Proof Study Guide

Proof by David Auburn

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Introduction

The plot moves into high gear when Hal discovers in one of the notebooks that Robert left behind a proof of a mathematical theorem that mathematicians had thought impossible. It is a sensational discovery, but Catherine stuns Hal by claiming she wrote the proof. But did she? The handwriting in the notebook looks very like her father's. As the mystery develops and resolves, the playwright explores issues such as what the link may be between genius and madness and whether either or both can be inherited. But *Proof* is also a story about human relationships, suggesting that developing trust and love can be as difficult, and just as uncertain, as establishing the truth of a mathematical proof.

Author Biography

David Auburn was born in Chicago in 1969. Raised in Ohio and Arkansas, he attended the University of Chicago where he studied political philosophy. At the time, Auburn did not know he wanted to be a writer, but he joined a student group that performed comedy sketches. Auburn started writing some of the sketches and found he had a talent for it. He then started to write longer pieces. After Auburn graduated in 1991, he won a writing fellowship offered by Steven Spielberg's Amblin Productions, and he moved to Los Angeles to learn the craft of screenwriting. When the fellowship ended, Auburn moved to New York where he wrote plays and had some of them performed in tiny theaters. During the day, Auburn worked as a copywriter for a chemical company. In 1994, Auburn was accepted into the playwriting program at Juillard, where he also studied acting. Auburn soon gave up acting to concentrate on playwriting. His work at Juillard led to his first major play, *Skyscraper* (1997). In this play, the lives of a group of people are changed as they discover their connections with each other during the demolition of a crumbling skyscraper in Chicago.

In 1998, the Dramatists' Play Service published several of Auburn's one-act plays under the title *Fifth Planet and Other Plays*. The title play charts the friendship between two observatory workers as it waxes and wanes over the course of a year. Other plays in the collection included *Are You Ready*? in which the fates of three people drawn to the same restaurant are altered in an instant; *Damage Control*, about a politician and his aide during a crisis; *Three Monologues*, depicting a young woman's solitude; *We Had a Very Good Time*, in which a married couple travels to a dangerous foreign country, and *What Do You Believe about the Future*, in which ten characters answer the question posed by the play's title.

Proof, Auburn's most successful play, premiered at the Manhattan Theatre Club in May 2000 and opened at Broadway's Walter Kerr Theatre on October 24, 2000. The play won the Pulitzer Prize for Drama in 2001, the Joseph Kesselring Prize, the Drama Desk Award, and the Tony Award for Best Play of 2001. Auburn has written a screenplay based on the play, and the film was in production as of 2004.

Also in 2004, Auburn had his play *The Journals of Mihail Sebastian* debut at the Keen Company in New York on March 6. A one-man show, it is adapted from the writings of Mihail Sebastian, a Romanian novelist and playwright, whose journals recalling anti-Semitism in Romania during World War II were published in 1996. The expressionistic play covers six years in Sebastian's life, with the journal being created over the course of the evening.

Plot Summary

Proof is the story of a young woman named Catherine. She is the daughter of Robert, a brilliant mathematician, who misplaces both his brilliance and his sanity in his later years. Catherine, a budding mathematician herself, must give up her schooling and her most creatively productive years in order to take care of her father, who has become convinced that alien civilizations are communicating with him directly through the local library's Dewey decimal system.

As the play opens, Robert has just died and Catherine, conversing with his ghost, wonders if she may have inherited his tendency toward madness. Robert had first shown signs of madness in his mid-twenties. Catherine has just turned twenty-five. Her suspicions seem confirmed when her sister Claire and Robert's protégé, Hal, begin to treat her as if she is mentally unstable. Claire, returning for her father's funeral, wants to take her "fragile" sister Catherine back to New York where Claire can keep Catherine safely under her wing and submit her for psychiatric treatment. Hal, who becomes Catherine's lover on the night of the funeral, defends Catherine to Claire, but retains suspicions of his own about Catherine's stability when she claims to be the author of a proof so advanced it overshadows all of Robert's previous work.

Catherine drops her bombshell at the end of Act 1, claiming that she is the author of the proof. Act 2 opens with a flashback to Catherine and Hal's first meeting. They had met on her twenty-first birthday. Hal was handing in his senior thesis while Catherine was still hoping to begin undergraduate school, but only if her father's remission into lucidity continued. The audience is thus introduced to the depth of the sacrifice Catherine has made to tend her father. Not only did she give up school and career, but, revealingly, on her twenty-first birthday she has no friends with whom to celebrate. She and her father invite Hal to her birthday dinner, but he declines.

Four years later, Hal invites Catherine out on a date, but she is suspicious of his motives. Hal is now a teacher in his own right, while Catherine has yet to be able to return to school. To make matters worse for Catherine, conventional wisdom states that mathematicians are already past their prime at twenty-five. If Catherine has not done her best work by now, she will never have the chance again. The existence of the brilliant proof is Catherine's only saving grace. It represents her one chance at success on her father's level.

When Hal and Claire doubt her authorship and conspire to take the proof away, Catherine sinks further into depression. Claire views her outlandish claim and symptoms of depression as evidence of severe psychosis similar to their father's and intends to drag Catherine to New York with her whether her sister likes it or not. Meanwhile, Hal and his colleagues have examined the proof and Hal returns in the nick of time to tell Catherine that he now believes the proof to be her work. As the play draws to a close, Hal begins to treat Catherine with the respect she deserves as a mathematician. Catherine's bitterness makes her initially resistant to Hal's overtures, but

ultimately she cannot resist the prospect of discussing her work as an equal with a colleague whose respect she has earned.

Plot Summary

Act 1, Scene 1

Proof begins at one o'clock in the morning on the porch of a house in Chicago. Catherine sits in a chair, exhausted, and is startled when she realizes her father, Robert, is there. Robert gives her a bottle of champagne and wishes her happy birthday. He wants her to celebrate her birthday with friends, but she says she has none. Robert expresses concern about her, saying that she sleeps until noon, eats junk food, and does not work. He tells her to stop moping. She has potential and there is still time. It transpires that Robert did his best work by the time he was in his mid-twenties. After that, he became mentally ill. Catherine is worried that she will inherit the illness.

It then transpires that Robert died a week before, of heart failure, and the funeral is the next day.

Hal, a former student of Robert's, enters. He has been working on Robert's notebooks, but Catherine says there is nothing valuable in them. Hal invites her to hear him play in a rock band, but she is not interested. He speaks about how he admired her father, who helped him through a difficult period in his doctoral studies. This was four years ago, when Robert's illness went into remission. Catherine, fearing that Hal may be taking one of her father's notebooks from the house without permission, demands to see his backpack. She finds nothing there, but as he is about to leave, a notebook falls from his jacket pocket. She accuses him of stealing it and calls the police. He protests that in the notebook, Robert wrote something appreciative about Catherine on her birthday four years ago. Hal was going to wrap the notebook and give it to her.

Act 1, Scene 2

The next morning, Catherine and Claire, who has arrived from New York, are drinking coffee. Claire tries to be kind, but Catherine is not receptive. Claire quizzes Catherine about Hal and about why she called the police, but Catherine resents the questioning. Hal enters unexpectedly, and there is a moment of confusion as Catherine berates her sister. Hal quickly exits, leaving Claire saying that decisions must be made. She wants Catherine to stay with her in New York.

Act 1, Scene 3

That night, there is a party following the funeral. Catherine is on the porch when Hal, who has been playing in the band, approaches her. He compliments her on her dress and talks about how mathematicians consider they are past their peak after the age of twenty-three. He refers to them as men, but Catherine mentions Sophie Germain, an eighteenth-century Frenchwoman who did important work on prime numbers. Catherine apologizes for her behavior the day before, and Hal confides that he thinks his work in

mathematics is trivial. They talk about how elegant Robert's work was. Catherine then surprises Hal by kissing him. Hal reminds her of when they first met, four years ago, and they kiss again.

Act 1, Scene 4

Hal and Catherine have spent the night together, and the next morning she gives him a key to the bottom drawer of her father's desk. Claire enters with a hangover. She tells Catherine that she would like her to move to New York. Catherine says she would prefer to stay in Chicago, but Claire replies that she has already sold the house. They quarrel. Catherine complains that Claire never helped to take care of their father; Claire replies that she worked fourteen-hour days so she could pay off the mortgage on the house. She says that Robert should have been sent to an institution, but Catherine disagrees. Hal returns with a notebook. Inside it, he says, is a proof of a theorem about prime numbers. If it checks out, it will show that when Robert was supposedly insane, he was doing some of the most important math work in the world. Catherine stuns him by saying that it was she who wrote it.

Act 2, Scene 1

It is a September afternoon four years earlier. Robert and Catherine talk on the porch. Catherine says she has enrolled as a math major at Northwestern. She tells him that since he has been well for nearly seven months, he does not need her there all the time. Robert is not happy about her decision and says she should have discussed it with him. Hal enters. At this time, he is Robert's graduate student, and he brings a draft of his dissertation. Robert says he will look it over and tells Hal to come by his office in a week. Then, he realizes that it is Catherine's birthday, and he had forgotten it. He is annoyed with himself, but Catherine tells him not to worry. They agree to go out to dinner. As Catherine goes out to dress, Robert begins writing in his notebook.

Act 2, Scene 2

Catherine, Hal, and Claire discuss the newly discovered notebook. Catherine insists that she wrote the proof, working on it for years after she dropped out of school. Hal and Claire are skeptical. Claire thinks the proof is written in her father's handwriting. She suggests that Catherine talk them through it to convince them, but Hal says that would not prove anything, since her father might have written it and explained it to Catherine later. Catherine is unhappy that they do not believe her. She says she trusted Hal and wanted him to be the first person to see the proof. He still cannot believe that she wrote it, since to do so she would have to have been as good as her father. After Catherine snaps at him, he exits. Catherine and Claire struggle over the notebook and Catherine throws it to the floor.

Act 2, Scene 3

The next day, Claire berates Hal for taking advantage of Catherine and sleeping with her. She refuses to let Hal talk to her, but she does let him take the notebook. She tells Hal to figure out what is in there and advise the family about what to do.

Act 2, Scene 4

It is winter, three and a half years earlier. Robert is on the porch in the cold, writing in a notebook. When Catherine, who is a student at Northwestern, arrives, he tells her that he is working again. He feels he has regained all his intellectual brilliance and is excited about what he will be able to produce. He wants her to collaborate with him and hands her his notebook, which Catherine reads slowly. It is confused, rambling nonsense. She puts her arm around him and takes him inside the house.

Act 2, Scene 5

Back in the present, Claire and Catherine prepare to leave for New York. At first, they appear to be getting on well, but when Claire tells her how much she will love New York, Catherine gives sarcastic replies, and the two women quarrel. Claire exits, upset. Hal enters. He is excited. The proof has checked out. Catherine is not surprised and tells him to publish it. He now believes that it is her work because it uses new mathematical techniques that he thinks Robert would not have known. He wants Catherine to talk about her work so he can understand it better. Catherine is upset that he did not trust her in the first place. He hands her the book. She says that doing the proof was just a matter of connecting the dots. Her father knew nothing of her work. Hal asks her to go through it with him, and she picks up the book, finds a section, looks at him, and begins speaking.

Act 1 Scene 1

Act 1 Scene 1 Summary

The scene is set at night on the back porch of a house in Chicago. Catherine sits in a chair with her eyes closed. Her father, Robert, a "rumpled academic" stands behind her.

Robert startles the sleeping Catherine; he asks her why she's not in bed. Catherine tells her father she is waiting up for his former student and protégé, Harold "Hal" Dobbs, who is upstairs examining some papers in Robert's study. Robert tells her Hal can let himself out and reminds her it is after midnight, so it is her birthday. Robert hands her a bottle of champagne, but forgets the glasses. She drinks alone, from the bottle, as they argue about whether or not she's inherited his insanity. Catherine is nearly the same age as her father had been when madness first struck him, but Robert insists she just needs to get out of the house more, get a job, make some friends. He tells her by the time he was twenty-five, he had already done his best work. Catherine reminds him that he has been dead for a week, her sister Claire is flying in for the funeral tomorrow and asks him what it means for her to be sitting here talking to him. Robert admits it is not a good sign.

A door slams, startling Catherine upright. She looks around; Robert is gone, but Hal has just exited the house. He carries a backpack and a folded jacket. Hal apologizes for scaring her and, noticing the champagne, asks if she is drinking alone. She admits she is. Hal asks her for another week to finish reviewing Robert's notebooks. Catherine tells him he is wasting his time, that the books contain nothing but a crazy man's gibberish. Towards the end, she tells him, Robert believed aliens were sending him messages through the library's Dewey decimal system. She is nonetheless protective of her father's things and adamant that nothing leave the house. Hal is insistent, asking if he can come back tomorrow. Catherine tells him the funeral is tomorrow.

Hal apologizes for his bad timing, but then asks her to come hear his band play at a bar on Diversey; the show doesn't start until two a.m. because they have low billing. She reminds him tonight is a school night and wonders if his job as a professor, plus his involvement with the band, will allow him time for reading her father's notes. Hal tells her he will make the time because of his immense respect for her late father's work. Robert had already done his best work by the time he was Catherine's age, Hal reminds her. Hal is twenty-eight, three years older than Catherine and has not achieved anything like Robert's level of work. When he comments that he could write his own ticket at any university if he had one tenth of her father's ideas, she demands to search his backpack. She tells him his services are no longer required; she herself will review her father's work. Hal patronizes her, explaining that she would not be able to understand Robert's complex mathematical theorems.

Catherine searches his backpack and finds nothing suspicious. Awkwardly, she tells him he can come back tomorrow to continue reviewing Robert's work. Hal delicately

suggests she might benefit from some counseling and a regular exercise program. He offers to take her running sometime, then again invites her to the club, but she declines both offers. When she picks up his folded jacket to hand to him, one of Robert's notebooks falls out. Catherine dials the police before Hal can explain. While she is reporting a robbery in progress, Hal reads to her a passage from her father's notebook, dated four years before, on her birthday. It refers to some unspecified good news Catherine had given her father that day and contains references to Robert's gratitude for the years she lost taking care of him. Hal gives her back the book, telling her he'd intended to wrap it as a birthday present for her. Catherine hangs up on the police as he exits. In the distance, she can hear a police siren.

