals, and in both cases found their practices led them to self hypnotic states through repetition and sensory focus. Sacks notes the power of suggestion can also elicit hallucinations, such as in the case of haunted houses. One may not believe in ghosts, but still "feel" a presence when it is suggested that a presence exists. Even imaginary friends, Sacks points out, can be considered hallucinations, since a child below the age of seven cannot distinguish internal and external thoughts. To them, their imagination is projected externally. The elderly, too, hallucinate at the time of death, often hearing or seeing a loved one beckoning them to heaven.

Chapter 14: Doppelgangers: Hallucinating Oneself and Chapter 15: Phantoms, Shadows, and Sensory Ghosts

Chapter 14: Doppelgangers: Hallucinating Oneself and Chapter 15: Phantoms, Shadows, and Sensory Ghosts Summary and Analysis

In Chapter 14, Sacks discusses out of body experiences, or the feeling that one is watching oneself from the outside. This can happen during seizure, migraine, or with any electrical stimulation of the cortex, such as with drug use or self induced hypnosis. It can also happen with very low blood pressure, or heightened anxiety. In some cases, an out of body experience can lead to a near death hallucination, if its cause leads to a near fatal incident. Near death experiences are often similar in nature, and scientists have sought to show this is due to the experience directly correlating with what is happening in the brain. For example, people tend to feel they are pulled in a dark tunnel, which may be caused by decreased blood flow to the retina.

Some individuals during migraine or other incidents see a double of themselves in front of them, mimicking their movements, called and autoscopic hallucination. These are often the result of brain disease or schizophrenia. Although most instances are brief, some may last longer, depending on the severity of the damage in the brain or sight. In rare instances, there is heautoscopy, or an interaction between the patient and his or her double, and this interaction is usually hostile. At times, vision seems to shift between the two, furthering the confusion of which is the "real" original, resulting in fear and anger. In some cases, this condition leads to suicide, in an attempt to "kill" the imposter. In literature, this idea of a doppelganger, or an evil "other" is popular, but in reality, some are quite benign. Sacks closes by noting that although the idea that one's body is his or her own seems irrefutable, studies have shown that it is possible to trick the brain into accepting false representations of the body, simply by fooling the senses. This tends to indicate that our sense of self is much more complex than mere embodiment concepts can explain.

In Chapter 15, Sacks opens by discussing phantom limbs, or the feelings that tend to continue in a no longer existing limb following amputation. Although this is common, Sacks notes it is not widely discussed, for fear of ridicule or shame. Early studies in the late 1800s showed that some phantom limb symptoms never disappeared, while others faded over time. Those studies also showed that the ability to "move" the phantom limb may become impossible. These questions were answered nearly 100 years later by modern science. Phantom limbs are hallucinations, in that they are misperceptions of

things in the external world but they differ from other hallucinations in that they are not varied at all from their original state. They are, to the individual, exactly like their now lost limb, and with that, the patient has control over them, unlike other hallucinations. In fact, this ability is vital if one is to successfully use a prosthesis, since the "phantom" limb is often felt as the driving force behind the false limb. However, in some cases, the phantom limb shrinks, and becomes embedded in a painful position, where the patient can actually feel pain. In other cases, the body can completely misinterpret the signals from the brain, resulting in completely inaccurate body image, such as happens in dental procedures where the numb lip feels very swollen, when in fact, it is not.

V.S. Ramachandran's work on phantom limbs suggests that the paralysis and pain felt in phantom limbs over time is a "learned" behavior, in that the brain eventually accepts the lost limb, and therefore attributes feelings of paralysis and pain where it believes they should be. Ramachandran sought to "unlearn" the brain's behavior through a simulator that caused the phantom arm to appear to again visually exist. Ramachandran showed this method worked, and those with painful phantom limbs were again able to move them and be without pain. Conversely, there is another hallucination of limb known as the reflex paralysis, in which damaged limbs are intact, but have lost all feeling, and seems "detached." This often occurs in situations where damage causes signals from the brain to be lost, thereby negating them to the limb. Still another body image hallucination is termed "shadows" or "doubles," and involves the brain believing an immobile limb actually belongs to someone else. In these cases, a person feels as though their limb has been taken over, or worse, actually substituted by someone else's body part. Finally, Sacks discusses another body image hallucination, the sensory ghost. In these cases, people affected can feel a "presence," either benign or evil, near them, watching them. This occurs generally in heightened arousal states, or in cases of neurological conditions. Sacks also notes these hallucinations, caused by excitation of the parietal or temporal lobe, may account for spiritual beliefs of one's higher power being near.

