

ZSOLT DE HARSANYI

The Star-Gazer

TRANSLATED FROM THE HUNGARIAN

by

PAUL TABOR

G · P · PUTNAM'S SONS



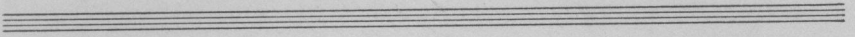
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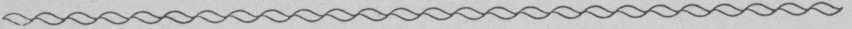
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I



I

UNDER the Ponte Vecchio stood a young man absent-mindedly tearing a sheet of paper into strips, which fluttered away, borne on the waters of the Arno—a young man who meant to kill himself.

For a long time he had thought of suicide. At first a stale weariness had come over him; gradually the thought had taken shape. Then he had made up his mind: he was going to kill himself. His life seemed finished at twenty-three. He could so clearly see himself already a corpse that it did not seem to him to matter much exactly when he drew the noose of the rope he kept hidden at home. A few days more or less! He felt as though mere indolence had prevented him from dying, either yesterday or the day before.

But this very slackness, this weary idleness which loathed the thought of having to live, had prolonged his life again and again. He was so used to his own incapacity for action that he felt curious to observe: would his will ever gather enough strength to make the decisive effort and do this thing which his mind had considered in all its bearings? Yet not even this curiosity was alive in him. Even that made him shrug his shoulders. What use was anything!

The clear green river was now muddied into yellow by the autumn rain; it flowed with the heartless indifference of the infinite, bearing the tiny paper scraps to destruction. He was going to die the day after tomorrow, or maybe in the next half-hour. The flowing river made him remember his life, from its baby memories: A yard in a house in Pisa where he had played in the sand with the neighbors' children. Sometimes a grain of sand looked very beautiful, sparkling, catching the sun like a great diamond. Deeply entranced, he watched the miracle, waiting till the invisible grain of sand began to glitter again, and then lost its glory. The other children could not understand what he was looking at; they jeered at him and pushed him about.

His father's shop, a draper's shop, with strange musty-smelling bales of cloth, with brocades and silks; an empty shop, and his father sitting in the corner playing some old tune on his lute. The little boy stopped

in the doorway to listen. He could not tell why the music filled his heart with such peaceful sweetness . . . and then, in the yard outside, the raucous, vehement, complaining voice of his mother. . . .

Later they had moved from Pisa to Florence. His parents had seemed never to stop quarreling; sometimes they had quarreled all night long. It still brought a little boy's terror into his eyes to think of those two quarreling grownups: his mother, with wildly rumpled hair, shouting and stamping about the room, quite out of control; his father, with a deathly pale face and eyes moist from helpless rage, standing there motionless. He had grown up to the tune of such scenes, and often the neighbors had crowded in on them to protest against the fiendish din. . . . He and the younger children had run away to hide in the corner, as though they were frightened of being trampled on. . . .

His thoughts moved to the friendly village of Vallombrosa: The pealing of an organ in the monastery, with its stone flags and whitewashed walls—a fairy-tale world of music and incense, ruled by the fat, eternally smiling abbot, Don Orazio Morandi, whose favorite pupil he was. Hours of exciting and happy study, of discoveries in geometry and arithmetic, of the Greek verb, the Latin *accusativus cum infinitivo*.

It had been a time whose magic could never return. In his young mind the unutterable delight of learning had fused with the mysterious ecstasy of confession and holy communion. He had made up his mind to be a monk and had already entered the novitiate, when his father had come and taken him back to Florence, saying curtly that he should never be a priest. Long days of grief and pining for the happiness of monks, hours of secret weeping in the dark, while the healthy snores of his sisters and his one brother filled the night around him.