Act 1 Scene 1 Analysis

A picture of Catherine is painted by her dead father, Robert. He chastises her for sleeping all day and wasting her mathematical talents. According to Robert, the clock is ticking on her precious youth and abilities. Her subsequent conversation with Hal contains several parallels to her conversation with Robert. Both men remind her that by the time Robert was Catherine's age, he had already done his best work. It seems that Catherine's father has left a long shadow and Catherine has probably heard about her father's early brilliance from many academics over the years. Hal does not realize he has struck a nerve with Catherine. He knows she has spent the last several years caring for her father, but Hal does not yet understand how much she gave up in the process. He does not understand how acutely Catherine feels the ticking of the clock; how aware she is that she has lost valuable years of youth and productivity. Hal is too little acquainted with her situation to realize how left behind Catherine feels, how unfulfilled.

The play's audience does not yet know the depth of her sacrifice either, but this first scene lays the groundwork by showing us Catherine's depression. According to Robert, she wastes her days sleeping and refuses to find a job or make friends. However, her depression may be quite normal under the circumstances, as her father's ghost indicates. Robert speaks as if from the point of view of Catherine's conscience. The audience is not given the impression that Catherine is necessarily crazy. Robert's ghost could be like the ghost of any parent's voice which imprints itself in the minds of its offspring. This internalized parental wisdom acts alternately as wise mentor, strong supporter and even harsh critic, but the true voice behind it is always Catherine's own conscience. Viewed in this light, the dialogue with Robert in Act 1 Scene 1 reflects Catherine's own view that she is giving in to depression and that it's time she move forward in life, make some friends and use her talents. She seems to be having a hard time, but she also appears to be capable of handling it on her own terms.

Act 1 Scene 2

Act 1 Scene 2 Summary

The next morning, Claire arranges bagels and fruit on a tray on the porch. When Catherine emerges from the shower, Claire tries to take charge of what she eats, wears and even the shampoo she uses. Catherine responds to being treated like a child with petulance, until Claire announces that she's marrying her boyfriend, Mitch. Catherine congratulates her and promises to come to New York for the wedding in January. Claire fishes for information on Catherine's future plans and her feelings about their father's death. Catherine asks about the reason for all the questions and Claire admits that the police came by while Catherine was showering. They told Claire that Catherine had made a false crime report the previous evening and that she had been verbally abusive with the police when they arrived, refusing to sign a statement or to allow them to enter the house.

Catherine explains about Hal, but Claire questions her story, acting as if Hal is a figment of her imagination. Claire invites her sister to live in New York with her and Mitch. She tells Catherine it would be a "safe place" for her to get some "downtime." Just then, Hal arrives. Catherine introduces him triumphantly to her sister and asks for an apology. Claire insists they need to make decisions about Catherine's future, but perhaps she shouldn't have brought it up so early in the morning. Catherine goes back in the house, leaving her sister to breakfast alone.

Act 1 Scene 2 Analysis

Claire arrives and instantly starts making assumptions about Catherine. Claire's hidden agenda puts Catherine on the defensive. Catherine's defensiveness is heightened because of the fact that she, too, entertains some of the same fears as her sister about inheriting Robert's mental illness. For some reason, Catherine is the one they both have selected as a potential candidate; it occurs to neither sister to imagine that Claire is mentally ill. Certainly, Claire has a better track record in life, but that's hardly a fair basis for comparison when Catherine has given up her education, career and romantic prospects to nurse their father. Claire seems to believe that Catherine's refusal to commit Robert to a mental institution is a symptom of Catherine's own insanity. It certainly may be symptomatic of Catherine's fear that she may one day be in her father's shoes.

Act 1 Scene 3

Act 1 Scene 3 Summary

The funeral party is in full swing. Catherine has escaped to the porch. The band finishes a number and moments later, Hal appears on the porch with two beers. He promises Catherine that his band is finished playing and thanks her for allowing his mathematician musician friends to attend the funeral, as they were also fans of her father's.. He compliments her dress. Catherine replies that both the dress and inviting his friends were her sister's ideas. Catherine is surprised and pleased at how well it has all turned out. Hal jokes about what hardcore partiers mathematicians are. The older ones, especially, use amphetamines frequently to keep up with the younger minds in the field. Hal mentions his belief in the theory that mathematical creativity peaks at twenty-three and that it's all downhill from there. Catherine tells him her father had agreed with that theory. She says the field belongs to young men. Hal protests that there are some young women as well, but cannot name any.

Catherine tells him about Sophie Germain, who was born in Paris in the late eighteenth century. Her father had been a mathematician and so despite the social ban on allowing women into universities to study math, Germain had learned from her father's books and works. When Catherine mentions Germain prime numbers, Hal recalls the name. Germain had corresponded about her work with a well-known mathematical genius named Gauss. Upon discovering she was a woman, Gauss had written Germain a letter praising her dedication and talent and expressing his admiration for the mathematical mastery she achieved despite the extra obstacles she faced as a woman. Catherine has memorized this letter from a book about Sophie Germain which her father had once given her and quotes it for Hal. Hal leans in and kisses her, then apologizes. Catherine tells him that it's all right and apologizes for giving him a difficult time about studying her father's notebooks.

Hal admits that she is probably right about the work being junk. He has discovered the one book out of some hundred thirty which appears to be written while the old man was lucid, but it contains no math. She expresses interest in Hal's own work, but he downplays his research, telling her it lacks the kind of big ideas her father had. Catherine tells him her dad did not come up with big ideas, either. "He'd attack a question from the side, from some weird angle, sneak up on it, grind away at it. He was slogging. He was just so much faster than anyone else that from the outside it looked magical." (pg. 37) Hal discounts her opinion of her father's methods and insists he could never do anything as elegant as Robert's work. He reminds her that he is twenty-eight and on the downward slope of his career. Hal has lowered his expectations and consoles himself with the fact that he enjoys teaching. She teases him that he could try amphetamines and leans in to kiss him, making her passionate intentions clear. As they kiss, she asks if he remembers meeting her four years before. He remembers, but is surprised that she does.

Act 1 Scene 3 Analysis

By telling him the story of Sophie Germain, Catherine has revealed her heart to Hal. She has given him all the clues he needs to figure her out, but Hal's chauvinistic assumptions prevent him from considering that she might have inherited her father's talent. It is ironic, because both Hal and Claire assume Catherine has inherited her father's madness, but neither of them thinks she may have inherited his brilliant mathematical mind. Had Catherine been a son instead of a daughter, both Hal and Claire would likely have had much higher hopes for her mathematical abilities.

Sophie Germain's story parallels Catherine's and makes her an ideal role model for Catherine's character. Germain, like Catherine, was denied a university degree in mathematics. In Germain's day, women were routinely barred from the male-dominated mathematics field because of gender. According to the playwright, Catherine also lost out on her degree due to her gender. In an interview for the Mathematical Sciences Research Institute at Berkeley, David Auburn states that he made Catherine's character female because a man would not have been expected to stay home to care for an ailing parent (as reported by www.maa.org, The Mathematical Association of America.) As a woman, Catherine's sacrifice is expected rather than appreciated. Therefore, she treasures the words of appreciation received by Sophie Germain from her mentor, Gauss. The long dead Gauss is the only man to appreciate the courage it takes for a woman to succeed in the field of mathematics. Catherine shares these words with Hal, believing that he will understand how much they mean to her. For it was Hal, in an earlier scene, who had shown her the words of appreciation her father had written in his notebook.

The gender issue is not the only obstacle Catherine faces. At twenty-five, she has already missed out on the peak early years so critical to a mathematical theorist. Everyone tells her mathematics is a *young man's* game and she believes the *young* part if not the *man* part of that statement. She is willing to challenge the gender issue. She does not, however, dispute the youth issue. Catherine remains susceptible to the belief that only youthful minds are capable of great work in the field. This, more than anything, is what brings on her depression. Having just turned twenty-five, she is on the downward slope of her creativity, or so she believes. Catherine is depressed because she is afraid it is too late for her to achieve her dream.

Act 1 Scene 4

Act 1 Scene 4 Summary

The next morning, Catherine sits on the porch in a robe. Hal comes out, half-dressed and asks her how long she's been awake. Their conversation is awkward after their time together the night before. When he learns that Claire is still sleeping, he advised Catherine to let her sleep because she did some heavy drinking with the theoretical physicists last night. When Hal asks to spend the day with Catherine, their awkwardness dissolves. She hands him the necklace from around her neck; it contains a key. She tells him to use the key in the bottom drawer of her father's desk. When he asks what he is looking for, she remains mysterious. He kisses her, then leaves to try out the key. She smiles to herself, elated.

Claire appears, very hung over. Catherine thanks her for the dress Claire had insisted she wear to the funeral; it turns out, to both their surprise, that Catherine loves the dress. Claire brings up the topic of New York again, insisting that Catherine would be better off if she moved there. Catherine admits she needs some time to sort out her plans, but intends to do that here. At this point, Claire tells her the house is on the market and expects it to be sold by the end of the week. Catherine demands to know why she's being kicked out of her own house and Claire insists it's for her own good. Catherine says if Claire had wanted to help, she's a little late; Dad is dead. Claire reminds her she paid all Robert's bills including the mortgage while Catherine was taking care of her father. Claire tells her sister that their father would have been better off in an institution and that Catherine wasted her time taking care of him. Claire tells her she wasted her talent, too and ventures the opinion that Catherine inherited some of Robert's talent along with some of his instability. Catherine gets suspicious and asks if Claire has looked into mental institutions for her in New York. Claire assures her she only needs to go on an outpatient basis, if she goes at all.

Hal returns with a notebook and thanks Catherine for sharing such an incredible item with him. In response to Claire's question, Hal explains that it is an extremely important mathematical proof. The notebook, on first glance, appears to prove a theorem that mathematicians have been struggling with since the very beginning. Claire asks where he found it and Hal explains that Catherine gave him the key to unlock Robert's drawer. Hal tells Claire that the proof is historic and additionally proves that Robert had done his finest work at the end of his life when everyone thought he was insane. He explains that reporters from across the globe will want to speak with the person who found the notebook. Catherine says she didn't find it. Claire asks who did find it. Catherine says she did not find the proof, she wrote it.

Act 1 Scene 4 Analysis

Act 1 ends with the main character's revelation that she is a brilliant mathematician in her own right. The audience has discovered that although Catherine is now considered too old to become a mathematician, it does not matter because she has already done her best work. Or has she? If the proof does not turn out to be valuable, Catherine will not get another chance to impress the leading mathematicians of her day; at twenty-five she is over the hill. This notebook containing her proof is all Catherine has to show for her twenty-five years on earth. Thus, there is a lot of pressure on Catherine for the work to be good. And it must be accepted by the experts in the mathematics field. If she cannot get Claire and Hal to believe she is the author, then it is far less likely that anyone else will take her claim seriously. Unfortunately, due to their preconceptions about Catherine, neither Hal nor Claire is predisposed to believe that the work is actually hers.

One can now see why Catherine was so possessive about her father's things. It was really her work she wished to protect. She had known Claire was not to be trusted with something so important, but she was not sure about Hal. The possibility exists that he has simply come to steal credit for her father's work and now, for hers. She had not trusted him originally, but after their romantic night together, her feelings have softened. By presenting him with the key to the desk drawer containing her valuable proof, she has really given him the key to her heart. His reaction to this bombshell, that the proof is hers, will be a major factor in determining the future of their relationship, or lack of it, as the case may be.

Act 2 Scene 1

Act 2 Scene 1 Summary

Exactly four years earlier, Robert dozes on the same back porch. Catherine enters and stands quietly behind her father. He senses her presence and greets her. She has come to ask if he needs anything from the store, as she is on her way out to buy ingredients for dinner. He has no preference, but when she offers spaghetti, he argues vehemently against it. Robert proposes they take a walk to the lake, stop at the store afterwards and choose dinner together. Catherine agrees, but then blurts out of nowhere that she is going to school.

Catherine has been accepted into Northwestern's math program and will start classes at the end of the month. It's an hour and a half away and she intends to live on campus. Robert points out every potential negative inducement he can think of regarding her going back to school and is upset that she's waited so long to tell him of her plans. Catherine explains that she was waiting to make sure Robert was really going to be okay. He reminds her he returned all the library books and is no longer decoding messages from alien ships. Just as he berates her for bringing up the subject, Hal shows up, asking if it's a bad time. Robert remarks on his poor timing, but welcomes him to join them in a drink. Robert suggests to Catherine that they take a break from their argument, "back off the problem, let it breathe, come at it again when it's not looking." (pg. 54)

Hal has stopped by to bring the first draft of his thesis to his professor. Robert tells him that Catherine is starting at Northwestern and Hal congratulates her, mentioning how nice it is to get out of the house and go away to school. In the ensuing awkward pause, Robert chimes in to say how thrilled he will be to have his home to himself again. He now seems to be encouraging Catherine to go to school, but at the same time he reminds her she'll have to "run pretty hard to catch up." (pg. 55) Before Hal leaves, he sets an appointment with his professor to go over his thesis and as they discuss the date for the meeting, Robert suddenly remembers his daughter's birthday. He apologizes to Catherine for his forgetfulness and wishes her a happy birthday. Robert insists they forget the shopping and the cooking and go out to the restaurant of her choice. Catherine picks an old-fashioned steak house, then turns to Hal and invites him to come. After hesitating, Hal turns down the invitation, citing a previous engagement. He leaves and Catherine goes back in the house to change clothes. Robert picks up his notebook and begins to write. His words are the words of the journal entry Hal found in Act 1 Scene 1, which he presented to Catherine as a birthday gift.