Characters

Oliver Sacks

Oliver Sacks is the author of the novel, and a well known author and scientist. Sacks has worked in many fields that qualify him as an expert on the topic of hallucinations including his work with encephalitis patients, migraine patients, those with phantom limbs, and elderly patients with Charles Bonnet Syndrome, Parkinson's, and other diseases which cause frequent hallucinations. Additionally, Sacks himself admits to experimenting heavily in hallucinogenic drugs over the course of his younger years, which has allowed him a rare personal insight into how these hallucinations manifest. Still further, Sacks has researched hallucinations heavily, and supplements his own first hand experiences with both historical and modern accounts of the diseases and symptoms he writes about. His motivations for writing the book are clearly not only to alert the public to the commonality of hallucinations for a variety of reasons, but also to give possible solutions to many modern day mysteries, including ghosts, God, myths, and cultural icons. Because his writing style is both intellectual and humorous, his novel appeals to a wide audience, and his work is undeniably one of the most cumulative discussions of hallucinations outside of mental illness.

Rosalie

Rosalie is a patient Sacks brings up on several occasions in the novel, particularly with respect to Charles Bonnet syndrome. Rosalie was in her nineties in 2006 when Sacks was first given the case, and she experienced vivid and lively hallucinations, even though she was completely blind as a result of age and illness. She had been seeing hallucinations for days, and Sacks realized she had a common problem known as Charles Bonnet Syndrome. This disease causes those who have lost their sight to be "granted" visions of intricate detail, usually benign. The hallucinations are generally irrelevant, and often simply come and go throughout the day. In Rosalie's case, the hallucinations disappeared, only to reappear after a traumatic experience, only this time, they were more menacing. Rosalie later had hallucinations of men surrounding her bed when she believed she was going to die, and also during a time of distress, when she lost a good friend. Rosalie is a perfect example of a normal individual experiencing hallucinations since she was not mentally ill, had her full faculties around her, and was not suffering from any illness causing dementia or confusion. Rosalie was an older, confident woman who simply suddenly began to see things that didn't really exist. Rosalie is used in the novel by Sacks to show not only that completely normal individuals can have hallucinations, but also to show that a single individual can have multiple kinds of hallucinations, stemming from multiple sources.

Dominic ffytche

Dominic ffytche is a highly regarded researcher of Charles Bonnet Syndrome, and his work is quoted often in Sack's book. His studies show that nearly a quarter of CBS patients experience text hallucinations of one type or another. Dominic ffytche is also quoted as having done pioneering research in London on the neural basis of visual hallucinations, and it is this categorization that Sacks uses in his book. ffytche then went on, using this classification system, to do brain imaging which helped to show which areas of the brain were affected in which hallucinatory category. Sacks points to this work as nearly definitive proof that the hallucinations one experiences are directly correlated to where in the brain stimulation occurs.

Charles Bonnet

Charles Bonnet is the man who originally wrote about a syndrome in which his grandfather, blinded by disease, experienced hallucinations. Bonnet was an eighteenth century Swiss researcher who ranged broadly in his work. When his grandfather began losing his sight and gaining hallucinations, he helped him write about his hallucinations in stunning detail, but unfortunately those notes were lost for nearly a century. When they were found, they offered a detailed glimpse into one of the first instances of CBS on record.

Carol Burnett

Carol Burnett is a friend of Sacks who not only interned with him, but who also lived in New York at the same time Sacks was experimenting with sleeping medication. On experiencing severe hallucinations one evening, it was Carol whom Sacks contacted; she helped him to determine he was suffering from DTs as a result of his drug withdrawal. Since Sacks wanted to wait out the tremors and experience them, Carol agreed to sit with him to make sure he didn't harm himself or others. She then repeatedly checked on him for the ninety-six hours the DTs lasted.