Then Pisa again: The university, where his father had sent him to study medicine. The noisy japes of wretched student lodgings; the pride of the student's gown; the pillared university courtyard, crowded with students; the numbered doors of the lecture rooms on the open corridor. . . . Lectures on Galen which wearied and sickened him, and dead bodies whose stink pursued him even in his dreams. Then suddenly another world of magic, opened to him by Ostilio Ricci, tutor to the little Medici prince—the amazing world of algebra and geometry. . . . Even the young man about to die smiled at the memory like a

dreamer, sitting, just awake, on the edge of his bed. That had been a time worth living, eager and exuberant in its demands and joys! When the ducal tutor saw the quick wit of the draper's son, he began to give him private lessons. Not that it was necessary to teach, as he soon perceived. He had only to show his pupil this or that, and then lend him Euclid's book. The lad could not tear himself away from it, his pleasure in it was so keen. From a Sunday night to a Tuesday morning he could not manage to put it down. "One hour more," he kept on saying to himself, "and then another, and then a last one," till, half-asleep, he slid off his chair, pulling the candle along with him, and only by sheer luck not setting the house on fire. He questioned everyone who might tell him something about Euclid. Had this amazing Greek worn a beard? Had he lived to be old? Had he any family? Was he a cheerful fellow? Or not? But Galileo found out very little. Even Ostilio Ricci knew scarcely anything about Euclid's life, and there was nobody else at the university to whom he could turn. His professors of medicine, whose lectures he shamefully neglected, frowned upon him. So he wandered about the streets of Pisa, with his head full of delightful geometrical shapes, sitting to rest by the Arno and scribbling with a twig in the dust the Pythagorean theorem of the rectangular triangle, which obsessed him. All his thoughts were haunted by Euclid, the unseen hero of his dreams.

And then—the miracles of algebra! One could use letters instead of quantities. What a triumph of the human mind! The ancients said: "Add any two numbers, and multiply the sum by two, the result will be the product of twice the first number added to the product of twice the second." This was true. Multiply the sum of three and five by two; the result is the sum of six and ten. Or multiply four and six by two; the result is the sum of eight and twelve. One could demonstrate with a million examples. But these Arabs simply used letters which could be made to stand for any quantity; and what other people put into so many words, their algebra expressed like this: $2(a + b) = 2a + 2b$. This was immensely clever, witty, and practical. No *commedia dell'arte* was so enthralling; he had not read the most fascinating of Boccaccio's tales with half such eager curiosity as the heroic tale of how the cubic equation had been solved. For a long time no one could solve the cubic equation. The great scientist, Luca Paccioli, announced that man-

kind would never solve it. But Scipione dal Ferro did! Dal Ferro would not share the secret with anyone but his favorite pupil, who had to take a solemn oath to tell nobody. He guarded the mystery faithfully, just as a famous painter keeps to himself the mixtures of powdered stones and plants and different oils which compose his coloring. All over the world armies of scientists were struggling with letters, formulae, complicated processes. And thirty years later the stuttering Niccolò Tartaglia found out for himself; he could put into writing a formula which reduced cubic equations to child's play. And then, like a thief attacking a man who has found a diamond, the jealous, covetous Cardano stole Tartaglia's treasure, robbed him of his solution. His pupil, Ferrari, could solve even equations of the fourth degree!

The imagination of other students was fired by the deeds of arms of ancient heroes. They admired Alexander the Great, Leonidas, or Julius Caesar. But this young man dreamed of the learned, of those scientists and mathematicians who battled with the mysteries of theorems, pushed on into the undiscovered territory of a new potential with desperate adventurous content, sometimes doing battle to the death for the Golden Fleece of an unknown formula. His whole being revolted against the trade his father had chosen for him. He loathed Galen, Hippocrates, and all the rest, was sickened with weariness by the jumbled and chaotic science of the human body's "humours." In this teaching all was uncertain and contradictory. In his own beloved study all was clear, certain, radiantly exact.

But then a new ideal came into his mind. He became a disciple of Aristotle. Even medical students were made to study that ancient sage, but at first the young man had scarcely troubled about him. Only later had he been impelled by the magic of algebra and geometry to want to know something about physics. And so at last he made up his mind—he would die sooner than be a doctor! He had not the least wish to learn the secrets of human beings; but he longed to know the secret of all else—of the whole universe. "Space and time are eternally divisible." The sheer greatness of this conception brought tears to his eyes. The man who dared write such a thought was greater than any pope or king; a man whose mind had power to raise him from off the earth, from the central point of the whole cosmos, into blue infinity, thence

to proclaim the truth which shall solve everything, past, present, and future. Such a man is almost equal to God.