Act 2 Scene 1 Analysis

This scene is a flashback to four years prior and gives the audience the back story on the journal entry Hal had read to Catherine at the beginning of Act 1. Her memory of

that day intrudes on the present day events in the first scene of the second act, allowing the author to maintain suspense a little longer before he reveals Hal and Claire's reaction to Catherine's bombshell, which ended Act 1. The audience still doesn't know how Hal and Claire will react to Catherine's work and this scene does not directly relate to the current action. However, it is an important part of the back story; it shows Catherine's first meeting with Hal and more importantly, it shows how much going away to school meant to Catherine.

She betrays her deep desire to go to school through her hesitancy to start classes in the fall. The dream is so important to her she is afraid to let herself believe it can happen. She is terrified that her father's apparent improvement will not last and that she will lose her dream for the second time. Thus, the audience's foreknowledge of the fact that she already dropped out of Northwestern to care for her father makes this scene especially poignant. The story will become more poignant still in an upcoming scene in which the author depicts the precise moment when Catherine makes her final decision to drop out of Northwestern.

Act 2 Scene 2

Act 2 Scene 2 Summary

The action picks up in present day, the moment after the end of Act 1; Catherine has just delivered her bombshell. Claire's immediate reaction is to ask if Catherine means that their father had dictated the proof to her. Catherine insists that she wrote it and in response to Claire's questions, divulges that she began working on it after quitting school and had completed it a few months before their dad died. Claire points out that the proof is written in one of Robert's notebooks and had been found in Robert's desk drawer. Claire continues to doubt Catherine's story; Hal has yet to say anything. Catherine reveals more details, how she worked nights at the house after Robert had gone to sleep. Claire insists that the handwriting is their father's and asks Catherine to prove her knowledge of the proof. Catherine says she wouldn't understand it.

Catherine looks to Hal for support of her claim, but Hal refuses to support her claim to authorship. He recommends that he take the book into his university for further study by other men who knew Robert's work well; he intends to tell them that "we're not sure about the authorship." (pg. 63) Catherine is outraged that he intends to steal her proof without her permission and accuses him of wanting to claim the credit for himself. Hal tells her the handwriting is obviously her father's, but backs off a bit, allowing for the possibility that Catherine's handwriting might resemble Robert's. He continues to argue the case that the proof is Robert's, picking up right where Claire left off. Hal reminds her how great her father was and tells her that Hal's generation hasn't produced any mathematicians of Robert's caliber. Catherine tells off Hal, who leaves. Then she angrily tries to destroy the book, but Claire wrestles with her to preserve the proof. Finally, Catherine throws it to the ground and stalks away.

Act 2 Scene 2 Analysis

The initial response to Catherine's announcement is everything she had feared. She had expected Claire's disbelief, but she feels that she has forged a connection with Hal and expects him to believe in her. Catherine feels defeated when neither Hal nor Claire believe her. To make matters worse, they see her claim as a symptom of mental illness. This must terrify Catherine, given that the author has already established her sister's position on mental illness. Claire believes their father should have been thrown into an asylum and now Claire is taking charge of Catherine's life, herding her around as if she were a helpless child. The only support Claire has offered Catherine over the years has been financial. Now, when Claire is finally offering more personal, emotional support, it is of the smothering, debilitating variety. Yet it is the best Catherine can get. It is therefore not surprising that Catherine shows signs of giving in to Claire's will. Catherine's decision to wear the dress Claire tells her to wear and the fact that Catherine decides she likes the dress after all, are two decisions which indicate her desire to be mothered by Claire and to be told what to do. Catherine needs some

looking after, which may be why she is so quick to give her heart to Hal. Both Hal and Claire disappoint her deeply by refusing to believe her about the proof and further, they frighten her by making her feel powerless over her own future and her own work. Once she throws the proof on the ground and walks away from it, the audience is left to wonder how hard the dispirited Catherine will fight to protect her interests, if she fights at all.

Act 2 Scene 3

Act 2 Scene 3 Summary

Hal knocks on the back door the next day. He is surprised when Claire answers, thinking she had planned to leave the previous day. Claire informs him that she cannot leave because of the state Catherine is in and refuses to let Hal see her. She reprimands Hal for toying with Catherine's affections, calling Catherine fragile and implying she is too unstable to care for herself. Hal insists he did not take advantage of Catherine and tells Claire her sister is tougher than Claire thinks. Claire nevertheless refuses to let him speak to Catherine. Hal agrees, but refuses to leave until Claire gives him the notebook containing the disputed proof. To Hal's surprise, Claire hands it over readily. She believes Hal's intentions are good and thinks he will be doing her a service by verifying the authenticity of her father's work. He begins to leave with the notebook in hand, but Claire stops him and asks him to explain the meaning of the proof. As the scene ends, Hal is telling her it will take some time to explain and inquiring as to her level of mathematical knowledge. Claire tells him she's inherited just enough of her father's abilities to be a good currency analyst.

Act 2 Scene 3 Analysis

Once again the author shows Hal in a somewhat shady light. When Claire answers the door, Hal makes it seem as if he has only stopped by to see Catherine, but his hidden agenda becomes clear when he asks for the notebook just before he leaves. With Catherine in Act 1 Scene 1, Hal begins to romance her only after she denies his request to access her father's notebooks. The audience cannot be clear at this point whether Hal's interest in Catherine is genuine, or if it is merely a self-serving way to get at her father's work. Catherine is certainly worried that he is using her for that purpose. Yet Hal does seem genuinely interested in Catherine and it appears most likely that in Robert's house, Hal has found two passions to pursue, math and Catherine. If he could only understand that despite her gender she is a brilliant mathematician, he would realize that this woman is his ideal, intellectually, if not romantically.

Act 2 Scene 4

Act 2 Scene 4 Summary

This scene takes place three and a half years earlier. Robert sits on the porch wearing a thin t-shirt and writing in a notebook. Catherine's voice calls to him from inside. She comes out on the porch wearing a parka and asks her father what he's doing outside in a t-shirt when it's thirty degrees. Robert insists that the cold is helping him work. Catherine admonishes him, telling him she has been calling and calling and because he didn't answer, she had felt compelled to skip a class in order to drive the hour and a half to check in on him. Robert apologizes, but explains that the phone is a distraction to his work. Catherine is thrilled to hear him say he's working, especially when he enthuses that he feels positively inspired and his mind is clearer than ever. He is in the middle of a very important discovery, he tells her.

Caught up in the enthusiasm of his new project, Robert suggests that Catherine rearrange her class schedule in order to work with him on his big breakthrough. He indicates the notebook he's been writing in and insists they start immediately. Catherine opens his notebook, reads silently for a moment, then gently suggests that they go indoors where it's warm. Robert will not be swayed. He refuses to go inside until Catherine discusses his new proof with him and demands she read it aloud to him so they can begin their discussion. With hesitancy, Catherine begins to read the "proof." It is a nonsensical story problem about the cold, boasting phrases such as, "The future of heat is the future of cold. The bookstores are infinite and so are never full except in September..." (pg. 74) Catherine closes the book and helps her father to his feet. He begs her not to leave him. She tells him she won't leave and guides him back inside the house.

Act 2 Scene 4 Analysis

Again, the author has chosen to prolong the suspense by jumping into the past for a flashback scene. Not only does this temporal interruption increase the suspense, but it also ups the ante regarding the proof's importance for Catherine. The proof represents her only personal achievement since she was forced to drop out of school to take care of Robert. In this flashback scene, the author has chosen to depict the turning point; the moment in time when Catherine decided to drop out of Northwestern. On this day, she is compelled to leave class and drive an hour and a half out of concern for her father. At first, despite his lack of coat in the winter cold, she feels relieved because Robert tells her of his new project and gives her reassurances that his mind is working, not only properly, but better than ever. This is everything Catherine wishes to hear. Not only does it justify her choice to put off college for a year while caring for her mentally ill father instead of allowing Claire to lock him up and throw away the key, but it also justifies her decision to take classes at Northwestern. If Robert really is okay, she can relax in the knowledge that she drove all this way for nothing and next time she worries about him,

she will be able to tell herself she's worrying over nothing. She won't need to leave class again to check on Robert if his mind is working well; he would know to go inside out of the cold before he did himself any harm.

We can imagine, then, how Catherine must feel upon discovering that the notebook which contains her father's important breakthrough is only gibberish, an old man's dementia. Suddenly his eccentric behavior is recognized as dangerous; he really doesn't know enough to come in out of the cold and had she not rushed home, he might have died that very night of hypothermia. The audience can practically feel the sinking feeling in the pit of Catherine's stomach as she realizes that if she continues to take classes an hour and a half away, her father will surely die from self-neglect.

Act 2 Scene 5

Act 2 Scene 5 Summary

Moving again into the present, a week has passed since Hal accepted the notebook from Claire. This morning, Claire sits on the porch drinking coffee from a takeout cup and examining the plane ticket she holds in her hand. Catherine joins her, carrying luggage and Claire gives her a cup of takeout coffee. Catherine compliments the coffee and Claire says there is a lot of good coffee to look forward to in Manhattan. Claire begins to worry that Catherine cannot take the morning chill and wonders if they shouldn't take their coffee indoors after all. Catherine insists that it's a lovely morning to take coffee on the porch, but when Claire offers her a jacket, Catherine accepts. Claire reassures Catherine that she's made the right decision and tells her they don't have to leave for the airport for another twenty minutes, so if Catherine would prefer to have some time alone, Claire won't mind.

Catherine assures her she feels good about the trip, but as Claire lists the sights they should see, Catherine's bitterness comes out in the form of sarcastic comments about electroshock treatment and carefree college days. Catherine mockingly informs her sister that she promises to be a good patient and do whatever Claire and her psychiatrist order her to do and that she will never leave her room or cause any trouble whatsoever. Claire responds to this outburst by telling Catherine she couldn't take care of herself for five days. She accuses Catherine of forcing her to sacrifice a week of her life wondering and waiting for Catherine to get out of bed. Catherine insists that she was tired and did not wish to speak to Claire during that time. Claire angrily tells her to stay here if she hates Claire so much. "And do what?" Catherine responds. (pg. 78) Claire tells her to figure it out herself and leaves without her.

Just then, Hal hurries into the scene. Excitedly, he announces to Catherine that several men from the university have combed through the proof twice and they have discovered that it works; it is a viable proof of a formerly unprovable theorem. Catherine archly advises him that she already knows it works. She tells Hal she is leaving. He says he knows, but asks her to stay a moment. Catherine tells him to just take the proof and publish it, either under her father's name or his own. Hal answers that he no longer believes her father wrote the proof. He explains to her that the mathematical techniques strongly suggest a younger author, but there are no young mathematicians in the field this brilliant. Hal tells her he learned more mathematics by studying the proof than in four years of graduate school.

Hal begins to argue that Robert would not have been able to write such a modern, "hip" proof. Catherine plays devil's advocate, tearing down his arguments. Finally, Hal mentions that parents and children often have similar handwriting and so it would make sense if her handwriting looked like her father's. Catherine reminds him that is what she told him last week. She tells him that he's blown it with her, sarcastically calling him a genius for managing to both seduce her and steal the notebook. Hal tells her she is

giving him too much credit for coming up with such plan. He humbly tells her he would like nothing more than to discuss the proof with her on a professional level. She tells him to forget it. Catherine reminds him that there is no more evidence this week than there had been last week to support her authorship. She tells him there is no definitive way to prove it's her work and that is why she had counted on him to trust her.

Hal changes the subject. He asks about the house and Catherine informs him it has been sold. Hal tells her she should stay in Chicago anyway. He does not think, he tells her, that she needs to be looked after like a child in New York. He returns the notebook to her; she accepts it. She hesitantly offers some insights to Hal about her writing process. She laments that her work is not as elegant as her father's. Hal suggests again that she talk him through the proof, offering to serve as a sounding board to help her refine the pieces she feels are rough. Catherine is too passionate about her material to avoid being drawn into the conversation. She opens the notebook and begins to read through it. Finding an appropriate spot to begin, she turns to Hal and, as the curtain falls, she begins to speak.

Act 2 Scene 5 Analysis

The scene starts out with the worst possible scenario for Catherine, but winds up with the best. A week after being declared mentally incompetent by Claire and having her proof taken from her by Hal, she has submitted to the ominous fate Claire has in mind for her. Catherine has spent the previous week in a brooding depression over Claire's actions; she retreats from the threat both Hal and Claire pose to her future happiness. Claire, however, totally misinterprets the situation and assumes the worst about Catherine because she is sleeping until noon every day.

This is a chilling example of interfamily politics, because mental illness is a difficult charge to dispute and human society has an unfortunate history of using such a diagnoses - whether spurious or accurate - against the diagnosed individual. Even in today's relatively enlightened society, many people are afraid to seek help for minor anxiety or depression because it could potentially be used against them by insurance companies, employers, political rivals, or even by family members. Misdiagnosed insanity is a powerful theme in many contemporary books and movies and David Auburn does it justice with his balanced portrayal of the family dynamic between Claire and Catherine. The author's delay in revealing the authenticity of the proof allows him to create additional suspense and keep the audience wondering if Catherine is insane. Her behavior could be indicative of many things; a creative temperament, a temporary depression caused by current life circumstances, or it could also indicate a deeper issue, as Claire and Hal assume. Their readiness to jump to conclusions about Catherine is only aggravated by her moodiness and sarcastic, defensive mode of communication.

Fortunately for Catherine, she is ultimately proved correct in placing her trust in Hal. Having become intimate with her, Hal comes to believe she authored the proof because he gets a glimpse of her soul within the lines on its pages. Catherine sees her work as a

direct expression of her being. When he initially denies her creation, Hal has, in her mind, negated her very existence. As it turns out, Catherine only needs to give Hal time to really see the proof. Once he has examined it, he is captivated by the author's unique voice and recognizes that voice as Catherine's. His acceptance of her work validates Catherine's hopes, dreams, her very existence. Thus, the play ends on an uplifting note as the audience realizes that Catherine will receive and accept, the credit she is due. Although Claire has not yet been convinced that the proof belongs to Catherine, it no longer matters what Claire thinks. Catherine's authorship has been accepted by the academic community. Therefore, not only Catherine's work, but her judgment in people, is validated by Hal's acceptance that she is a brilliant mathematician.