Hughlings Jackson

Hughlings Jackson is considered the father of English neurology. One of the first to discuss the concept of "positive" symptoms of neurological disease, including overactive brain activity, hallucinations, and delusions. He was also the first to discuss the dream like state that accompanied some complex seizures. In fact, modern science still refers to focal motor seizures that start in the hands and move up the arms as Jacksonian epilepsy, because he was the first to distinguish such symptoms. He also developed the idea that problems in the higher brain areas produced a release of lower brain areas, because the higher areas actually restrained the lower. He also discussed double consciousness, a concept which was much later fully developed.

Wilder Penfield

Wilder Penfield was an American neurosurgeon in Montreal in the 1930s who developed a surgical approach to epilepsy that helped many patients for whom medication did nothing. This approach, called the "Montreal Procedure" essentially involved the removal of the epileptic focus in the cerebral cortex of the brain. To do this, they first had to map the patient's temporal lobe, and locate the area of the brain causing issues. By keeping the patient awake, they could electrically stimulate the brain, and locate the area that caused their issues, and then remove it.

Gabriel Anton

Gabriel Anton was the first to describe the symptoms that became known as Anton's syndrome. Patients with Anton's syndrome are completely blind, but they seem to be unaware of the problem. They talk, move, and behave as though they can completely see, and if they run into things, they claim furniture or objects have been moved. They are completely unaware they cannot see, and they will readily describe what they "see" in a room, even though it is completely incorrect. The belief that one can see is, in these cases, unshakable, regardless of the facts presented.

T.M. Luhrmann

T.M. Luhrmann has done many in depth studies of societies who use forms of self hypnosis to achieve hallucinogenic states. Luhrmann believes these individuals, through their ritual and dances, obtain a self hypnosis that completely explains their then spiritual or divine experiences. Through the power of suggestion, cultural anticipation, and self hypnosis, T.M. Luhrmann believes individuals provide their own surroundings in order to have divine experiences. She herself was able to achieve a hallucinatory state by immersing herself in one of these cultures, participating in their activities for nearly a year.

V.S. Ramachandran

V.S. Ramachandran's research focused on the ability to "unlearn" the brain's learned response to a missing limb. In some cases, Ramachandran discovered, a person with a phantom limb lost control over it, and it began to paralyze. This seems an odd concept, but if one can "feel" a missing limb, one also notices when that feeling disappears. In many cases, the "limb" begins to cramp, causing immense pain. Ramachandran suggested this was the brain's response to the visual cues that the limb was, in fact missing. To unlearn this behavior, Ramachandran set up imaging studies where the patient could "see" the missing limb. Almost immediately, the brain recognized the limb, and the phantom limb again was able to move.

Objects/Places

Charles Bonnet Syndrome (CBS)

Charles Bonnet Syndrome (CBS) is a disease in which a blind individual, who is blind due to ocular degeneration or other illness, suddenly begins seeing hallucinations.

The Prisoner's Cinema

The Prisoner's Cinema is the common hallucinatory effect of sensory deprivation, which results in brilliantly colored and varied hallucinations.

Sensory Deprivation Tanks

Sensory deprivation tanks are tanks that immerse an individual in water, total darkness, and without sound, in an effort to entice the brain into a variety of hallucinations as a result of sensory deprivation, or a lack of input to the senses.

Anosmia

Anosmia is the complete lack of ability to smell.

Parosmia

The unnatural hallucination of putrid smells is called parosmia.

Cacosmia

Hallucinations of vile smells is called cacosmia.

Lewy Body Dementia

Lewy Body dementia is a neurological disease where the brain contains an excess of proteins, which often result in visual hallucinations.

Capgras Syndrome

Capgras Syndrome occurs in schizophrenics and others with dementia, and involves seeing a "duplicate" of one's self, and believing that duplicate is an imposter, since there are not feelings of warmth or care one would expect from seeing oneself.

DT (delirium tremor)

DT (delirium tremor) occurs often in alcoholics, or in any case where there is severe withdrawal from a substance. DTs involve highly detailed, often terrifying hallucinations.

