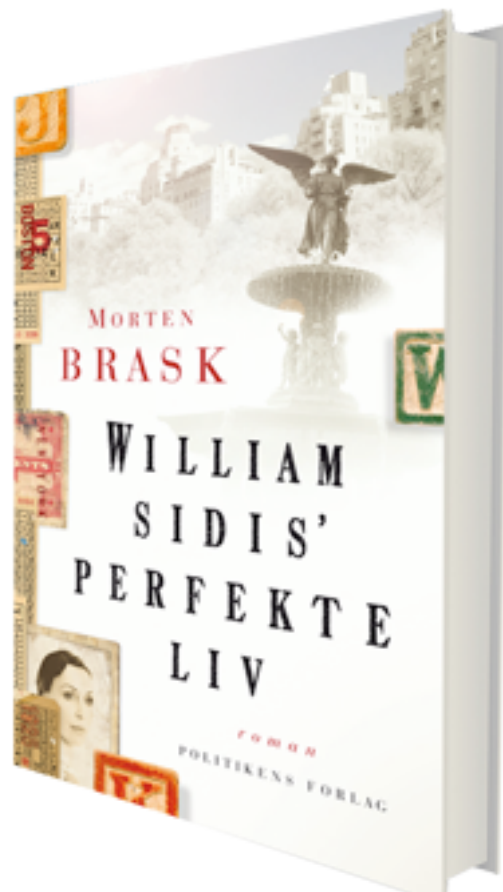


# THE PERFECT LIFE OF WILLIAM SIDIS

By Morten Brask

Translated by Mark Mussari



## About this book

This novel is based on the life of William James Sidis (1898-1944). I took inspiration for most of the book's events, persons, thoughts, and conversations from Sidis's own books, articles, and letters, and from newspaper articles written about him at that time, court records, memoirs, diaries, and letters written by his contemporaries. Not least of all, I am indebted to Amy Wallace's biography of Sidis, *The Prodigy*, an essential help in writing this book.

Despite the authentic source material, this is a work of literary fantasy. The depictions of William James Sidis and the other historical personalities that appear in the novel are my own creation. In a few rare instances, I stray from historical facts. This novel should be viewed solely as a literary endeavor to cast a distinct light on one man's destiny.

Morten Brask

**“I want to live the perfect life. The only way to live the perfect life is to live it in seclusion.”**

William James Sidis to a journalist in 1914

## Downtown Boston, 1944

**T**he sky descends on Boston. Fog weighs heavily on the city's avenues, swallowing treetops, statues, and streetlamps. It sinks onto the asphalt and cobblestones, down into the cellars, through the sewer grates, all the way down to the subway tunnels. In the streets, the air turns humid; skyscrapers disappear, story-by-story, into the thick, moist air, as bricks, windows, and roofs dissolve into grey.

On the sidewalk people with dampened faces lean forward as they walk through the fallen clouds. They dab their skin with handkerchiefs and stay close to the storefronts, creeping forward, on their guard. The moisture penetrates everything, under their hats, through the fabric of their clothes, misting their glasses. The fog swallows all sound, turning the city strangely quiet. The rhythmic click of leather soles, windows slamming shut, human voices, car motors—every sound dissipates within the shrouded city.

At exactly 4:01 p.m., William Sidis steps out of the accounting office of Lynch & Co., on the 21<sup>st</sup> floor of Custom House Tower at 3 McKinley Square. His coat, threadbare from years of use, is still open, and his hat, having lost all shape, is pulled down firmly over his forehead. When he reaches exactly four yards from the office door, his fingers slip behind the knot of his tie and loosen it slightly.

As always, there's a line at the elevators as office workers pour out of all the doors. The men are wearing cotton coats, cinched at the waist with a belt. They smoke just-lit cigarettes, clenched between their lips, and squint against the smoke, just as they've seen film stars do on the big screen. The women, mostly secretaries and stenographers in skirts and cheap, light-colored jackets, reek of perfume, mostly de Raymond's Persian Lamb, which all American women are wearing this year. William loathes the smell of Persian Lamb; its penetrating purple heaviness presses against his eyes. When he passes by a woman wearing Persian Lamb, he holds his breath and walks faster.