Characters

Catherine

Catherine is Robert's twenty-five-year-old daughter. A college dropout, she has spent several years at home caring for her mentally ill father. A few years earlier, when his illness went into remission for almost a year, she enrolled as a sophomore at Northwestern University in Evanston, Illinois. She dropped out of that program and returned to look after her father when he again became ill. Their relationship, although sometimes antagonistic on the surface, was sustained by strong mutual affection.

Catherine is worried that she may inherit her father's illness, and the signs of mental instability are already there. Although she is a highly intelligent woman, she has no direction in life and often, according to her father, sleeps till noon. Some days she does not even get out of bed. She is obviously suffering from depression, and her attitude about life is bitter. Claire, her sister, wants her to move to New York so she can keep an eye on her and arrange for the best medical treatment, but Catherine resents her interference. Evidence of her unstable mental condition emerges in Claire's report of her aggressive behavior toward the police officers who came to the house after Catherine reported a burglary in progress (which was her extreme reaction to Hal's attempt to smuggle out one of her father's notebooks).

Hal attempts to befriend Catherine. She then takes the lead and seduces him. Wanting to show affection and trust, she allows him to discover the amazing mathematical proof that she has written in one of her father's notebooks. She is upset when Hal does not believe she wrote it and feels that her trust in him has been betrayed. Eventually, Hal is convinced that she wrote the proof, and the mathematical genius that Catherine inherited from her father is finally revealed and acknowledged. It appears that Catherine and Hal may be on their way to a rewarding relationship, both professionally and personally.

Claire

Claire is Catherine's efficient, practical, and successful sister. Unlike Catherine, she has inherited none of her father's erratic genius. Instead, she has made a career in New York as a currency analyst. She made enough money to pay off the mortgage on the family home in Chicago, even when she was living in a studio apartment in Brooklyn, New York. Claire lives with her boyfriend, Mitch, who also has a successful career, and they plan to marry in January. Claire and Catherine have never gotten along well, and when Claire returns from New York for their father's funeral, they quarrel. Claire feels responsible for Catherine's welfare and wants her to move to New York, but Catherine resents what she sees as Claire's interference in her life. It transpires that they have quarreled in the past over how to care for their father. Claire thought he should be sent to an institution, but Catherine believed it was important for him to remain near the

university. Claire has little understanding of Catherine and regards her as mentally ill, but she means well and takes her family responsibilities seriously.

Hal

Hal, whose full name is Harold Dobbs, is a twenty-eight-year-old mathematician who teaches at the University of Chicago. He also plays drums in a rock band made up of mathematicians. Hal is a former student of Robert's, whom he admires immensely, not only for the brilliance of his achievements in mathematics but because Robert helped him through a bad patch in his doctoral studies. Hal first met Catherine briefly four years earlier, and when he meets her again, he tries to make friends with her. He seems rather shy and inexperienced with women, and it is she who seduces him rather than the other way round. After they spend the night together, he is ready to fall in love with her. Hal also confides in Catherine that he is dissatisfied with the progress of his career. His academic papers are being rejected by journals, and he feels that his work is trivial. Although he does not openly acknowledge it, this is one of the underlying reasons that he is examining Robert's notebooks. If he can discover something important, it will boost his career and perhaps make a name for himself. He is thrilled when he finds the proof in Robert's notebook and takes some convincing by Catherine that it is her work. This harms their relationship, since Catherine is annoyed that he does not believe her. When Hal is convinced, he reacts with humility rather than jealousy. He tries to repair their relationship and asks Catherine to go over the proof with him so he can ask questions and understand it better.

Robert

Robert was a famous mathematician who has just died of a heart attack in his fifties. He is already dead when the play begins, but he appears in the first scene in Catherine's imagination and returns in two later scenes, which flash back to earlier years. Robert was a mathematical genius. When he was in his early twenties, he made major contributions to game theory, algebraic geometry, and nonlinear operator theory. According to Hal, his former graduate student, he invented the mathematical techniques for studying rational behavior. While he was still in his twenties, Robert was afflicted by a serious mental illness, which dogged the remainder of his life. He became so incapacitated that his daughter Catherine had to stay at home to care for him. Robert had a deep affection for Catherine. He realized the sacrifices she made in caring for him, and he believed that she saved his life. Robert was also worried that she appeared to be wasting her life. Four years before his death, Robert's illness went into remission, and he was able to teach again for one academic year. During that year, Robert thought he was back at his best and would once more be able to do exciting, pioneering work in mathematics. He even asked Catherine if she would collaborate with him, but she soon found out that his notebooks were full of nonsense; his mind was confused, and he was lapsing into insanity.

Objects/Places

The Back Porch

The setting where all of the action and dialogue takes place.

The Proof

Catherine's brilliantly written proof of a mathematical theorem formerly believed unprovable. Unfortunately for Catherine, no one believes - at least at first - that she is its author.

Robert's Notebooks

One hundred and thirty notebooks left behind by the mathematical genius turned madman. Hal insists on sifting through them looking for ideas of value, but the only value he finds is the proof Catherine wrote.

Northwestern

The university Catherine attended until she had to drop out to care for her father.

Hal's Thesis

Hal's post-graduate thesis, completed under the guidance of Robert. It is this thesis which Hal brings to the house, occasioning his first meeting with Catherine.

Hal's Backpack

The backpack Catherine searches when she is initially suspicious of Hal's motives.

Hal's Jacket

What Hal used to conceal the notebook he attempted to smuggle out of Catherine's house.

"¡"

One of the songs which Hal and his bandmates play. The title, "¡," is the mathematical term for "imaginary number." Thus the "song" is actually a mathematician's joke; it does

not exist. Hal and his band "play" their imaginary number for Robert's funeral; it consists of several minutes of respectful silence.

Catherine's Key

The key which she wears on a chain around her neck. It goes to the drawer in her father's desk where she keeps her proof locked away.

University of Chicago

The college where Robert taught during his final days as a professor and where Hal attended post-graduate school and now teaches.

Themes

Genius and Madness

The link between genius and madness has been explored by many authors, playwrights and filmmakers. The cliché of the "mad scientist" has become so commonplace in our society that it is often one's primary association to the term "scientist." One pictures a benign, be-spectacled *man* with a shock of white hair ala Einstein. Albert Einstein has come to symbolize this visual cliché of the mad scientist despite the fact that he was not himself mad. As the most famous scientist in the world, he is simply the first image to come to mind, although there is little doubt that he was eccentric. In addition, he is an appropriate symbol because madness did seem to run in his veins; Einstein's son spent the majority of his adult life consigned to an insane asylum. His story, then, is one example of the genetic association of genius with madness.

David Auburn's play, *Proof*, is another. The depth of Catherine's resemblance to her father is the central question in *Proof*. The play opens with Catherine discussing her potential insanity with the ghost of her father, Robert. As Robert says in the scene, that "could be a bad sign." (Act 1 Scene 1, pg. 13) In this way, David Auburn casts suspicion on Catherine's mental stability from the outset. The correlating question for the audience then becomes *has she also inherited her father's mathematical genius?* The mad scientist cliché conditions many people to assume a correlation between genius and madness.

No statistically significant correlation has been proven, partly because both genius and madness are difficult to define. Better defined is the connection between "creativity" and "madness," with *creativity* defined as the work of artists, musicians and writers and *madness* defined as anything from depression to psychosis. Yet with a slightly different definition of creativity, one finds that there exists an obvious link between creativity and the theoretical branches of science. Einstein was arguably more creative than Michelangelo. Theoretical physicists or mathematicians are inspired by the same creative process which moves a human being to find the form of *David* in a rough block of marble. The rules of math already exist, yet for human beings to experience or benefit by them, these rules must be discovered and reliably proven. Mathematicians must literally conjure their ideas out of thin air. Theorems and proofs begin as creative inklings, gut instincts and hunches.

Does this seemingly magical ability to conjure proofs from thin air correlate to such things as holding conversations with the ghost of one's dead father, like Catherine does? That is the question that David Auburn explores. *Proof* doesn't really resolve any of Catherine's questions; the potential for mental illness still exists for her. However the playwright creates such a likeable and understandable character in Catherine that the audience members are likely to arrive at the conclusion that Catherine is no more or less insane than the average citizen. Or, perhaps, it is simply that society more easily forgives eccentricity in one so brilliant as Catherine.

Academic Chauvinism

For many generations, women have been excluded from the ranks of academic achievement, particularly in the fields dominated by men, such as mathematics and science. Sophie Germain's story is vital to Catherine's world view, as Germain is the only historical role model available for her. Women have not traditionally received the support men do from these male dominated fields. Men have many role models to look to and are more likely to receive additional support from older, wiser professors or other experts in the field who desire to give back by helping their chosen protégés to develop their budding skills. Women have often faced a hostile and unwelcoming environment, which means not only do they lack support, but they also face more challenges and obstacles than do their male peers in the field.

To be welcomed and supported in their chosen environment is the unfulfilled dream of many career women. Catherine desires the acceptance of her peers as well, but she wishes to be accepted on her own terms, for her own brilliant mind and not for her father's reputation. For this reason she eschews attending the University of Chicago, where her father's star had shone so brilliantly for many years. Yet despite her desire to avoid riding on her father's coattails, due to the circumstances of her life, he becomes her sole mentor and teacher. As a mentor he lets Catherine down in many respects. He never introduces her work to his colleagues or makes efforts to give her a leg up in the field. Much of this can be attributed to his illness; however in his year-long period of lucidity he was more concerned with keeping Catherine by his side than in helping her future career. He needed her and this need overrode his concern for her well-being and prompted her to willingly sublimate her needs to his. In this way, Germain's story becomes even more important for Catherine and Sophie Germain's mentor, Gauss, becomes Catherine's mentor as well. The kind words which Gauss wrote to Germain move Catherine deeply because they are the words she longs to hear someone say about her:

"'A taste for the mysteries of numbers is excessively rare, but when a person of the sex which, according to our customs and prejudices, must encounter infinitely more difficulties than men to familiarize herself with these thorny researches, succeeds nevertheless in penetrating the most obscure parts of them, then without a doubt she must have the noblest courage, quite extraordinary talents and superior genius.'" Act 1 Scene 3, pg. 36

Sacrifice

Catherine's sacrifice drives the action in David Auburn's play, *Proof*. Had she not dropped out of school to take care of her ailing father, the story would have merely chronicled the academic success of a brilliant, female mathematician. It is Catherine's sacrifice which gives the story its human edge. The author plays on the audience's assumptions about male and female roles in exploring this theme of sacrifice. Through the character of Catherine, he is able to communicate the depth of sacrifice involved in

being a full-time caretaker for a seriously-ill family member. This role is held by people of all ages in society; caretakers can be elderly spouses or younger children of the declining individual. However Auburn wrote *Proof* based on the assumption that the vast majority of such caretakers are women. Due to social expectations, men are not expected to sacrifice their careers or earning power to fill the role of caretaker. Whether this assumption bears out statistically or not, Auburn's play is a beautiful tribute to the countless real women who do sacrifice themselves to care for a loved one. He shows how little appreciation such women may receive for their sacrifice and most interestingly, he explores just how big the sacrifice might be, not only for the women themselves, but for society at large. He considers the question of what society is giving up by sacrificing brilliant young minds due to gender stereotypes. Catherine is shown to have such a brilliant mind that its loss would have been devastating to society. By showing the audience Catherine's potential, David Auburn shows the potentially high cost which gender stereotyping can have on society.

Genius and Madness

Robert and Catherine, the two mathematical geniuses, are brilliant but mentally unstable, and they are contrasted with the other two characters, Hal and Claire, who lack the genius of the other two but are better adjusted to the world.

Robert revolutionized the field of mathematics when he was in his early twenties, but he has waged a long battle with mental illness. The implication is that the illness is somehow connected with his genius. Another implication, in addition to the fact that genius, at least in this case, appears to be inherited, is that insanity may be inherited too. Catherine worries about this possibility, and although Robert tries to reassure her that it is not the case, she too shows signs of mental instability. She is too depressed to function effectively, and her life is not moving in a positive direction. She is bitter and finds it hard to trust the good intentions of others. And yet she is as brilliant as her father. Genius is therefore presented as a fragile thing; it can produce great intellectual achievements but may be inimical to personal happiness and stability. There is a price to pay for being an extraordinary individual.

The genius of Robert and Catherine is contrasted to the more pedestrian figures of Hal and Claire. Hal is a hard worker, a competent mathematician, and probably a good teacher, but he lacks the spark of genius. His work, as he says himself, is trivial. The big ideas elude him, and always will. This is why he combs through Robert's notebooks, hoping that some spark of genius will fly out from the pages, enabling him to bask in reflected glory. Claire too is competent and practical, "very quick with numbers," and this has enabled her to have a successful career as a currency analyst. But making money in the big city is a far cry from genius, which Claire acknowledges in her father but does not understand. She is too well adjusted to the world to have any interest in the beauty of abstractions.

Thus through the four characters the play contrasts the mundane and the ordinary, on which the day-to-day world turns, with the exceptional and the extraordinary, which is the rare stuff of genius that creates the peaks of human achievements.

Love and Trust

The certainty of a mathematical proof, which can be followed logically and established as absolutely true beyond any doubt, is a sharp contrast to the fragility and uncertainty of human life and relationships. Unlike in mathematics, truth in life is a harder thing to understand and grasp. Much of it, the play suggests, depends on trust. Catherine and Robert trust each other, and Robert believes that his daughter's love for him saved his life. There is never any doubt of the strength of the bond between father and daughter. But the other central relationship in the play, that between Catherine and Hall, is more problematic. It develops tentatively, and issues of trust soon surface. The truth is hard to determine. Catherine is suspicious of Hal's motives in going through Robert's notebooks, thinking that he may want to publish some of her father's work under his own name. Hal vigorously denies this, but she does not believe him, and perhaps Hal may not be willing to acknowledge even to himself that his motivation may not be entirely disinterested. He knows, after all, that his career has stalled, and a major discovery such as he seeks might give it a boost.