Scintillating Scotoma

Scintillating scotoma is a kidney shaped form that moves slowly over the visual field of a migraine sufferer shortly before a migraine occurs. The blind area within the shape is the scotoma.

Lexical Hallucination

A lexical hallucination is one which involves words or phrases.

Lilliputian Hallucination

A lilliputian hallucination in one in which things, people, or animals seem smaller than they would be in real life.

Montreal Procedure

The Montreal Procedure is a surgical procedure where the brain is mapped electronically to discover points causing seizures, which are then removed in order to stop the symptoms.

PTSD

PTSD, also called post traumatic stress disorder, occurs when an individual experiences something that is highly charged with emotion, stress, fear, terror, or violence. These memories are often repressed and then appear later as flashbacks, or hallucinations in which the patient relives the event.

Autoscopic Hallucination

An autoscopic hallucination is one where an individual sees a double of themselves in front of them, mimicking their movements, which usually occurs during a migraine.

Heautoscopy

A heautoscopy occurs when a patient interacts with his or her double, or autoscopic hallucination.

Themes

Neurological Basis for Hallucinations

The primary theme of the novel is the concept that there is a neurological basis for many hallucinations that is not the result of mental illness. Sacks is quick to point out that one of the major points of the novel is to combat the idea that hallucinations, whether visual, auditory, olfactory, tactile, or otherwise, can occur to common people in common situations, and do not necessitate a diagnosis of a mental disorder. Each hallucination mentioned in the novel has, at least as a suggestion, a neurological basis, from epilepsy to excitation in various places to damage in the areas that affect sight. Sacks has both personal and third hand stories of the hallucinations present in a variety of situations, and in all cases, a neurological basis can be found. Sacks does mention, as well, that in several circumstances, patients have been misdiagnosed as mentally ill as a result of their hallucinations, when really, they had migraines or an actual neurological disorder. In other cases, patients lived for many years suffering because they were afraid to admit their hallucinations, due to the stigma placed on them. By writing the book, and pointing to these cases, Sacks hopes to give hallucinations a more medical basis, so patients and physicians alike can better understand the every day hallucinations as well as the more complex hallucinations of advanced diseases.

Hallucinations as Cultural Influences

Another theme in the book is the influence of hallucinations on culture throughout history. Sacks, several times in the novel, points to various works of art, music, literature, or other cultural mediums, and identifies specific artists whose symptoms often manifested in their works. He mentions Lewis Carrol, who suffered migraines, and he notes that Alice in Wonderland mentions the concept of growing larger or smaller, a symptom typical in migraine sufferers. He also mentions Hippocrates, and his descriptions of the "sacred disease" or the disease that caused divine spiritual meetings, now known as epilepsy. Author Fyodor Dostoyevsky's works changed dramatically from realism to fantasy, as a result of his hallucinations during seizures. Joan of Arc is believed to have been an epileptic, thereby explaining her divine messages. Elves and fairies and leprechauns, all possible lilliputian hallucinations, are rampant throughout history in popular literature, and Sacks suggests these may be the product of the author's own hallucinations. Even divine feelings of God being near, or the feeling of evil spirits or ghosts, can be explained through hallucinations. There is evidence presented in the book that shows that alien abductions, modern cultural events, can even be the product of hallucinations caused by sensory deprivation or extreme exhaustion. Mediums, Sacks points out, can use self hypnosis to hallucinate, thereby appearing "real" and "genuine" to the public. Even doppelgangers, or the "evil twin" in many stories, is a popular hallucination. In almost every area, evidence can be seen of how hallucinations have influenced society since the beginning of time.

Effect of Personal Experience and Culture on Hallucinations

Another theme in the novel is the effect of personal experience and culture on hallucinations. Several times in the novel, Sacks notes that while some hallucinations, such as simple ones, have relatively little to do with one's life or experiences, others have a tremendous link. For example, whereas the patterns seen in hallucinations right before falling asleep tend to be random patterns, those in a patient with PTSD are directly linked to that person's past. Hallucinations involving personal experiences tend to be charged with emotion, and tend to be far more damaging than other types of hallucinations. PTSD patients are often forced to relive painful memories, while the loss of a loved one may cause grief and sadness as the bereaved sees hallucinations of his or her partner long after death. In one case, the fact that a culture believed one would die in a nightmare if a blessing wasn't given resulted in the deaths of hundreds during times of genocide, when the blessing couldn't be given. The Salem witch trials and stories of entire communities being haunted or possessed show the power of influence and suggestion on hallucinations. A person may not believe in ghosts, but if presented with information that a house is haunted, strange noises or occurrences may automatically be attributed to the "ghost," simply because the culture provides for that reasoning. It is clear, then, that personal experience, as well as culture, can play a large role in how hallucinations are perceived by the sufferer.