In front of the elevators, voices are buzzing, easy, fluid, questioning each other about their day, about colleagues, bosses, and the dream of one day buying a car. The three elevators

arrive in close succession, opening their doors and devouring the office-workers in large mouthfuls. People are pushing and shoving—the impatient throng, the hope of being one of the ones who makes it, right now, until no more will fit and the doors shut with a mechanical gurgle, the elevators swallowing their loads.

William chooses to take the steps, just as he does every other day. It annoys him a little because he loves the sinking feeling as the elevator glides down its shaft, the sound of the cables and the gears. But he does not like the thought of standing in an elevator where he might risk meeting colleagues from the office. He'd have to speak to them in an elevator. The steps are a refuge where he rarely meets others. Here, no one stops to ask questions, the kind of questions he always hears after a little time in a new job, questions that are always the same. He can't risk their already discovering who he is.

On each of the 20 days he has been employed at Lynch & Co., William has taken the stairs, all 21 floors, 42 landings, and 360 steps. He enjoys the monotony of going down the stairs, the rhythm of the controlled descent from step to step. He stops at the foot of the stairs, just in front of the door to the lobby, and loosens his tie a bit more. Turning around, he looks back at the steps he has just descended. How many times has he stepped on each step? 20 days of 360 steps up and 360 steps down? It comes to exactly 14,400 steps—but that cannot be totally correct. He is forgetting the day he went to the employment interview with Mr. Kowalski; that day he also took the stairs. Therefore, the correct number of steps must be 15,120.

20 days at the same workplace is good. That constitutes a lot of days without any questions, and he is glad to be working at Lynch & Co. No one asks any questions, other than young Petersen who sits across from him, but he's harmless. 20 days. With a little luck he'll be able to keep this job even longer. He kept the last job for 33 days. That one was on the sixth floor, and there were 12 steps to each staircase in that building, so 7,920 steps in the course of 33 days means . . . he calculates it . . . it means that up until now he has walked on 52.38% more steps here in Custom House Tower than in his last position, despite the fact that he managed to work there for 65% more days. 33 days is good, but it's too short. He must learn to hold onto a job for a longer period of time. If he could just stay in a job without disruption, a job where they leave him in peace, without questions, a place where no one pays any attention to him, where one morning there isn't suddenly a different buzzing in the halls when he arrives

and where they don't stare at him with that knowing gaze, nodding to each other behind his back and whispering: "Is it really him? Unbelievable."

William opens the door to the lobby. He usually stops for a moment to view the Doric columns beneath the cupola, but not today. Today he's too busy. He reaches the revolving door at the same time as another man wearing a recently pressed suit, an office manager. Both men stop; the man looks quickly at William, looks up and down at his clothes, the threadbare tweed jacket, shoes that haven't been polished, his out of shape hat. Both men hesitate. Who has the right to go first? Whose duty is it to yield to the other? Which rule applies when two people arrive at an exit at the same time? William steps aside.

"After you," he says.

The office manager nods, stepping behind the swinging door. William steps into the next one; he pushes the revolving door forward and thinks: If only a fourth of Boston's 400,824 male citizens, regardless of their age, in the course of one day allow another person to go first out a door, an action that takes shall we say three seconds, it would require 83.51 hours of daily politeness. So little. So much.

## HARVARD 1910

Snowflakes fall silently on Oxford Street. It has snowed since last night, at first thickly in the swirling night wind and then more softly. In the first light of day snowy crystals are dropping slowly from the sky.

Professor and Doctor Boris Sidis steps down off the streetcar and onto the crunching snow. He takes a few hesitant steps at first to ensure that his soles won't slip and then turns around.