The relationship between Hal and Catherine moves in an awkward dance of mistrust followed by attempts at trust. In act 1, scene 1, Catherine thinks he is stealing a notebook, and he is, but not for the purpose she thinks. In act 1, scene 4, she tries to show her regained trust when she gives him the key to the drawer which contains her proof. But then when she claims the proof is hers, the tables are turned; it is now Hal who mistrusts Catherine, refusing to believe that she is capable of such work of genius. In turn, she once more becomes suspicious of him, saying the reason he wants to take the proof is to show off to his colleagues: "You can't wait to show them your brilliant discovery," she says. Mistrust again fills the air, on both sides. The proof that sits harmlessly in the notebook may embody a beautiful, irrefutable truth, but for the people arguing over it, such truth is elusive, not only about who wrote the proof, but also in terms of the truthfulness of their relationship.

The uncertainty continues into the final scene. Hal has overcome his doubts about whether Catherine wrote the proof, but she is still dealing with the hurt feelings that arose because he did not trust her word at first. She now plays devil's advocate and makes a telling comment that plays on the contrast between mathematical certainty and the uncertain, ambiguous world of human activities and relations. Even though Hal has carefully elaborated his reasons for concluding that the work is hers, she says that none of the arguments he has produced prove anything. "You should have trusted me," she says. It seems that trust is the only way that certainty can be established in this uncertain world; it is the only thing that can guide people through the complexity of human relationships, although the play leaves no doubt about how easy it is to undermine trust and how hard it is to maintain it. To Hal's credit, he does not try to argue with Catherine. Like a fine mathematical proof ("streamlined, no wasted moves," as Hal

says of Robert's work), he takes the surest way to the goal, acknowledging that she is correct: he should have trusted her. It is on that basis of trust that he and Catherine can go forward together.

Style

Point of View

The author does not use narration in his play. Every character's point of view is conveyed through dialogue, action, or body language. However, as the protagonist, Catherine's point of view is central to the play. The dialogue is slanted to make her the focus of nearly every conversation. She is present in every scene except one, in which Hal and her sister, Claire, discuss her in her absence. And yet, although the play is about Catherine's point of view, the author uses various tricks to make the audience wonder if Catherine's point of view is sound, or if she is actually as crazy as her father.

David Auburn's primary method of instilling doubt in the audience is through the timing which he uses to reveal Catherine's story. All of the things that have gone before are unknown to the audience as the play opens. Auburn instills doubt from the outset by opening his play with a conversation between Catherine and her dead father. Catherine's lack trust in both Hal and Claire makes matters look worse for her, as she does not reveal her talents to either of them until the end of the first act. Catherine does drop hints as to her true character when she shares the story of Sophie Germain with Hal, but despite Catherine's identification with Germain, the audience has no way of knowing at this point just how similar Germain's story is to Catherine's. Only after Hal and Claire express their doubts that the proof belongs to Catherine does the playwright reveal, with a flashback scene, Robert's lack of lucidity in the days preceding his death. He would not have been capable of writing such a proof. With the author's measured revelations, the audience is gradually led to trust Catherine's point of view after all.

Setting

Proof is set in modern-day Chicago, Illinois. The author has challenged himself by limiting the setting entirely to the back porch of Robert's house. Yet as confining as this setting seems, it is actually an inspired choice. David Auburn could have just as easily chosen to use one of the rooms inside the house to set all of his scenes. By setting each scene on the back porch, instead, he contrives a setting in which the characters are always either on their way in, or on their way out of the house. This adds a hurried dynamic to each scene. Hal, especially, as the outsider to the family, is forced to linger on the porch in the hopes of establishing a rapport first with his mentor Robert and later, with his love interest, Catherine. This gives each scene with Hal a slightly desperate edge. Hal desires access to Robert's genius and to Catherine's company, but must struggle to remain in each scene like a salesman trying to get his foot in the door.

The single set-piece is a definite plus from a production standpoint, too. The cost to produce a single, static setting is minimal compared to many other popular productions which involve revolving stages and multiple set-pieces. Given the minimal budgetary requirements to stage the setting of the play, *Proof* lends itself easily to being produced

by high school and college drama departments across the nation. As a Pulitzer Prize winning play with such a simple setting, it has already been produced by many such drama departments and promises to become a staple production in schools across America.

Language and Meaning

Proof author David Auburn cites the illustrious playwright, David Mamet, as one of his influences. Proof is indeed replete with Mamet-like dialogue. Auburn shares some of David Mamet's gift for making his dialogue sound natural, not scripted. Just as in Mamet's work, Auburn's characters frequently interrupt each other. They don't explain what they mean. Their thought process is not spelled out to the audience; rather, the audience must read between the lines to guess at the characters' motives. A prime example is in Act 1 Scene 1, when Hal is explaining to Catherine what a great man her father was. His praise becomes overly effusive and when he says, "if I came up with one-tenth of the shit your dad produced, I could write my own ticket to any math department in the country," (pg. 17) Catherine responds by demanding to see his backpack. A lesser author might have written dialogue in which she explains her sudden suspicion that Hal has come to steal her father's work. David Auburn, in the tradition of David Mamet, reveals her suspicion through her verbal demand to search Hal's backpack, instead of hitting the audience over the head with a detailed explanation of her feelings.

Another important aspect of the language in *Proof* is the incorporation of mathematical lingo which gives the play the feel of an insider's look into the world of mathematicians. Auburn references historical figures like Gauss and Germain who are well-known within their field, but not famous in the eyes of the general public. Auburn's research into the field of mathematics has provided him with an insight into this world that he shares with the audience in the form of insider references and jokes such as Hal's band's song, "Imaginary Number."

Structure

Proof's structure is integral to the storyline. David Auburn has created a linear plot which spans a week in the life of its characters, but his judicious use of flashbacks in the second act allows him to maintain suspense as the climax unfolds. In addition, Auburn uses parallel scenarios throughout the entire play to draw allusions between Catherine and her father. These parallel scenarios highlight both the similarities and the differences between Catherine and Robert and since the central question asked in *Proof* is whether Catherine has inherited Robert's mental illness, these parallel scenarios ultimately help the audience determine where their similarities begin and end. For example, Robert, in his madness, refuses to don the coat Catherine offers him one freezing wintry day. Yet later in the play, Claire offers Catherine a coat, treating Catherine as if she is mentally fragile, but Catherine, unlike her father, accepts the coat.

This is a symbolic and important indicator of the differences between Catherine and Robert and ultimately supports the position that Catherine is indeed sane.

Proof is written in a basic two-act structure. The first act is comprised of four separate scenes, all chronologically linear and devoted to plot and character development. The first scene introduces the main character, Catherine, as well as the characters of Robert and Hal. The second scene continues the introduction and development of the plot as the audience is introduced to Claire, Catherine's controlling sister. In Scene 3, Hal and Catherine become lovers and Catherine's newfound trust in Hal inspires her to reveal her stunning secret at the end of Scene 4, which completes Act 1. The second act contains five scenes, but they are markedly shorter in duration, which speeds up the pace of the second act. The first scene in Act 2 is a flashback, which shows Hal and Catherine's initial meeting. Robert is also in the scene and his lucidity leaves ambiguous the question of whether he was capable of writing the proof to which Catherine, at the end of Act 1, claimed authorship. This flashback also leaves the audience in suspense as they wait for Hal and Claire's reactions to Catherine's claim. Scenes 2 and 3 return to the linear plot and end with another suspenseful turning point as Hal walks off with the proof. The author lets the audience wonder about Hal's intentions throughout Scene 4, which is another flashback, but one which supports Catherine's claim of authorship. Through these carefully placed flashback scenes, David Auburn keeps the audience guessing up until the very end of Act 2 Scene 5, which ends the play on a satisfyingly positive note.

Exposition

The exposition of a play is the introductory material, which creates the tone, introduces the characters, perhaps suggests the theme, and gives the background information necessary in order to understand the play. In this play, the exposition is done with great economy and skill. So much is accomplished in the first eight pages of the script, amounting to less than half of the first scene, in which Robert and Catherine talk to each other. In this short time, the audience learns that there is affection as well as frustration between father and daughter; that Robert is a mathematician and a genius who did his best work while he was in his twenties and who is now mentally ill; that Catherine is depressed, has no friends, and does not like her sister; that she has some mathematical knowledge and can banter with her father about mathematical concepts; that she is worried about inheriting his illness. All this is accomplished within a couple hundred mostly short lines of dialogue.

Theatrical Surprise

The playwright shows that he is a master of the theatrical surprise, a moment when something is revealed that the audience up to that point had not known or guessed. Halfway through the first scene, for example, Robert says that the only reason he can admit that he is crazy is because he is also dead. This is a startling moment and also a surprisingly humorous one (the intensity and sadness of the play is offset many times by

humor). Another aspect of this strategy of surprise is the fact that in a number of scenes, a new piece of information is produced near the end to give a twist to the interactions of the characters. This occurs for example at the end of the first scene, when Hal reveals the real reason he tried to sneak out with the notebook. It also occurs in act 1, scene 3, when Hal reveals that he and Catherine have met before. The most stunning use of this technique occurs at the end of act 1, when Catherine claims that she is the author of the proof.

Historical Context

Sophie Germain

Sophie Germain, the French mathematician so admired by Catherine in *Proof*, was born into a middle-class family in Paris in 1776. She first became interested in mathematics when she was thirteen. Confined to her home because the French Revolution had broken out, she taught herself mathematics in her father's library. Her family tried to discourage her, considering that mathematics was not an appropriate field of study for a girl. But Sophie persisted. She obtained lecture notes from the École Polytechnique, an academy founded in 1794 that trained mathematicians and scientists but refused to enroll women. Becoming interested in the work of J. L. Lagrange, she submitted a paper to him under the pseudonym Antoine-August Le Blanc, a man who was a former student at the academy. Lagrange was impressed by the paper and wanted to meet the author. Overcoming his surprise at discovering a young female mathematician, he agreed to become her mentor. This gave Germain entry into the circle of mathematicians and scientists that had up to then been closed to her.

In 1804, Germain began corresponding with the German mathematician, Carl Friedrich Gauss (as Catherine tells Hal in *Proof*), one of the most brilliant mathematicians of all time. Germain shared with him her work in number theory. It was three years before Gauss discovered that the bright young correspondent whom he had been mentoring was a woman. A dozen years later, Germain wrote to the mathematician Legendre, presenting the work in number theory that was to become her greatest contribution to mathematics. In 1816, Germain was awarded a prize by the French Academy of Sciences for her work in explaining mathematically the vibration of elastic surfaces. That Germain continued work in this area was another of her lasting contributions to mathematical theory. Germain died in 1831, before she could accept an honorary degree from the University of Göttingen that Gauss had convinced the university to award. Germain's contribution to mathematics was all the more remarkable because, like Catherine in *Proof*, she lacked formal academic training.

Trends on Broadway

When *Proof* was first produced in 2000, it was the latest in a number of plays that took their inspiration from intellectual disciplines such as mathematics and physics. The aim of the playwrights seemed to be to give the audience some substantial food for thought as well as an evening's entertainment. The fashion began with British playwright Tom Stoppard. Stoppard's *Hapgood* (1988; revised 1994) used the intricacies and paradoxes of quantum physics as metaphors for the world of espionage during the cold war. In 1994, Stoppard wrote *Arcadia*, another play in which the audience found themselves immersed in quantum physics, as well as chaos theory. Like *Proof*, *Arcadia* features a young woman with an extraordinary grasp of mathematical theory. Also like *Proof*, it alludes to a nineteenth-century woman who made an impact on mathematical theory.

This was not Sophie Germain but Ada Byron, Lady Lovelace, the daughter of the poet Lord Byron, who worked with mathematician Charles Babbage in developing the theory of a new calculating machine. The mathematical plan she wrote is now considered to be the first computer program.

Other plays which drew on quantum physics included Michael Frayn's *Copenhagen* (2000), a sophisticated investigation of a meeting between physicists Werner Heisenberg and Niels Bohr in 1941, and *Hypatia* by Mac Wellman, which was based on the life and death of Hypatia, a fifth-century mathematician and philosopher. According to Bruce Weber, whose *New York Times* article, "Science Finding a Home Onstage," is about the contemporary fashion of writing plays with scientific content:

This flowering use of science as narrative material and scientific concepts as metaphors for the stage . . . provides evidence that science is re-entering the realm of popular culture, not just in imaginative, futuristic fiction but also in other mainstream and alternative forms: from historical reconstruction and theoretical abstraction to fluffy romance and contemporary realism.

Critical Overview

As might be expected of a Pulitzer prize-winning play, *Proof* was received enthusiastically by audiences and most reviewers. The stunning revelation at the end of act 1, when Catherine announces that it was she, not her father, who wrote the proof, was regularly greeted with gasps by the audience. Bruce Weber, in the *New York Times*, called *Proof* "an exhilarating and assured new play . . . that turns the esoteric world of higher mathematics literally into a back porch drama, one that is as accessible and compelling as a detective story." Weber admired the pacing of the play, and further noted that it "presents mathematicians as both blessed and bedeviled by the gift for abstraction that ties them achingly to one another and separates them, also achingly, from concrete-minded folks like you and me." Weber also appreciated the spirit of the play in which there was no meanness; the characters struggling to deal with the devastating effects of mental illness were all "good people."

Weber reported again on the play over a year later, noting in the *New York Times* that it was still playing to sold-out houses at the Walter Kerr Theatre. A change of cast had not diminished its appeal, but rather shown that the characters and their relationships could be given "new and distinct emotional shadings."