He pored over the eight books of Aristotelian physics. He wanted to know about matter, movement, weight, water, sound, heat, and—to see it all. He would stand in the middle of his room letting a stone drop to the floor a hundred times, and a hundred times he would pick it up again. He raised his arm; the stone fell with a loud clatter; he watched it entranced and dropped it again. His eyes were wide as though he were seeing God. Wherever he could find two vessels he poured water from one into the other, using all conceivable variants of height and speed. He filled his pitcher with water, placed it in a basin, and let stones fall into it. He pushed and knocked, measured and dropped, piled up or stood in water—everything. In fact, he behaved like a lunatic; and every night, after praying to the Saviour and the saints of Holy Church, he prayed to Aristotle. Yet, being a godless youth, he did not waste much time on prayers.

Aristotle was the fundamental truth, the Alpha and Omega of knowledge. All that the human mind could ever conceive had been born in the cool alley of the Temple of Apollo at Athens where the sage walked among his pupils. Every argument began with and returned to him. The faith of men was given to the Holy Trinity, but their minds could belong only to Aristotle. Wherever in the world there was disputation, whatever language the arguers used, it sufficed to throw into the argument the authority of the Peripatetic genius: αὐτὸς ἔφη. He said it. No need to name him; that settled the matter.

Till then he had accepted Aristotle as a being second only to God, because his teachers had so instructed him. But in Pisa he realized it consciously. He was like a nun seeing the Virgin Mary. And it was then he began to watch the stars. . . .

He also arrived at a double turning point in his life. A deep cleft opened between him and his father—and the same cleft separated him from Aristotle. Both had been terrible experiences.

The father was firm in insisting that he should become a doctor. But when the elderly draper came over to Pisa to see his son, Galileo blurted out his decision. The older man laughed at first, then, seeing the strength of his son's resolve, became afraid and tried to use his

authority. They were sitting drinking in a tavern. The Chianti had loosened his father's tongue.

"You're almost a man now; I can talk to you about such things. But no . . . what I wanted to say . . ."

"Say it, sir. You want to talk about my mother."

His father nodded, a little confused and red in the face:

"Perhaps it's wrong, but I'd better say it. Your mother is a very good woman, only—it was the devil gave her his temper. You may not realize."

"Of course I realize. At home we children used all to discuss it among ourselves. When I came to Pisa the thing I liked most was being away from home, our horrible home. I hope you aren't angry, father; but that was how we were always talking among ourselves . . ."

"A nice thing to have to listen to!"

"You mustn't mind it, father. You're so kind and gentle we'd follow you to the end of the world. But she . . ."

His father, a poor and careworn man, the last of an old Florentine family but now a struggling draper, nodded and took a deep draught of the red wine:

"Poor thing, she can't help it! If you're born with yellow hair, who can blame you for that? Nobody! She was born with her temper. . . . But sometimes I can't bear it any longer. Tell me, where am I to find joy? Apart from music, which I love, only in my children. You are my first-born, my greatest hope. Your sisters will marry and go to live with strangers in strange families. But you two, you and your brother Michelagnolo, carry on my name, which used to be noble, and now is tarnished and humbled by shameful poverty, through no fault of mine! Michelagnolo hasn't many brains; he'll never understand anything except music."

"But, father, perhaps he . . ."

"No, don't interrupt! You know it just as well as I do. He'll grow up to be a musician, and glad enough to snatch a bare living. Whereas you! . . . Ever since I taught you to read and write, all your masters have said they'd never had such a clever pupil. Why don't you use your gifts to help your father?"

He had drunk a good deal—already his tongue was beginning to stumble over the quick Tuscany speech; yet he was still sober, and it

was plain that he meant what he said and was opening his heart to his son.

"Listen, father," said Galileo. "I want to ask you something. What made you marry mother?"

"I fell in love with her."

"And you wouldn't have married anyone else?"