"Are you coming, Billy?"

William is still standing inside the streetcar. In one hand he holds a piece of paper that he has examined thoroughly, a ticket he picked up off the floor. He turns it around in his hand, studying the date stamped on it, evaluating the slanted punch marks from the ticket machine. The conductor rings the bells.

"Billy, come out of there and throw away that ticket—the streetcar is leaving now!"

Suddenly realizing that his father has gotten off, William shoves the ticket into his jacket pocket and jumps out into the snow. The doors close behind him, and the streetcar rolls farther down the tracks.

"You know full well what your mother has to say about all these dirty tickets you keep coming home with," Boris says.

"Okay," says William.

Walking at his father's side, he looks down at his shoes sinking deeply into the snow, disappearing into the snow. He turns around and looks back at their footprints in the new fallen snow, Boris's large ones and William's small ones, proof that they have walked side by side, an adult and a child.

"Come along—we'll be there in a minute," says Boris.

William bends down, fills his hands with snow, and tosses it high into the air. He laughs as the snow hits his head, sliding down into the collar of his coat.

“Billy, will you stop getting yourself dirty before we get there?”

Boris walks ahead on the whitened pavement; William gathers snow into a snowball and throws it at his father. It hits one of his shoulders, and William laughs.

“Stop that nonsense!”

William runs up to Boris’s side and, without thinking about it, slips his hand into his father’s. Boris stiffens for a moment and, embarrassed, looks down at William. They walk a little farther, neither saying a word, listening to the snow crunching beneath their shoes, the sound of their footsteps walking next to each other. William’s hand rests lightly, ever so lightly, in Boris’s, the two hands together for the long moments until Boris has to cough, releasing his grip around William’s hand to cover his mouth. He coughs a few times and then lets his hand glide down into his jacket pocket. William can still feel the light, warm touch of Boris’s hand.

“Are you nervous, Billy?”

“A little,” says William.

“It will be fine. Are you cold?”

“No.”

“I think the cold bites at your ears. You should have put your hat on, like your mother told you to.”

“I like the cold,” says William.

He breathes through his nose. The air is metallic, clear, filling his lungs with cold, and then the cold turns to warmth; he breathes deeply again.

“When it’s cold, nothing smells.”

“Hmm. It’s strange with you and smells,” says Boris.

William bends down again, gathering snow into his hands. He loves the feeling of snow being pressed together in his hands and taking form; he loves the snow’s compressed hardness, the solid sound of packed snow, the rounding of the snowball in his hands. He presses it into a perfect ball, packing it until it can no longer be compressed. He throws the snowball at a wall, and it hits the wall with a gentle crash, bits of snowing flying from the ball. William laughs.

“Did you hear that, father? That sound when the snowball hit the wall?”



“What sound? Billy, I told you not to get yourself dirty before we go to the lecture.”

The prefect ball has left a broken white impression on the brown wall. William and Boris continue walking along the wall until they reach the green double doors of Conant Hall.

Though still early, the banquet hall is almost full. The first spectators arrived an hour ago. Arrangers anticipated a somewhat larger turnout than normal for this morning's lecture by the Harvard Mathematical Society, especially after all the write-ups in the newspapers, but many more than were predicted had already arrived. The spokesman for the mathematical society, John Dixon, who is personally greeting the attendees, has counted more than 60 professors from Harvard, Tufts, the University of Massachusetts, Yale, Princeton, Wellesley College, the Massachusetts Institute of Technology, and other universities all over New England. Some of the audience members have already taken their place among the rows of seats, but most are standing around in small groups. Voices rise up from the groups, bouncing off the naked walls before merging into a steady buzz in the high-ceilinged room. Dixon walks around among his colleagues, falling into conversations, restless, alert. He walks off to get hold of the janitor and ask him to find more chairs. The janitor has to go down into the cellar to fetch more of them. Four more rows are added, but it looks as if some will have to be satisfied with standing.