In *Variety*, Robert Hoffler wrote of the play's "rich, aching melancholia" and praised its ambitious structure and its sense of humor: "The mercurial nature of the mathematician's art is refracted everywhere, usually in ways that offer a humorous counterpoint to somber loss." In *Library Journal*, Robert W. Melton was equally enthusiastic, describing *Proof* as a "wonderful" play: "[its] deft dialog, its careful structure, and the humanity of the central characters are themselves proof of a major new talent in the American theater."

One dissenting voice was that of Robert Brustein, in *The New Republic*, who complained that although the playwright had a competent grasp of his material, the plot was too thin. The author "runs out of material so quickly that, by the middle of the second act, the play jerks to a halt and starts running in place."

Criticism

- Critical Essay #1
- Critical Essay #2
- Critical Essay #3

Critical Essay #1

Aubrey holds a Ph.D. in English and has published many articles on modern drama. In this essay, Aubrey discusses the parallels between the mathematicians Robert, Catherine, and Hal and the lives and creativity of real life mathematicians, especially John Forbes Nash Jr.

In researching *Proof*, Auburn consulted with a number of mathematicians and also read the biographies of prominent mathematicians, aspects of whose lives find their way into the play. When Hal tells Catherine that some of the older mathematicians he encounters at conferences are addicted to amphetamines, which they take to make their minds feel sharp, he is amplifying the well-known story of mathematician Paul Erdös who began taking amphetamines so he could keep up the fast pace of his mathematical work. When friends persuaded him to stop taking the amphetimines for a month, Erdös complained that he had not been able to do any creative work during that time and promptly resumed taking the drugs.

Andrew Wiles is another mathematician whose story finds an echo in *Proof*. Wiles, a professor of mathematics at Princeton University, worked for many years to prove Fermat's Last Theorem when the conventional wisdom was that such a proof was impossible. In 1993, Wiles announced at a conference that he had proved the theorem. It transpired that he had been working on it in solitude, in an office in his attic, for seven years, telling no one of what he was doing. This surely inspired the picture presented in *Proof* of Catherine, who also works in solitude and in secret, and then suddenly, out of the blue, unveils a ground-breaking mathematical proof.

But the mathematician whose life story is most closely linked to *Proof* is John Forbes Nash, Jr, who is the subject of *A Beautiful Mind* (1998), a biography by Sylvia Nasar which was made into a popular movie in 2001. Nash was a mathematical genius. In 1949, when he was twenty-one years old and a graduate student at Princeton University, he wrote a slim, twenty-seven-page doctoral thesis on game theory (a theory of how people behave when they expect their actions to influence the behavior of others) that revolutionized the field of economics. Nash became a professor at the Massachusetts Institute of Technology (MIT) when he was only twenty-three and quickly went on to solve a series of mathematical problems that other mathematicians had deemed impossible. He seemed destined to become one of the greatest mathematicians in the history of the discipline. Then, in 1959, when Nash was thirty years old, his behavior, which had always been eccentric, became bizarre and irrational. He heard strange voices and became obsessed with the idea of world government. He accused a colleague of entering his office to steal his ideas. He turned down the offer of a chair at the University of Chicago with the explanation that he was going to become Emperor of Antarctica. Nash was admitted to McLean Hospital in Belmont, Massachusetts, where he was diagnosed as a paranoid schizophrenic.

Schizophrenia is a severe mental disorder that distorts thinking and perception. It leads to a loss of contact with reality and bizarre, sometimes anti-social behavior as the

sufferer withdraws into his own inner world. Schizophrenia is difficult to treat and there is no cure. Nash spent the next thirty years afflicted with the disease, which would occasionally go into temporary partial remission before returning. His career was destroyed although he made a surprise recovery during the 1990s. He resumed living a normal life and studying mathematics and was awarded the Nobel Prize in 1994.

The parallels between the real life of Nash and the fictional life of Robert in *Proof* are many, and they prompt questions of whether genius and insanity are linked and whether both are inherited. Robert is clearly a Nash-like figure. Hal reminds Catherine in act 1, scene 1 that when Robert was in his early twenties he had made major contributions to three fields: game theory, algebraic geometry, and nonlinear operator theory. These are exactly the same fields, according to Nasar, in which the young Nash made his impact. Nasar also points out that in the early days of his illness, Nash seemed to have a heightened awareness of life:

He began to believe that a great many things he saw□a telephone number, a red necktie, a dog trotting along the sidewalk, a Hebrew letter, a sentence in the *New York Times*□had a hidden significance, apparent only to him. . . . He believed he was on the brink of cosmic insights.

This is echoed by Robert, as he recalls his mental state soon after he became ill. He tells Catherine about the clarity with which he saw things, and he believed that his mind was even sharper than before:

If I wanted to look for information□secrets, complex and tantalizing messages□I could find them all around me. In the air. In a pile of fallen leaves some neighbor raked together. In box scores in the paper, written in the steam coming up off a cup of coffee. The whole world was talking to me.

Although the play does not mention the exact nature of Robert's illness, the hallucinations and delusions he suffered from make it clear that he, like the real-life Nash, was schizophrenic. Robert was no doubt mistaken when he claimed that his mind had become sharper, because during his illness his mental processes no longer bore any relation to reality. As with Nash, the insights he thought he had contained meanings known only to him and were useless for objectively verifiable mathematical knowledge. Just as Nash believed that powers from outer space, or foreign governments, were communicating with him through cryptic messages in the *New York Times* that only he could decode, so too Robert used to borrow large numbers of books from libraries because he thought that aliens were sending him messages through the Dewey decimal numbers on the books, and he was trying to work out the code.

Was Nash's insanity, or that of Robert in *Proof*, somehow related to their genius? The idea that creativity and madness are linked is an old one. Plato wrote in his dialog Ion that the poet was inspired with a kind of divine mania, and cultural history turns up many examples of exceptionally creative people who have been afflicted with mental illness of one kind or another, including the philosopher Friedrich Nietzsche, the artist Vincent van Gogh, and the writer Virginia Woolf. In more modern times, American poets Sylvia Plath

and Robert Lowell suffered from mental illness. (In 1959, Lowell was a patient at McLean Hospital in Belmont when Nash was admitted.)

The most common type of mental illness amongst creative artists is manic-depression, also known as bipolar disorder. This is not the same as schizophrenia. Although manic-depression can produce delusions, it is mainly characterized by extreme mood swings, ranging from great elation to deep depression. Research suggests that creative artists, poets in particular, are two to three times more likely to suffer from manic-depression than scientists. For the poet or writer, it is possible that manic-depression can enhance creativity, since the mood swings may offer more acute insight into the peaks and troughs of human experience, which in turn can lend the artist's work a profundity that might escape those who live on a more even emotional keel. Creative people who suffer from manic depression are often able to function quite normally between episodes, which is usually not the case with schizophrenia.

It would seem that schizophrenia, far from being somehow linked with creativity, is in fact inimical to it, since the feeling of heightened awareness it may produce translates only into delusional perceptions, not deeper insights into truth. Although there does seem to be a certain unusual quality to the minds and personalities of many great scientists and philosophers, madness does not describe it. Nasar points out many examples of men of genius, including Immanuel Kant, Ludwig Wittenstein, Isaac Newton, and Albert Einstein, who had emotionally detached, eccentric, solitary, inward-looking personalities that may have been useful in promoting the kind of creativity that these disciplines require. Such people□Nash was one of them before his illness□are able to think not only more profoundly but also in different ways than less gifted individuals. Nash was used to solving problems in ways that had not occurred to others. He developed this habit of thinking "out of the box" at an early age. His sister reported that Nash's mother was once told that her son, then in elementary school, was having trouble with math, because he could see ways of solving mathematical problems that were different from the methods the teachers were used to.

When Nash was a mature mathematician, his mind not only worked faster than anyone else's, he continued to approach mathematical problems in unusual ways that would unlock new possibilities that astonished his colleagues. Nasar reports that Donald Newman, a mathematician who knew Nash at MIT in the 1950s, said of him that "everyone else would climb a peak by looking for a path somewhere on the mountain. Nash would climb another mountain altogether and from that distant peak would shine a searchlight back onto the first peak." Sometimes when Nash presented his unexpected results to professional audiences, there would be some who said they could not possibly believe them, so novel was Nash's approach to the problem.

Auburn clearly incorporated this dimension of Nash's mind into the character of Robert in *Proof*. When Hal says to Catherine that hard work was not the secret of Robert's success, she contradicts him but immediately explains that the work went on almost unseen, and Robert's success resulted from his taking an unusual starting point:

He'd attack a question from the side, from some weird angle, sneak up on it, grind away at it. He was slogging. He was just so much faster than anyone else that from the outside it looked magical.

Hal's immediate response, about the beauty and the elegance of Robert's work, also corresponds to what mathematicians said about Nash's work. It is quite common for mathematics to be described in this way, as if it somehow partakes in the essential beauty and order of the universe. The French mathematician Henri Poincaré wrote about the aesthetic feeling known by all mathematicians when they recognized these qualities revealed in their work, describing it as "the feeling of mathematical beauty, of the harmony of numbers and forms, of geometric elegance."

A final aspect of Nash's life finds its way into *Proof* in Catherine's worries that she may inherit her father's illness, even though the depression she suffers from is not related to the symptoms of schizophrenia. Catherine is right to be concerned, since expert opinion considers that although the cause of schizophrenia is unknown, there is a genetic factor in the disease. It can be inherited and, indeed, Nash's own son, John Charles Nash, was diagnosed, like his father, as a paranoid schizophrenic. Like his father also, John Charles Nash was a mathematician, brilliant but without his father's spark of genius. Unlike schizophrenia, genius is not transmitted through genes, and there are numerous examples of geniuses whose offspring have been distinguished only by their mediocrity. So for Catherine in *Proof* to inherit both Robert's genius *and* his mental illness would be a very unlikely event in real life, although of course, as *Proof* shows, it can be turned into excellent drama. Nash himself discovered this when at the age of seventy-three his biographer, Nasar, took him to see a performance of the play. An article in the *Los Angeles Times* by John Clark contains Nasar's description of how Nash reacted:

'He loved it,' says Nasar, who admits she was a little nervous about his response. 'It was so much fun to see him laugh and react to *Proof* because [the father] is clearly inspired by Nash's story, and to witness John Nash seeing this on the stage in front him□it was adorable.'

Source: Bryan Aubrey, Critical Essay on *Proof*, in *Drama for Students*, Thomson Gale, 2005.

Critical Essay #2

Guyette, a longtime journalist, received a bachelor's degree in English writing from the University of Pittsburgh. In this essay, Guyette discusses how Auburn highlights the uncertain nature of human existence by contrasting it with the certainty found in mathematics.

In his Puliter Prize—winning play *Proof*, Auburn brings into high relief the uncertain nature of life by contrasting it with the world of mathematics, where the truth or falsity of an idea can be proved with absolute certainty. In the world of numbers, two plus two always equals four; there is no doubt involved. But in matters of flesh and blood, especially in the way people relate to the world around them, there is no formula for absolute knowledge.

The tenuous nature of reality as perceived through human eyes is vividly depicted in the play's very first scene. Catherine, the troubled daughter of Robert, a brilliant mathematician of world renown, is having a revealing conversation with her father early in the morning of her twenty-fifth birthday. During the conversation, it is revealed that Robert suffers from mental illness. By its very nature, mental illness radically distorts a person's perceptions of the world. It is also the nature of such an illness that the person afflicted with it is deluded into thinking that his perceptions are completely grounded in reality. As Robert tells Catherine, "Crazy people don't sit around wondering if they're nuts." As their conversation continues, he reinforces the point by saying, "Take it from me. A very good sign that you're crazy is an inability to ask the question, 'Am I crazy?'"

Robert is, in fact, an expert on the subject. After displaying mathematical genius in his early twenties, his career had been cut short by a debilitating mental illness. This is a man who, after rocking the math world with his proofs, began attempting to decipher the Dewey decimal codes of library books because he was convinced that they held hidden secret messages. Consequently, Catherine is wary of accepting the insights of a certified crazy person. It is not until midway through this first scene that the audience discovers that Richard is actually dead and that the action playing out in front of them is only a figment of Catherine's imagination, calling into question her sanity. As a result, from the outset, the audience itself is forced to ask the question: What is true and what is not□and how do you prove the conclusions arrived at?

This theme is carried throughout the play as Auburn compels the audience to keep wondering what the truth is. There is a particularly poignant scene near the end of act 2 when Robert makes another appearance, this time in a flashback. After suffering through years of mental illness, he has experienced months of clarity. His recovery has been so significant that Catherine, who had given up pursuit of her own career in mathematics in order to care for him, was able to return to school. She pays a visit to her dad and finds him sitting outside in the freezing cold, working. He tells her that his "machinery," meaning his brain, is once again firing on all cylinders. He is exhilarated to the point of being overheated and has gone out into the December day in order to cool off. Trying to describe for his incredulous daughter the incredible feeling that he is

experiencing, Robert tells her that it is not as if a light has suddenly turned on in his mind, but rather the whole "power grid" that has been activated after years of dormancy. "I'm back!' he tells her. "I'm back in touch with the source□the font, the□whatever the source of my creativity was all those years ago. I'm in contact with it again." She reads what he has been scribbling in his notebook and in an instant it becomes painfully clear that what has returned is not the spark of genius but insanity.

The play's most significant questions are raised about Catherine, who is the main focus of uncertainty. Has she inherited her father's genius? Does she suffer from the same mental illness that afflicted him? Have both the incandescent brilliance and the dark demons been passed from father to daughter? Again, unlike the world of mathematics, the answers to those questions are anything but clear-cut. It is part of Auburn's genius that he constructed a play guaranteed to hold the audience's interest by inserting the compelling elements of a mystery into what is, at its heart, the story of complex human relations. In an interview with Mel Gussow of the *New York Times*, Auburn notes that the genesis of this play can be traced to two ideas. One involved writing about two sisters "quarreling over the legacy of something left behind by their father." The other had to do with someone whose parent suffered from mental illness and began to wonder whether she, too, might be starting to succumb to madness. To pull the audience along, Auburn tells Gussow that he wanted to use what Alfred Hitchcock referred to as a "Maguffin," or plot device involving an object of mysterious origin. In this case, Auburn chose to insert the discovery of a mathematical proof into the story. That proof, whose existence is revealed at the end of act 1, provokes two essential questions: Is it indeed a brilliant breakthrough and, if so, who produced it□Robert or, as she herself claims, Catherine?