"No—though, God knows, they wanted me to make many a rich match. But I only desired the Ammannati girl. I used to follow her like a sleepwalker. You see, Galileo, your mother was a very beautiful girl. . . ."

"I know she was; you can still see it. So you wouldn't have married anyone else, sir, because you loved her. You see, it's just the same with me. I can choose no other career except philosophy, because I'm in love with it. No use to offer me anything else! Riches? Glory? This is the only thing I want. I love it like a woman."

"Like a woman—but how do you mean?"

"Yes. You see, I'm eighteen. Other students, even the poorest, are already thinking about marriage. I never think about it. I've never been in love, and I can't imagine I ever shall be. All the others find a pretty Bianca or Lucia. I have only my science. I blush when they talk of it. My heart quickens whenever I begin to think that soon I'll be sitting at my desk to draw parallaxes."

"Parallaxes? What's that?"

"Listen, father! Have you ever traveled in a fast coach?"

"Indeed I have."

"Well, if you looked out of the side window, you thought that the trees along the road were all moving in the opposite direction. . . ."

"Yes. And then?"

"But did you notice the distant hills, far beyond the trees, almost on the horizon? They don't seem to move against the coach. And yet they don't remain motionless. They look as if they . . ."

"Yes, yes," his father interrupted him. "They look as if they were going the same way as the coach. But why shouldn't they? It's quite natural."

Galileo had not expected such an answer. He glanced with delighted surprise at his father, at this poor little draper who had never said a

word to him about science. The old man answered his surprise with a wise, rather melancholy smile:

"I see that surprises you. You ought to have remembered where you get your brains. Not from your mother; she isn't clever, only very strong and violent, like the earth when it quakes. She gave you the strength which I never had. But I gave you your talents, Galileo! Others know that, though you may not. I'm a man of parts, who promised much, but whose wings were clipped. I might have gone far. No need to ask me in what—I'll tell you: in music!"

He fell silent again, and the boy dared not look straight at him. He felt that his father was about to open his heart, but he knew that he would shrink back into himself at a single inquisitive look or word. It was like some rare bird on a branch, and he dared not move for fear of frightening it. So he pulled out his clay pipe and began to fill it with great care. He waited till his father said:

"My son, I've a real gift for music in me. You should know that about your father. I'm not the kind of musician who tinkles pretty tunes for ladies. I know music as a science, as a system, as a complicated wisdom. I know it so well that I've written a long book about it, full of wholly original ideas. With God's help, it may get printed. If you think, you'll see that music and mathematics were born in the same part of the human mind. Mathematics always came to me easily. Do you understand?"

"Perfectly," answered the boy, lighting his pipe and puffing excitedly.

"I look at you, and I see my own talents. I remember how once I wanted to live only for music and philosophy, for the wise and beautiful things in which men delight. I didn't do it, son. I opened a shop, to keep my family, and I can only dream sometimes of what I wanted. It hurt me at first, no use denying it. But there's nothing we can't manage to get accustomed to. You have your mother's strength. If you want to, you can conquer yourself. Be wise, Galileo, be rich and successful! And then you can follow your inclinations and do your work at the same time—just as I wrote my book on music."

The boy shook his head.

"I simply can't become a doctor! All you've done, sir, is to argue against yourself. Father, you have talents but no strength. But I have

both! Why shouldn't I try to get what I want? I'll become a great scholar and get a professorship. I can live on that. And I'll live better than anyone else. Because I'll be a more famous scientist than anyone ever has been yet! Listen, that thing we started talking about, the parallaxis . . ."

"No, son, we're long past that! What if I never get to know what a parallaxis is? It's more important to talk about you. How do you mean to become a great scholar? It takes a long time and a lot of money. It's sad to say it, the saddest thing a father can tell his son: I haven't the money for it."

The boy looked up, startled. Something had entered his life which he never had considered before.

"You haven't the money?" he repeated in a puzzled voice.

"No, my son. But, of course, you never thought of that. Your parents have paid for you and said nothing. But now you must hear. We're very poor, the shop is going from bad to worse, and there seems no hope of better times. The weavers are asking more and more, and money is scarcer every day. I have to sell everything below cost. Perhaps I can hold on till you take your degree, but only by stinting your sisters and brother. How can I wait till you're a famous professor of mathematics and physics? It isn't possible."