Pushing the main door open, Boris steps into the hall. His glasses immediately start to fog up; he takes them off, wiping them on his jacket sleeve while, squinting, he peruses the attendees. Without glasses, his face appears sharper, Slavic. His hair is severe, a bit wavy, combed back, his strong eyebrows are so heavy that they make it seem as if his quick, observant eyes are being pulled together. Boris is wearing his usual gray suit and narrow black tie.

William enters behind him. He has hung up his coat in the cloakroom. Although it is winter, he has on black corduroy knickers, a Russian peasant shirt, and a red handkerchief around his neck. His hair is darker than Boris's, just as severe, but shiny. Sarah has combed it forward over his forehead like a helmet; it almost reaches down to the restless gray eyes viewing the attendees. So many people have gathered in the hall, the noise, the voices, all these bustling people. William feels a strong urge to turn around, to go back to the street and the snow, to the odorless cold.

“Boris! Boris!”

A voice calls through the cacophony of conversations. William recognizes the voice, which belongs to Professor William James. He spots him in the crowd; he’s standing in one of the largest groups but breaks free, making his way in their direction. People stop their conversations, stepping aside for the renowned William James.

“Boris! Boris!”

Finally reaching them, Professor James clasps Boris’s hand between his own.

“James, how wonderful to see you again!” Boris says, smiling.

“Same to you, dear Boris. How is Sarah?”

“She’s excellent, thank you,” says Boris. “She asked me to convey her greetings to Alice.”

“Alice will be pleased to hear it. I know she is very excited about this event. Tonight she’ll insist that I tell her every little detail.”

Professors gather around them. Black and gray suits, starched collars, chains of silver glinting in arcs from the buttonholes of their silk vests to their watch pockets. All the men in suits say hello to Boris. Hand are extended and shaken. All the professors want to say hello to Boris—everyone knows Boris.

Professor James spots William and opens his arms.

“William, my friend, how are you?”

He extends his hand toward William but then hesitates, hesitates for an awkward second, patting him instead on the shoulder.

“I’m fine, thank you, Professor James,” says William.

“Good, good! My wife asked me to tell you that she’s always thought you were a good boy.”

“Thank you, Professor James.”

Three other professors join the group, all of them staring curiously at William, frowning, leaning toward each other, nodding at William. Unable to endure their stares, he looks down at the floor. He can feel the weight of their eyes.

“Are you nervous, William?” asks Professor James.

William nods.

“I can certainly understand that—but I am not in the least bit worried about you. I know that everything will go splendidly.”

“Thank you,” says William.

“So, this is the young Sidis,” says a white-haired professor, Gerald Hauptman from MIT.

“Yes, it’s my godson, William James Sidis,” says Professor James, patting William on the shoulder again.

“That’s right. I read somewhere that Professor Sidis named the boy after you, no?”

“Yes, and I consider it a great honor,” says Professor James.

“And how old are you, William?” asks Professor Hauptman.

“Eleven,” replies William.

“Eleven?” Hauptman glances up at Professor James. “I thought I definitely read that he was ten...?”

“He’ll be eleven in April, the first of April. Isn’t that right, William?”

William nods.

“The first of April—an April fool? Ha! Okay. Well, it should be interesting,” says Hauptman.

“There couldn’t be a prouder godfather than I,” says Professor James. “You’re in for a surprise, gentlemen.”

“Yes, that’s what they say, that’s definitely what they say.”

Looking up, William notices a man just stepping into the hall. He recognizes him immediately: that red mane of hair, those hard eyes—it’s the journalist named McGlenn! Behind McGlenn comes another man carrying a camera on his shoulder. William has not seen the photographer before; he was not there the day stopped him from running away down at Brookline Reservoir. His throat tightens. He was afraid McGlenn would show up today, but on the other hand it does not surprise him.

McGlenn stops. Standing in the doorway, he appraises the gathering of professors; he says something to the photographer who nods. William knows that the two men are looking for him.