Style

Perspective

The novel is written in first person or third person view, depending on which story is being told in the novel. As a narrator, Sacks is highly intellectual, giving information that tends to be extremely technical. He has experience in the neurological and medical fields, and as such, can get bogged down in his technical descriptions, but at the same time, these are necessary to provide a basis for the understanding of hallucinations. Simultaneously, Sacks has extensive personal experience in many areas, including migraines, drug use, sleep deprivation, elderly hallucination issues, and hallucinations due to various neurological diseases. During his discussions of his own personal experiences, Sacks is an engaging writer, with enough wit and humor to keep the reader interested, and yet enough technical information to really explain the base of his arguments. His bias, obviously, tends toward the scientific explanation for all hallucinations, but he backs this with empirical research and his own personal accounts. This makes his narration highly persuasive, and leads the reader to agree, at the very least, with the science behind his conclusions, if not his conclusions themselves. Overall, his blend of personal narrative, empirical research, and third person accounts makes Sacks a highly reliable narrator.

Tone

Sacks' tone in the novel is generally informative and objective. He does not try to persuade readers through bullying or force, but instead chooses to educate them on both the historical references to the hallucinations mentioned, and the findings of modern science. By combining these together, Sack presents well founded questions that he allows the reader to answer. Although Sacks attempts to guide readers to given conclusions, namely that all hallucinations that are not the product of mental illness have a neurological pr physical basis, he does so in a way that is non combative. His questions about how hallucinations may have influenced history over time may help lead the reader to conclusions, but Sacks does not force those conclusions. His questions are thought provoking, instead asking the reader to question their own beliefs, and determine for themselves from where those beliefs may stem. He does not ever seem to be preachy about his beliefs, nor does he "teach" throughout the novel, but instead presents a well thought out, well researched look at hallucinations in both a medical and social way that helps readers to understand hallucinations in all aspects. This allows the reader to learn while still being engaged, and allows the reader to make conclusions on their own, without unnecessary input or over-explanation. The end result is a look at hallucinations that makes them appear far less frightening, and far more human.

Structure

The novel is comprised of an introduction, fifteen total chapters of unequal length, an acknowledgements section, a bibliography, and an index section. Each chapter is identified both by number, and by chapter heading, which reflects the material Sacks plans to present within the chapter. The book is 326 pages in its entirety. Sacks' writing can be highly technical at times as he discusses various medical terminology. His discussions of brain mappings, including specific areas of the brain affected, can at times be long and in depth. His discussions of various diseases can also be technical, in terms of his explanations of the hows and whys of epilepsy, for example. Yet this level of technicality is necessary in order for the reader to understand the biological nature of hallucinations. Sacks' entire point in the novel is to take away the mystery of hallucinations, and to make them understandable, so they lose their stigma. To do that, Sacks has to have a high level of detail as he explains how the human brain functions. At the same time, his narration sections are warm, engaging, and very caring, showing him to be a reliable doctor, whose personal accounts lend credit to his technical arguments. His inclusion of historical writings also furthers his proof of consistent biological reasoning for the hallucinations he presents, which further accents his reliability.

Quotes

"I think of this book, then, as a sort of natural history or anthology of hallucinations, describing the experiences and impact of hallucinations on those who have them, for the power of hallucinations is to be understood from first-person accounts." - pg xiv, Introduction

"I explained to her that hallucinations, strangely, are not uncommon in those with blindness or impaired sight, and that these visions are not 'psychiatric' but a reaction of the brain to the loss of eyesight. She had a condition called Charles Bonnet syndrome." - pg. 5, Chapter 1.