Silence, till the father repeated, more firmly, though his voice was more calm:

"It isn't possible."

Then they were silent again, till the boy said:

"I'd rather die than be a doctor."

"That's easy said. But how can I keep you, without the money?"

"Father, listen! There are plenty of poor students with bursaries from the university. They get money from the ducal house. Why shouldn't I get a Medici bursary? You have so many friends in Florence who like you and will do what they can. Perhaps you could arrange it at Court. They would only have to ask Ostilio Ricci, the Duke's tutor, who knows who I am and what I can do. . . ."

He gazed imploringly at his father, whose eyes, clouded with wine, lit up:

"Now you're talking sense. That's a good idea."

Galileo snatched his father's hand and shook it hard; persuasively he drew his chair up close:

"I beg you, sir; I implore you to try to do this. Try everything! There's only one way I can show my gratitude. I . . . I promise to become a great scientist . . ."

"You're a good boy," his father answered, made sentimental by the wine.

Galileo embraced his father passionately, clumsily. They kissed each other. They were talking thirteen to the dozen; soon neither of them knew what he was talking about. They scarcely noticed how and when they left the tavern.

Next day the father was ashamed and silent. Yet, somehow they could revive the idea of the bursary, and when the older Galilei left he silently agreed to suspend his decision about his son's career.

About that time a student called Rossi came to the University of Pisa. He came from Padua, where he had been mixed up in some love affair; he was afraid that the brother of the seduced girl would kill him. He studied medicine and could not abide mathematics. Galileo met him in the corridor of the lecture hall. They started to talk about Padua, and Rossi began to complain and bewail the ill fate which had forced him to leave it. He was full of praises of the "Bo."

"Bo? What's that?" Galileo asked.

"That's our name for Padua University. Long ago there was a tavern standing on the site of the university, or close to it, I can't say which, and its sign said: '*Al bove*'—'At the Sign of the Ox.' The name stuck. Professors, students, even the townspeople, call Padua University the Bo. The Bo . . . ah, *Dio mio!*"

He almost wept. He spoke about the Padua customs, the splendid fights with the scholars of the Jesuit school, the miracles of near-by Venice. He dropped some notebooks which he was carrying under his arm. And, when he picked them up indifferently, Galileo saw mathematical formulae on the scattered sheets.

"What's this?" he asked eagerly.

"Notes of Moletti's lectures. But I don't need them now."

"Who is Moletti?"

"Don't you know? The mathematician of Padua. He is famous elsewhere too. But I can't do with mathematics. Give me diseases!"

But Galileo was already reading the notes. Only scattered sentences; yet they held his interest at once.

"Couldn't you lend me these?"

"You can keep them."

He took them, and began to read in the street on his way home. Moletti, the Padua mathematician, said astounding things; he attacked the divine Aristotle! He asserted that, though he had been a great philosopher, not all his statements could be accepted. He had often been wrong! For instance, his axioms on mechanics were full of mistakes.

The boy reading in the street stopped in amazement and consternation. It was just as if he had read that there was no God. At home he sat down at his table and shook his head. A turbulent anger filled his soul at such blasphemy. But some irrepressible urge forced him to continue with his reading. When he had finished, he went for a walk. It wasn't a walk; soon it had become a run. The chaos in his mind drove him on, like a broken-down, clumsily working mechanism.

"Aristotle maintains that the velocity of falling objects differs according to their weight; that is, a piece of lead drops quicker than a piece of wood. This is not true. The velocity of a falling piece of lead and that of a piece of wood are equal."

It was this small detail which made the greatest impression on his mind. He tried to picture the falling lead and the falling wood, and watch them closely. But this was no use; these mental pictures were not precise enough. He could not solve the problem like that. He tried ten times, without success. Angrily he shook his head, as though he wanted to shake his own slow mind. He set the question again. Which fell quicker? There was no answer. Then he looked around and felt his pockets. He drew out the key of his room. He stood still in the midst of his senseless hurry, in the center of the Piazza dei Cavalieri, holding the key; he stared at it helplessly, stupidly, and then looked about for a piece of wood of exactly the same shape. People turned to stare at the gaunt young man who seemed to be crazy, hurrying aimlessly, with a key held out in front of him and a look of madness on his face.