“It’s a big day, Billy, a big day,” says Professor James, who then turns toward his colleagues. The professors stop looking at William and join the circle around Boris. William is left standing alone. He looks up at his father. He can see Boris’s back and part of his face through a chink in the wall of suits. Boris, facing Dixon, is nodding and talking; they are

ensconced in a conversation lost in the choir of voices. William tries to catch Boris's attention, but his father does not notice him. He is laughing at something Dixon is saying.

William feels strangely uncomfortable. He is nauseated and can see small, glassy spots in the air. He feels faint from the cigarette and pipe smoke, the noise, the voices, the smell of wet clothes, the dust heating up on the light bulbs in the ceiling, the colognes, the drops of urine in the professors' underpants, their breath, their sweat, the sour acrid smell of sweat in the linings of their jackets. Feeling he needs to sit down, he walks over to an empty seat in the front row; he sits down and acts as if he is merely tired, but his brain feels exhausted. Glassy spots dance before his eyes; he presses his hands against his eyes until everything goes black. When he releases them, the blind spots have dissipated. All that remains is the blurry image of the hall.

How he wishes it were all over—that he and Boris could get away from the smell of all these people, out into the clean, cold world outside. He has no desire to do what they expect of him. He won't do it—he won't. Still, he knows how much it means to his father, and he knows what Sarah would have said if he had said no to the initiation from Dixon to give a lecture. It is an honor, an honor. Both Boris and Sarah said so. And William nodded, but he does not want to, not in front of all these people. He looks out the windows at the falling snowflakes, out into the white.

A piercing bell rings through the hall. Voices soften and disperse at the sound of the bell. The professors who have yet to sit down file into the clearly defined aisles, rattling their chairs, their leather soles clicking on the herringbone patterned parquet floor already soiled from the melting snow on the professors' shoes. Boris comes over to William and sits in the chair next to him.

“Are you ready, Billy?”

William looks up at Boris, but Boris turns to say hello to a man who sits down on his other side.

William turns around. Behind them, row after row is filled with men in suits, and behind them are more rows of spectators who are standing. These consist of the younger teachers and select students who have excelled in mathematics, physics, and philosophy and who have therefore received special permission to participate in meetings of the Mathematical Society. Among the faces William sees one he recognizes, a young student with long, shaggy hair, wearing a shirt that is no longer white, his hands in his pockets, reckless,

carefree, slightly slouching, with perpetually restless eyes, dark, very dark, almost black eyes: Nathaniel Sharfman. Sharfman lives in William's dormitory. Even though he does not really know Sharfman, William takes comfort in seeing a face he recognizes. Although they have never exchanged more than a few words, Sharfman is one of the few who say hello to William when they meet for lectures. Sharfman is eleven years older than William, yet the friendliest of all the students he has met until now. When one of the others living on their floor, Prescott Bush, took William's knickers—leaving him with nothing to wear—Sharfman was the one who told him where Bush had hidden them. Bush did nothing when William pulled them out of the trash; he laughed, but he said nothing. The others respect Sharfman, who is one of the “poor,” those on scholarship, but he is also known as one of the best students at Harvard. A.N. Whitehead, their philosophy professor, has made him his protégé.

“Turn around,” whispers Boris.

The hall is full. There are too many people: they have unbuttoned their jackets and vests and are dabbing at their faces with their handkerchiefs. Before stepping up to the carved mahogany lectern, Dixon gives the janitor a sign to open a couple of windows. Still holding the bell, he rings it again, not that it is necessary; aside from some scattered coughing and rustling of clothes, the hall is now completely silent.

“My honored colleagues, members of the Harvard Mathematical Society, and visitors from the press,” says Dixon. “I am pleased to welcome you to Conant Hall, to the first lecture this year, the fifth of January, 1910. I know we are all excited to hear today's lecture, ‘Sizes in the Fourth Dimension.’ Therefore I would like to welcome our speaker who will undoubtedly be most familiar from the press, the son of Professor Boris Sidis and—and I can certainly say this without having to look it up anywhere—the youngest speaker *ever* in the Harvard Mathematical Society. Welcome to young Mr. Sidis.”