"There is even a special term for the trains of brilliantly colored and varied hallucinations which come to console or torment those kept in isolation or darkness: the prison's cinema." - pg. 34, Chapter 2

"It is clear that attitudes to hearing voices are critically important. One can be tortured by voices, as Daniel Smith's father was, or accepting and easygoing, like his grandfather. Behind these personal attitudes are the attitudes of society, attitudes which have differed profoundly in different times and places." - pg. 59, Chapter 4

"She now receives love, attention, and invisible presents from a hallucinatory gentleman who visits faithfully each evening." - pg. 89, Chapter 5

"To live on a day-to-day basis is insufficient for human beings; we need to transcend, transport, escape; we need meaning, understanding, and explanation; we need to see overall patterns in our lives. We need hope, the sense of a future. And we need freedom...to get beyond ourselves, whether with telescopes and microscopes and our ever-burgeoning technology or in states of mind which allow us to travel to other worlds, to transcend our immediate surroundings." - pg. 90, Chapter 6

"And then, as if thrown by a giant paintbrush, there appeared a huge, trembling, pear shaped blob of the purest indigo. Luminous, numinous, it filled me with rapture: It was the color of heaven, the color, I thought, which Giotto had spent a lifetime trying to get but never achieved - never achieved, perhaps, because the color of heaven is not to be seen on earth." - pg. 110, Chapter 6

"It is known that Lewis Carroll had classical migraines, and it has been suggested...that his migraine experiences may have inspired Alice in Wonderland's strange alterations of size and shape." - pg. 126, Chapter 7

"None of these is conclusive, but they do suggest, at least, that Joan of Arc may have had temporal lobe epilepsy with ecstatic auras." - pg. 160, Chapter 8

"Hallucinatory experiences, whatever their cause, generate a world of imaginary beings and abodes - heaven, hell, fairyland. Such myths and beliefs are designed to clarify and

reassure and, at the same time, to frighten and warn. We make narratives for a nocturnal experience which is common, real, and physiologically based." - pg. 228, Chapter 12

"Imagination is qualitatively different from hallucination. The visions of artists and scientists, the fantasies and day dreams we all have, are located in the imaginative space of our own minds, our own private theaters. They do not normally appear in external space, like the objects of perception." - pg. 242, Chapter 13

"Thus the primal, animal sense of 'the other', which may have evolved for the detection of threat, can take on a lofty, even transcendent function in human beings, as a biological basis for religious passion and conviction, where the 'other', the 'presence', becomes the person of God." - pg 292, Chapter 15

Topics for Discussion

In the novel, Sacks discusses several types of hallucinations, stemming from a variety of causes, including blindness, loss of a loved one, and many others. Choose three causes of hallucinations in the novel, and discuss each in detail. Make sure to include how the cause of the hallucination has an impact on the type of each hallucination.

Compare and contrast simple hallucinations and complex hallucinations. What are their similarities? What are their differences? What are some of the causes of each type?

Describe in detail, what a lexical hallucination is, and how it is presented, symptomatically.

Sacks discusses several types of hallucinations related to body image, including phantom limbs, duplications of self, shadows, sensory ghosts, and others. Choose two types of hallucinations dealing with body image, and discuss them in detail. What are some of their causes? Their symptoms? What does Sacks suggest each is a result of? How does this cause problems for the sufferer?

Sacks discusses two types of hallucinations in sleep, hypnagogic hallucinations and hypnopompic hallucinations. What is the difference between the two? When do they occur? Which is more detrimental, and why? What are some of the possible ramifications of each for the patient? What causes these hallucinations?

What is a night-mare, when intended, as hyphenated? Why is it called that? What happens to cause a night-mare? What symptoms are presented? How does a night-mare (hyphenated) differ from the modern concept of a nightmare that is merely a bad dream? What is the difference between a dream and a hallucination?

In the novel, Sacks describes, in depth, his own personal experiences with several types of hallucinations, including drug hallucinations, migraine auras, a seemingly "other" limb, and shadows. Choose one of these, and explain, in detail, Sacks' accounts. What are his experiences? How and why does he participate in the experience? What are the results? Do you agree with his methods? Why or why not?