The character asking those questions is Hal, a former student of Robert's who has gone on to become a mathematics professor. He also has had a romantic eye on Catherine for many years. The question of the proof's validity is relatively easy to solve. Writing about this play in *The Chronicle of Higher Education*, David Rockmore explains that this is fundamental to the concept of a proof. "Assuming that a person knows the language and has the background," writes Rockmore, "anyone could, in theory, check all of the steps and decide on the correctness of a proof, and any two persons would make the same judgment." Determining whether Catherine is the source of this brilliant piece of work, or is instead merely suffering from the same sort of insane delusions that afflicted her father, is a much more difficult task. As Rockmore, a professor of mathematics at Dartmouth College, observes, "In statements about life, proofs of similarly absolute certainty are difficult, if not impossible, to derive."

Consequently, Auburn does not wrap his play up into a neat and tidy package. In that sense, it mirrors life. As the play approaches the final curtain, Hal comes to believe that it was indeed Catherine who produced the proof. It is Catherine herself who keeps the mystery alive, telling Hal:

You think you've figured something out? You run over here so pleased with yourself because you changed your mind. Now you're certain. You're so . . . *sloppy*. You don't know anything. The book, the math, the dates, the writing, all that stuff you decided with your buddies, it's just evidence. It doesn't finish the job. It doesn't prove anything.

That is the way life is. Very few things are completely provable beyond a shadow of doubt. But absent proof, there is always possibility. And so, it is entirely appropriate that this play ends on an optimistic note. There is the promise that Catherine is indeed every bit as brilliant a mathematician as her father. There is also the very real possibility that she will not be overtaken by madness and will instead be able to keep a firm grasp on reality. As the curtain falls with her and Hal sitting side by side, there is no proof positive that the two will find happiness and build a life together. There is, however, hope.

Source: Curt Guyette, Critical Essay on *Proof*, in *Drama for Students*, Thomson Gale, 2005.

Critical Essay #3

Covintree is a graduate student and writing instructor in the Writing, Literature, and Publishing department at Emerson College. In this essay, Covintree discusses the way the play's setting works to emphasize the main character's internal struggle with movement and change.

Unlike movies, television, and books, plays carry a sense of immediacy. What you see, while watching a play, happens as the audience watches. Neither the characters nor the actions are entirely fixed and every night a production can vary slightly. Casting changes will create character changes. Location and set affect the performance. This is the function of live theater, and people return to well-known plays to see the differences and variety of interpretation. What remains constant is the text. No matter where a play is being read or performed, it will always have the same number of characters engaging in the same situations in a specified order. The author's words and stage directions are the map that must be followed.

The map for Auburn's *Proof* is not complicated in terms of production. All that is needed is four actors (the ideal of two male and two female) and one back porch. The simplicity of staging does not make this play easy. The drama follows the characters' responses to grief, family legacy, madness, and mathematics. Each has his or her own motives, many of which still remain unclear to the audience even by the end of the play.

Auburn creates relationships between the characters that cause them to interact as if dancing between sanity/madness, intelligence/stupidity, trust/mistrust, and responsibility/freedom. As the play's main character, Catherine, struggles with the death of her father, she also struggles with a haunting possibility. If she has inherited the mathematical genius that made him famous, she could also have inherited the madness that destroyed his life. Auburn creates an either/or environment where characters try to make logic work in their world. He also shows the audience that making logic work is not that simple, and mathematics cannot solve every problem.

The play takes place on one simple stage set: "the back porch of a house in Chicago." This is the back porch of Catherine's childhood home, the home where she has cared for her father for at least the past four years. His mental instability has gotten progressively worse as he has gotten older, and Catherine is the primary caregiver. Auburn could just have easily placed this drama in the kitchen, the living room, her father's study, or her bedroom. Much of the action of the play would still translate to those locations. He also could have made it necessary for more rooms to be integral settings, but he does not. Instead, he places the real action of the play just outside the house. As David Barbour notes in his review, "Proof Positive" in *Entertainment Design*, "the audience [is] left on the outside, peering in, looking for clues to the lives lived there." Though the puzzle of this family is not fully solved by the end of the play, it becomes apparent that this setting not only keeps others out but also provides Catherine some distance from what is inside the home.

The house is what belongs to Catherine's father, Robert. It is where he lived with his wife, raised his daughters, met with students, fell into madness, and where he died. In the Broadway production, set designer John Lee Beatty made sure, according to Barbour's article in *Entertainment Design*, that "the kitchen and back hall of Robert's house were visible through the windows." In this way, some of the past is visible to the audience. In a review of the play found in the *Theater Journal*, the author, John Evan Foster, reinforces the intent behind Auburn's choice of location as he writes, "[the] understated set evoked at once familial comfort (a porch strewn with lawn chairs . . .) and its vulnerability to the depredations of time and illness (. . . gutters choked with leaves)." If this is what can be seen from the outside of the house, it can only be imagined the kind of chaos that remains inside.

Inside the house are the memories of Robert's gradual deterioration, the volumes of notebooks, the house in disarray. While Robert's former graduate student, Hal, pours over Robert's 103 notebooks for hours, Catherine waits, not in another part of the house, but outside. Inside the house, there is responsibility, obligations, order, and confinement. She has no interest in what remains there. Catherine's immersion in this house has put her in a kind of prison; she cannot move out of her father's grasp.

Throughout the play, Auburn shows how, before his death, Catherine is drawn back into the house and into his illness. She is bound to him, and Auburn makes this relationship clear. Catherine has his skill with mathematics, and she also has depressive episodes. When Catherine tries to leave the confines of the home and change her environment by moving an hour away to attend Northwestern, she is pulled back. Her own pursuits and identity are interwoven with her relationship to her father. Just before it is discovered that he has relapsed, Robert tells Catherine, "Your creative years are just beginning. . . . part of the reason we have children [is that] we hope they'll survive us, accomplish what we can't. . . . Work with me." Even in the ideal picture of Robert's sanity, he still wants to maintain a close and binding relationship with Catherine.

Of course, Robert is not sane, and like her mathematics hero, Sophie Germain, Catherine too is "trapped in her house." While describing Germain's history, it is almost as though Catherine is talking about herself: "she had to stay inside for safety and she passed the time reading in her father's study." The audience can imagine that this is what Catherine is driven to do as well.

If the house is a place of confinement, then the porch is a slight means of escape. The location of the play is a type of safe haven for Catherine. The back porch is the farthest Catherine can get from her father's influence without abandoning him. She seems most comfortable outside. The porch is a place where she can look to herself. Though her own identity is something she is struggling with, this location removes some of the constriction of her father's demands and expectations.

While Auburn does not omit action from taking place behind the house walls, he rarely shows Catherine involved in that action. Instead, Auburn continuously places her on the literal outside, as all the action the audience sees is what happens on the back porch. While stage directions create a "house party in progress" inside the house at the

beginning of act 1, scene 3, "Catherine is alone on the porch." She remains socially distant and outside. When Hal invites her to "Come on in," she responds, "I'm okay." For Catherine, being outside allows her to remove herself from some of the history of her life. This being outside allows her to focus on what is in front of her.

Since Catherine has sacrificed much of her life thus far to care for her father, her future is blank. There is practically nothing ahead of her. At 25, Catherine has not finished college, has no friends, and is being evicted by her sister. What is in front of her, however, is the possibility that she has inherited her father's illness. Having already spent "thirty three and a quarter days" in bed, she is reminded by the ghost of her father that she will "never know what else [she] threw away with them." Like the porch that is both outside in the world and still connected to the house, Catherine is in a type of middle ground, unsure if she wants to remain insular or explore her potential.

Ironically, it is the move outside, to New York, that carries more possibility for keeping Catherine mentally closed. Catherine admits to Hal at the end of the play that she is "afraid [she's] like [her] dad." In one respect, it could mean she is going crazy. Her sister, Claire, seems to hold this fear as well. She has scouted apartments and has looked into doctors for "her bughouse little sister." By bringing Catherine to New York, Claire will be able to care for her sister, and Catherine will still live without using her real potential, which is in mathematics. Claire believes New York could give her sister a fresh start, with resources available. Catherine views the move to New York her sister is trying to maneuver as one that keeps her in isolation.

When Catherine and Hal begin a romance, she reveals the other side of Robert that she has inherited, his skill with mathematics. In a discussion about Germain Primes, Catherine displays her own interest and passion for a subject in which she has no official training. With this burgeoning romance comes a confidence in Catherine that allows her to defend her own knowledge. This is Catherine's best and smartest self, the one that has not been able to come out so long as obligations to her father have been there.

In showing Hal this side of her, Catherine makes herself more vulnerable. When Hal does not believe that the proof could be hers, Catherine returns to her pattern of depression. Claire tells Hal, "She won't eat. She won't talk to me." She remains inside the house for the rest of the week. When Catherine becomes depressed, she returns to the inside and what is dark and hidden. But Auburn shows Catherine at her best and brightest when back on the porch. There she can stand up to her sister; she can consider all angles to her problems.

It is on the back porch that Catherine comes to decisions about her life. Catherine will not arrive at decisions in an elegant manner, like her father. Instead, she will be "connecting the dots." By staging the entire drama on the back porch, Auburn gives Catherine a means to explore and a means to escape. With the ghost of the house and her father behind her, Catherine can look ahead.

Source: Kate Covintree, Critical Essay on *Proof*, in *Drama for Students*, Thomson Gale, 2005.

Quotes

" ROBERT: Kid, I've seen you. You sleep till noon, you eat junk, you don't work, the dishes pile up in the sink. If you go out, it's to buy magazines. You come back with a stack of magazines this high-I don't know how you read that crap. And those are the good days. Some days you don't get up, you don't get out of bed.

CATHERINE: Those are the good days.

ROBERT: Bullshit. Those days are lost. You threw them away. And you'll never know what else you threw away with them-the work you lost, the ideas you didn't have, discoveries you never made because you were moping in your bed at four in the afternoon." Act 1 Scene 1, pg. 8

" HAL: If there was anything up there it would be pretty high-order. It would take a professional to recognize it.

CATHERINE: I think I could recognize it.

HAL: (*Patient*) Cathy...

CATHERINE: *What?*

HAL: I know your dad taught you some basic stuff, but come on." Act 1 Scene 1, pg. 20

" CATHERINE: *Okay?* I really don't need this, Claire. I'm fine, you know, I'm totally fine and then you swoop in here with these questions and 'Are you okay?' and your soothing tone of voice and 'Oh, the poor policemen'-I think the police can handle themselves!-and bagels and bananas and jojoba and 'Come to New York' and vegetarian *chili*. I mean it really pisses me off so just *save* it." Act 1 Scene 2, pg. 32

" HAL: They think math's a young man's game. Speed keeps them racing, makes them feel sharp. There's this fear that your creativity peaks around twenty-three and it's all down-hill from there. Once you hit fifty it's over, you might as well teach high school." Act 1 Scene 3, pg. 34

" CATHERINE: Yeah. Later a mutual friend told him the brilliant young man was a woman.

He wrote to her: 'A taste for the mysteries of numbers is excessively rare, but when a person of the sex which, according to our customs and prejudices, must encounter infinitely more difficulties than men to familiarize herself with these thorny researches, succeeds nevertheless in penetrating the most obscure parts of them, then without a doubt she must have the noblest courage, quite extraordinary talents and superior genius.'" Act 1 Scene 3, pg. 36

" HAL: Let her sleep. She was doing some pretty serious drinking with the theoretical physicists last night." Act 1 Scene 4, pg. 39

" CATHERINE: What about Dad? Someone had to take care of him.

CLAIRE: He was ill. He should have been in a full-time professional-care situation.

CATHERINE: He didn't belong in the nuthouse.

CLAIRE: He might have been better off.

CATHERINE: How can you say that?

CLAIRE: This is where I'm meant to feel guilty, right?

CATHERINE: Sure, go for it." Act 1 Scene 4, pg. 44

" HAL: I'll come to your office.

ROBERT: Stop. Sit down. Glad you're here. Don't let the dinner thing throw you, you'll bounce back. *(To* CATHERINE*)* This should be easier. Let's back off the problem, let it breathe, come at it again when it's not looking." Act 2 Scene 1, pg. 54

" HAL: He was the *best*. My generation hasn't produced anything like him. He revolutionized the field twice before he was twenty-two. I'm sorry, Catherine, but you took some classes at Northwestern for a few months.

CATHERINE: My education wasn't at Northwestern. It was living in this house for twenty-five years." Act 2 Scene 2, pg. 64

" HAL: I'm sorry, that's none of your business.

CLAIRE: Bullshit. I have to take care of her. It's a little bit harder with you jerking her around.

HAL: I wasn't jerking her around. It just happened.

CLAIRE: Your timing was not great.

HAL: It wasn't *my* timing, it was *both* of our-

CLAIRE: Why'd you do it? You know what she's like. She's fragile and you took advantage of her." Act 2 Scene 3, pg. 66

" ROBERT: ...Well, Jesus, look, enough bullshit. You asked me to see something. Let's start with this. I've roughed something out. General outline for a proof. Major result. Important. It's not finished but you can see where it's going. Let's see. *(He selects a notebook.)* Here. *(He gives it to CATHERINE. She opens it and reads.)* It's very rough.

(After a long moment CATHERINE *closes the notebook. A beat. She sits down next to* ROBERT*.)*

CATHERINE: Dad. Let's go inside." Act 2 Scene 4, pp. 72-73

" CLAIRE: Are you cold?

CATHERINE: Not really, I just-

CLAIRE: It has gotten chilly. I'm sorry. Do you want to go in?

CATHERINE: I'm okay.

CLAIRE: I just thought it might be nice to have a quick cup of coffee out here.