Following scattered applause in the hall, Dixon steps off the podium and sits down in a chair next to a blackboard set up for the lecture. Many of the attendees cough, shifting into more comfortable positions in their seats. William does not move. He remains seated. He looks at the empty podium; someone has placed a carafe and a glass of water at the edge of the lectern. He looks at the blackboard, which has been wiped clean, but in the lower right corner is an area the rag missed. He sees the lowest part of something that could be a three, a five, or an eight. Boris clears his throat, but William still does not move.

“Billy!” whispers Boris.

William looks again at the podium with the carafe and full glass of water.

“Billy, go up there. People are waiting.”

William looks up at his father. For a moment he hopes that Boris will smile at him and say that he does not have to go up there—that instead he will go up to the lectern for William—but his father nudges at his arm.

“Yes, father,” says William.

He tries to stand up. He pushes against the seat with his hands, but he cannot get up. His body feels heavy, so overwhelmingly heavy.

“Billy—get going!”

William cannot understand where he finds the strength to get up, but the muscles in his legs lift him and he stands up. A synchronized movement of heads turning toward him occurs among the spectators. So many people, so many sitting there waiting to hear him speak! His stomach tightens; he is shaking, his arms and hands are shaking. It is seven yards to the podium, seven yards of floor he must cross, over the polished herringbone floor, endless rows of arrows across the hall. He looks down at himself, lifting his feet; he sees that his shoes are now moving across the floor. He can feel their stares as they watch him; he takes one step and then lifts the other foot, yet another step. Somewhere behind him someone is coughing, and a chair leg scrapes against the floor. His feet are moving, yet another step, and another, and he has reached the podium where the lectern stands. He walks up to it but is surprised at how high it is here. He goes around behind it; the janitor has placed a crate on the stand behind the lectern. He steps up onto the crate and lifts his body up with his legs, lifts himself over the edge and looks out over the hall. He is elevated so high, so far above the assembly, it is as if he is floating, floating above all these people who are down below, a mass of suits and faces. He has been lifted above them, as if he is sitting in a hot air balloon as it ascends from the ground, elevated above their staring eyes. He can smell them from up here in his floating lectern; he can smell the remains of the breakfast that they thought they had brushed off their moustaches, the coffee they have drunk, the flatulence that they believe they do not let out in public. William can see all of it, all these well-read gentlemen sitting in their fine clothes and watch chains, passing gas, and the thought is comical, and suddenly he cannot help but laugh. He stands there laughing on the podium, in front of the professors. They look at him; they are tense, frowning, some looking away, embarrassed. William stops laughing. He looks down at his father, who looks back at him

with that worried look in his eyes. Boris is motioning now with his right hand, waving it back and forth in the air as if to say, "Get on with it, Billy!" William knows that he has to speak now. He opens his mouth:

"I never imagined that I would be speaking here, I mean that it would be happening now, but I have been asked to, and naturally I would like to..."

William can hear his own voice shaking. It sounds thin and small in the great hall filled with so many anxious faces.

"... but I am here now, here in Conant Hall, and I would like to tell you some thoughts I have had about the fourth dimension."

Silence. The professors' faces exude silence. They are not moving, they do not breathe, the hall is not breathing; they are sitting in their silence and staring at William. William is alone—he knows that he is so alone now that no one can help him in this moment: not his father, not Dixon, not Professor James. No one can help him now as he stands floating in front of the silence that fills the hall. He is alone, only he can help himself, alone in the black knickers, alone in his bright voice.

"What is the fourth dimension?" says William. "Can we really talk about a fourth dimension when we are locked in the three Euclidian dimensions we live in? How can we define it from this dimensionally limited point of view?"