He rushed home. He had a chest at his lodgings full of all kinds of rubbish—iron rings, screws, wooden balls, files, string, a mysterious copper cone, a thimble, a bell jar, nails. He found two apparently

equal articles: an iron cylinder and a wooden cube. He took one in each hand and let them fall together. But he couldn't be sure whether they touched the floor at the same time. He had dropped them too close to it. He set a chair on the table, climbed up, and let them fall again from there. Again he could not properly time their fall. They had rolled away. He jumped down and picked them up again, climbed up on the table again, and started afresh. After he had done this five times, he sat down at the table and, resting his head on his arms, began to think.

All that night he scarcely slept. Next day he spent the whole morning slinking around the Palazzo Bottonic, till at last he could filch a stone ball from the wall surrounding it. This he carried to a turner, whom he ordered to make him a wooden ball of exactly the same dimensions. It was ready next day. Galileo went to the university and dropped the two balls from the open gallery onto the marble flags of the yard. But the experiment failed. He couldn't drop them exactly at the same time, nor measure whether the crash of their fall sounded simultaneously. And, if not, which of them touched the flags first? He was soon surrounded by grinning fellow students. Finally one of the proctors came along and shouted at the student Galileo for ruining the pavement of the quad.

But he went on stubbornly experimenting. He read the Moletti notes again and again, was tortured by thoughts, fighting tooth and nail for Aristotle and yet horrified to see how, against his will, his doubts increased.

Since his childish experiments had been useless, he sought the defense of his hero in books. His greatest trust he placed in Cardano, the mathematician. Cardano's references led to other books. After Cardano, Pietro Pomponazzi, then the works of Nizzolio, Patrizio. But when he discovered the books of Telesio he was shocked to find that the godlike Aristotle was besieged by a thousand questions and taken to task by all these authors.

His chief trouble was that he had nobody to ask. He was unpopular, he could never stop arguing—passionately, aggressively, impatiently. He disliked his fellow students because they scoffed at him and were interested in other things. There was no faculty of mathematics or

physics in Pisa. Often he sighed for Padua, where Moletti could have answered his questions, or for Bologna, where the famous Cataldi taught mathematics. Here in Pisa, Cesalpino, the professor of medicine, was his teacher. And Cesalpino disliked him. No professor likes a student who cuts his lectures, and the dislike increases when the student does not try to hide his lack of interest in the subject. And, though Galileo sometimes came to lectures, he was apt to ask inconvenient questions, the answers to which seemed never to satisfy him; and he argued impudently.

While this storm of doubt was raging furiously, his father came to see him again. He came with a grim face, bringing bad news—the ducal Court had refused the bursary. There was room enough in the Medici college, where forty students were being maintained; but the professors had not sponsored the petition. In vain had Ostilio Ricci, the ducal tutor, used all his influence. His professors reported that the student Galileo Galilei was idle, argumentative, and impudent, and not fit to receive a ducal stipend. There were many other diligent young men, regularly keeping their lectures, blindly accepting their teachers' opinions. They deserved scholarships, full board, freedom from cares. Not so Galileo.

Father and son were sitting together again. But not in the gay, intimate mood of the night at an inn spent drinking Chianti. This was a rainy winter morning; they shivered and sat grimly facing each other, their tempers frayed.

The father tried not to look at his son:

"I'm not even going to reproach you. It would be no use. I can only tell you the truth. The shop is going from bad to worse; I'm almost broken with the cares of it. How shall I ever find dowries for your sisters? I was earning my bread at your age, and you idle here and rob your brother and sisters of the little I have."

"I don't idle! I study, I torment myself, searching for truth. . . ."

"That sounds very fine! But your family must eat, mustn't they? For the last time I ask you to settle down to medicine. It's your only hope of earning enough while you're still young. You're my eldest child, and I'm ailing already. When I'm dead and you're the head of the family, how are you going to face your duty?"