CATHERINE: No, it is.

CLAIRE: Plus the kitchen's all put away. If you're cold-

CATHERINE: I'm not. Not really.

CLAIRE: Want your jacket?" Act 2 Scene 5, pg. 75

Adaptations

Proof was adapted to film and was set to release in the United States some time in 2005. The screenplay is written by David Auburn and Rebecca Miller. Directed by John Madden, the film stars Anthony Hopkins as Robert, Hope Davis as Claire, Jake Gyllenhaal as Hal, and Gwyneth Paltrow as Catherine. Paltrow reprises her role as Catherine, which she played on stage in London's West End.

Topics for Further Study

Women have made valuable contributions to mathematics in the nineteenth and twentieth centuries. Research the work of two female mathematicians and briefly describe their achievements.

What do you think Catherine means when she refers in the play to "proofs like music?" What might mathematics and music, which on the surface seem so different, have in common?

What signs does Catherine show that she is suffering from depression? What is depression? How is it recognized? What are the causes of it? How is it treated?

In the script, the playwright uses the word "beat" as a cue for the actors. "Beat" means a pause in the dialogue, a moment of silence. It can indicate a moment of confusion or awkwardness or a change of mood in the characters. Examine act 1, scene 1, after Hal enters. From there to the end of the scene there are eleven beats during Hal's conversation with Catherine. Imagine you are playing Hal or Catherine. What is each character feeling during each beat? Describe what the actors would need to convey at each beat.

What Do I Read Next?

Auburn's *Fifth Planet and Other Plays* (2001) contains several one-act plays that Auburn wrote before *Proof*. The plays are *Fifth Planet*, *Are You Ready*, *Damage Control*, *Miss You*, *Three Monologues*, *What Do You Believe in the Future*, and *We Had a Very Good Time*.

Wit (1999) is a Pulitzer Prize—winning play by Margaret Edson. The protagonist is a female scholar of English literature who specializes in the work of the seventeenth-century poet, John Donne. She is now dying of cancer and uses the experience to explore mortality, the value of human relationships, and how life should be lived.

Copenhagen (2000) is a Tony Award—winning play by Michael Frayn about Werner Heisenberg (a physicist who was head of the Nazi's attempts to develop a nuclear bomb), Danish physicist Niels Bohr, and his wife Margrethe. Bohr and Heisenberg met in Copenhagen in 1941, and what they discussed has been a matter of dispute ever since. By adapting to the theater principles drawn from quantum physics, Frayn cleverly shows it is impossible to reach an objective understanding of what the two men discussed that day.

The Mind-Body Problem (1993), by Rebecca Goldstein, is a coming-of-age novel set in Princeton's mathematics community, about a young Jewish woman who marries a world-renowned mathematician.

Strange Brains and Genius: The Secret Lives of Eccentric Scientists and Madmen (1998), by Clifford A. Pickover, examines the connection between genius and madness in a highly eclectic way. Pickover profiles many eccentric scientists, from Nikola Tesla to the Unabomber, Ted Kaczynski (who was a mathematician), as well as some writers and artists.

Topics for Discussion

Does the playwright fully resolve the question of the proof's authorship? Explain the arguments for and against Catherine's claim while defending your own position.

Both Claire and Hal underestimate Catherine's abilities. Did you notice any qualities in Catherine that might have caused her to be underestimated, or do you think she is a victim of prejudice? Discuss both points of view and summarize with your own conclusion.

Is Claire's behavior toward her sister a reaction to Catherine's behavior, or to Claire's own fear about inheriting mental illness? Explain your position.

The author writes two parallel scenes in which first Robert, then Catherine, sit outside in the cold without jackets. Compare the two scenes and discuss the how they relate to the comparison which the author draws between Robert and his daughter, Catherine.

Describe the *positive* impact Claire's ministrations have on Catherine.

The play ends on a positive, but ambiguous note. In the form of a brief biography, summarize the events which might occur to Catherine after the close of the play. Does she stay in Chicago? Will she and Hal make it as a couple? Will she win a place in the academic limelight as her father did before her?

How might the play have been affected if the author had presented every scene in chronological order? Would it improve or detract from the story? Why?

Further Study

Billington, Michael, Review of *Proof*, in *Guardian*, May 16, 2002.

This review of the British production of *Proof* at London's Donmar Warehouse censures the playwright for not explaining what the crucial mathematical theory is. Billington calls this the weak point of the play.

Feingold, Michael, Review of *Proof*, in *Village Voice*, June 6, 2000.

A review that is generous in its praise. Feingold points out that Auburn has no interest in explaining the finer points of mathematics; it is simply a given that for three of the four characters, mathematics is something they love, and the play is more of a love story than anything else□love of mathematics, love of father and daughter, and the growing love of Hal and Catherine.

Heilpern, John, Review of *Proof*, in *New York Observer*, June 19, 2000, p. 5.

A laudatory review that praises the play's evocation of love between father and daughter, the fragility of life, and the discovery of love. The only flaw Heilpern sees is that the mystery of who wrote the proof is too easily resolved.

Parker, Christian, "A Conversation with David Auburn," in *Dramatist Magazine*, December 10, 2001.

In this interview, Auburn talks about how he became interested in writing plays and how his career developed.

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□□□, Review of *Proof*, in *New York Times*, October 27, 2001.

□□□, "Science Finding a Home Onstage," in *New York Times*, June 2, 2000, p. B1.

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Introduction

Purpose of the Book

The purpose of Drama for Students (DfS) is to provide readers with a guide to understanding, enjoying, and studying novels by giving them easy access to information about the work. Part of Gale's□For Students□ Literature line, DfS is specifically designed to meet the curricular needs of high school and undergraduate college students and their teachers, as well as the interests of general readers and researchers considering specific novels. While each volume contains entries on □classic□ novels

frequently studied in classrooms, there are also entries containing hard-to-find information on contemporary novels, including works by multicultural, international, and women novelists.

The information covered in each entry includes an introduction to the novel and the novel's author; a plot summary, to help readers unravel and understand the events in a novel; descriptions of important characters, including explanation of a given character's role in the novel as well as discussion about that character's relationship to other characters in the novel; analysis of important themes in the novel; and an explanation of important literary techniques and movements as they are demonstrated in the novel.

In addition to this material, which helps the readers analyze the novel itself, students are also provided with important information on the literary and historical background informing each work. This includes a historical context essay, a box comparing the time or place the novel was written to modern Western culture, a critical overview essay, and excerpts from critical essays on the novel. A unique feature of DfS is a specially commissioned critical essay on each novel, targeted toward the student reader.

To further aid the student in studying and enjoying each novel, information on media adaptations is provided, as well as reading suggestions for works of fiction and nonfiction on similar themes and topics. Classroom aids include ideas for research papers and lists of critical sources that provide additional material on the novel.

Selection Criteria

The titles for each volume of DfS were selected by surveying numerous sources on teaching literature and analyzing course curricula for various school districts. Some of the sources surveyed included: literature anthologies; Reading Lists for College-Bound Students: The Books Most Recommended by America's Top Colleges; textbooks on teaching the novel; a College Board survey of novels commonly studied in high schools; a National Council of Teachers of English (NCTE) survey of novels commonly studied in high schools; the NCTE's Teaching Literature in High School: The Novel;and the Young Adult Library Services Association (YALSA) list of best books for young adults of the past twenty-five years. Input was also solicited from our advisory board, as well as educators from various areas. From these discussions, it was determined that each volume should have a mix of □classic□ novels (those works commonly taught in literature classes) and contemporary novels for which information is often hard to find. Because of the interest in expanding the canon of literature, an emphasis was also placed on including works by international, multicultural, and women authors. Our advisory board members□educational professionals□ helped pare down the list for each volume. If a work was not selected for the present volume, it was often noted as a possibility for a future volume. As always, the editor welcomes suggestions for titles to be included in future volumes.

How Each Entry Is Organized

Each entry, or chapter, in DfS focuses on one novel. Each entry heading lists the full name of the novel, the author's name, and the date of the novel's publication. The following elements are contained in each entry:

- Introduction: a brief overview of the novel which provides information about its first appearance, its literary standing, any controversies surrounding the work, and major conflicts or themes within the work.
- Author Biography: this section includes basic facts about the author's life, and focuses on events and times in the author's life that inspired the novel in question.
- Plot Summary: a factual description of the major events in the novel. Lengthy summaries are broken down with subheads.
- Characters: an alphabetical listing of major characters in the novel. Each character name is followed by a brief to an extensive description of the character's role in the novel, as well as discussion of the character's actions, relationships, and possible motivation. Characters are listed alphabetically by last name. If a character is unnamed□for instance, the narrator in Invisible Man-the character is listed as □The Narrator□ and alphabetized as □Narrator.□ If a character's first name is the only one given, the name will appear alphabetically by that name. □ Variant names are also included for each character. Thus, the full name □Jean Louise Finch□ would head the listing for the narrator of To Kill a Mockingbird, but listed in a separate cross-reference would be the nickname □Scout Finch.□
- Themes: a thorough overview of how the major topics, themes, and issues are addressed within the novel. Each theme discussed appears in a separate subhead, and is easily accessed through the boldface entries in the Subject/Theme Index.
- Style: this section addresses important style elements of the novel, such as setting, point of view, and narration; important literary devices used, such as imagery, foreshadowing, symbolism; and, if applicable, genres to which the work might have belonged, such as Gothicism or Romanticism. Literary terms are explained within the entry, but can also be found in the Glossary.
- Historical Context: This section outlines the social, political, and cultural climate in which the author lived and the novel was created. This section may include descriptions of related historical events, pertinent aspects of daily life in the culture, and the artistic and literary sensibilities of the time in which the work was written. If the novel is a historical work, information regarding the time in which the novel is set is also included. Each section is broken down with helpful subheads.
- Critical Overview: this section provides background on the critical reputation of the novel, including bannings or any other public controversies surrounding the work. For older works, this section includes a history of how the novel was first received and how perceptions of it may have changed over the years; for more recent novels, direct quotes from early reviews may also be included.
- Criticism: an essay commissioned by DfS which specifically deals with the novel and is written specifically for the student audience, as well as excerpts from previously published criticism on the work (if available).

- Sources: an alphabetical list of critical material quoted in the entry, with full bibliographical information.
- Further Reading: an alphabetical list of other critical sources which may prove useful for the student. Includes full bibliographical information and a brief annotation.

In addition, each entry contains the following highlighted sections, set apart from the main text as sidebars:

- Media Adaptations: a list of important film and television adaptations of the novel, including source information. The list also includes stage adaptations, audio recordings, musical adaptations, etc.
- Topics for Further Study: a list of potential study questions or research topics dealing with the novel. This section includes questions related to other disciplines the student may be studying, such as American history, world history, science, math, government, business, geography, economics, psychology, etc.
- Compare and Contrast Box: an □at-a-glance□ comparison of the cultural and historical differences between the author's time and culture and late twentieth century/early twenty-first century Western culture. This box includes pertinent parallels between the major scientific, political, and cultural movements of the time or place the novel was written, the time or place the novel was set (if a historical work), and modern Western culture. Works written after 1990 may not have this box.
- What Do I Read Next?: a list of works that might complement the featured novel or serve as a contrast to it. This includes works by the same author and others, works of fiction and nonfiction, and works from various genres, cultures, and eras.

Other Features

DfS includes □The Informed Dialogue: Interacting with Literature,□ a foreword by Anne Devereaux Jordan, Senior Editor for Teaching and Learning Literature (TALL), and a founder of the Children's Literature Association. This essay provides an enlightening look at how readers interact with literature and how Drama for Students can help teachers show students how to enrich their own reading experiences.

A Cumulative Author/Title Index lists the authors and titles covered in each volume of the DfS series.

A Cumulative Nationality/Ethnicity Index breaks down the authors and titles covered in each volume of the DfS series by nationality and ethnicity.

A Subject/Theme Index, specific to each volume, provides easy reference for users who may be studying a particular subject or theme rather than a single work. Significant subjects from events to broad themes are included, and the entries pointing to the specific theme discussions in each entry are indicated in boldface.

Each entry has several illustrations, including photos of the author, stills from film adaptations (if available), maps, and/or photos of key historical events.

Citing Drama for Students

When writing papers, students who quote directly from any volume of Drama for Students may use the following general forms. These examples are based on MLA style; teachers may request that students adhere to a different style, so the following examples may be adapted as needed. When citing text from DfS that is not attributed to a particular author (i.e., the Themes, Style, Historical Context sections, etc.), the following format should be used in the bibliography section:

□Night.□ Drama for Students. Ed. Marie Rose Napierkowski. Vol. 4. Detroit: Gale, 1998. 234-35.

When quoting the specially commissioned essay from DfS (usually the first piece under the □Criticism□ subhead), the following format should be used:

Miller, Tyrus. Critical Essay on □Winesburg, Ohio.□ Drama for Students. Ed. Marie Rose Napierkowski. Vol. 4. Detroit: Gale, 1998. 335-39.

When quoting a journal or newspaper essay that is reprinted in a volume of DfS, the following form may be used:

Malak, Amin. □Margaret Atwood's □The Handmaid's Tale and the Dystopian Tradition,□ Canadian Literature No. 112 (Spring, 1987), 9-16; excerpted and reprinted in Drama for Students, Vol. 4, ed. Marie Rose Napierkowski (Detroit: Gale, 1998), pp. 133-36.

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Adams, Timothy Dow. □Richard Wright: □Wearing the Mask,□ in Telling Lies in Modern American Autobiography (University of North Carolina Press, 1990), 69-83; excerpted and reprinted in Novels for Students, Vol. 1, ed. Diane Telgen (Detroit: Gale, 1997), pp. 59-61.

We Welcome Your Suggestions

The editor of Drama for Students welcomes your comments and ideas. Readers who wish to suggest novels to appear in future volumes, or who have other suggestions, are cordially invited to contact the editor. You may contact the editor via email at: ForStudentsEditors@gale.com. Or write to the editor at:

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