He lets his eyes wander over the audience in Conant Hall. They are still sitting there silently, listening, in rows, turned toward him, and he sees himself through their eyes, a boy on a podium, without a manuscript, without notes, a boy standing on a raised platform on the podium with his childish voice, speaking to a gathering of the county's leading scholars.

"My own definition of the fourth dimension would be that it is an Euclidian space with one dimension added. It is the projection of the figures of the third dimension into space. The third dimensional figures, such as the cube, are used as sides of the figures of the fourth dimension, and the figures of the fourth dimension are called configurations. It is not possible to actually construct models of the figures of the fourth dimension, or to conceive of them in the mind's eye but it is easy to construct them by means of Euclid's theorem. In this theorem, F equals the faces of the figures, S equals the sides, V equals the vertices, and M equals the angles. The theorem is that F plus S equals V plus M...."

He has begun. He is speaking. William can feel the power inside him, can feel it coursing through him; he cannot stop the stream of words flowing out of his mouth. He

forgets that he is standing on a podium, forgets the professors, forgets McGlenn and his red hair. The words fill him; he jumps down from the podium and runs over to the blackboard. He can see now that it was an eight down in the right corner, for a second he ponders which subject ended with an eight in the corner of the blackboard. Meanwhile, the words flow, and he grabs some chalk from the end of the blackboard, writing at a furious pace. The chalk breaks, the nail of his index finger scrapes across the blackboard, he writes more with the stump of chalk, he does not hear the screeching of the chalk against the board's surface. Formula after formula, power to the power, fill the board while he speaks. Somewhat awkward drawings of figures that cannot exist outside of mathematics take form in front of the professor's astonished eyes. William does not stop for a moment laying out the theories he has developed throughout the last week. He speaks and speaks and speaks, and in the hall they are leaning forward, all of them leaning forward to hear what the boy is saying:

“Actually, it is possible to take any figure of the third dimension and use it to construct four-dimensional figures,” says William. “These figures of the fourth dimension are called polyhedrigons. In this way it is possible to construct figures in the fourth dimension with 120 sides called hecatonicosihedrigons...”

Whispers can be heard throughout the hall; some hands go up, and Professor Hauptman rises from his seat.

“Young Sidis,” he says—but William does not hear Professor Hauptman.

“It is also possible to create figures with 600 sides called hexacosihedrigons, and you can figure out parallelopipdons that are\_\_”

“Sidis!” says Professor Hauptman, louder.

William turns from the board.

“Mr. Sidis, excuse me, but I must interrupt you. Where did you get them?”

“I don't know what you mean, sir,” says William.

“Where did they come from ... these hedigrans?”

“From the fourth dimension,” says William.

Laughter. Professor Hauptman waves his hand dismissively.

“I mean the concepts you are using. I have been teaching geometry for 40 years, and naturally I know Hinton's tesseracts, but these terms... I mean I have never encountered them, and I am sure I am not the only one.”

Several audience members shake their heads.



“No, I do not think you will find them anywhere,” says William.

“I mean in what literature have you found them?”

“Nowhere.”

“Are you claiming they are your own definitions?”

“Yes.”

A murmur passes through the audience.

“Did that answer your question, sir?”

Professor Hauptman nods and sits down. William turns back toward the board and continues:

“It is possible to tell how many sides any given figure will have by applying Euler’s theorem. Some figures in the fourth dimension, however, cannot be worked out by this theorem, but must be tried by using logarithms. There will often be a vacuum in four-dimensional space, and I have filled them up by adding polyhedrigons of passing forms. I believe that my theories can have value for the dodescahedrons’ polyhedral angles. I believe it can solve many of the problems in elliptical geometry....”

William talks. An hour passes as he talks, writes, explains, dust chalk falling from the rapidly written numbers; his sleeves turn white from the quick strokes he uses to erase old formulas to make room for new ones. Many in the audience stare at the boy, shaking their heads in disbelief.