The Cubic*

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Characters

Chronicler	Tartaglia
Fontano	Mother of Tartaglia
Cardan	Ferrari
Father of Cardan	Messenger boy

Act I

(Chronicler comes in from the left in front of curtain. Stepping aside he points to the curtains that are about to open. He reads from a scroll.)

Chronicler: Ladies and Gentlemen, you will now behold upon our stage the character of Nicolo, which we this day call Tartaglia, the stammerer. Born in the sixteenth century in Brescia, he became the greatest mathematician of Italy. As a child he was present at the taking of Brescia by Gaston de Foix and at that time received a saber cut in his face which caused an imperfection in his speech. This gave him the nickname, Tartaglia. Since his mother was widowed when he was yet a tiny boy he was self-educated. She found it too difficult to pay his tuition. After overcoming many obstacles he learned to read and picked up a knowledge of Latin, Greek and mathematics by himself, and was able to appear as a teacher at an early age.

I now bring to you Tartaglia in person. (He walks out to the left as the curtains open.)

Scene: The home of Tartaglia in Brescia, 1523, late in the year. Tartaglia's mother, a woman of about fifty, is cooking by the fireplace at center back, and Tartaglia, in his twenties, is studying near a small table at the extreme left of the stage. There is a door at the rear right. A few chairs and benches are scattered about the room.

Tartaglia: Arma virumque cano, troiae que primus ab oris (pauses) troiae que primus ab oris.

(Fontano rushes in excited)

Fontano: Mama, I have another pupil for Nicolo. His father wants him to study Greek and mathematics.

Tartaglia: Another student for mathematics. May the subject progress!

Mother: Your father, my sons, wanted you to go to school and study Greek and Latin, rather than be troubled with a subject like mathematics. But he died before you were old enough to appreciate what he wanted you to study. (Sighs) I am sure you will not gain much by studying such a new subject. Nicolo, why do you waste your time on such nonsense?

Tartaglia: Italiam, fato profugnus, Lavinia que venit. (Closes his *Virgil*) Mama, there is mathematics in artillery and in war equipment. Wait! Before long I shall finish my book. The public will then awaken to the fact that there is mathematics even in the making of gunpowder.

Mother: Son, why do you mention the products of war. (weeps) Do you not remember that even you yourself were hurt at the taking of Brescia twenty years ago? Did you forget how Gaston de Foix overran our town? Look at the saber cut on your face. It should remind you of how terrible war is.

Fontano: (Looking at some loose paper which was lying near Tartaglia.) Yea, and that's why you stutter too, Tartaglia. What's this! What kind of mathematics do you call it?

Tartaglia: That is algebra. More than a thousand years ago, a Greek, Diophantus, worked out a system by which he could solve many problems. But this system remained undeveloped until—

* *Author's note:* The central plot of this play is based upon the impression I got from reading Vera Sanford's, *A Short History of Mathematics.* There may be some disagreement as to whether Cardan obtained his solutions through force or through playing into the role of Tartaglia.

Fontano: Oh yes, I remember, the Arabians took it up in the ninth century. But you give them too much credit. The only thing they contributed was the title.

Tartaglia: But remember that Musa al Khawarizm, although an astronomer, wrote the first algebra.

Fontano: (Sitting down by the dinner table.) But I think the Chinese deserve more credit. They contributed the "celestial method" of solving equations and it certainly made a decided advance in the solution of numerical equations.

Tartaglia: (Getting up and pacing the floor, pauses and looks up at the ceiling.) Three generations ago Scipione del Ferro asserted that he had solved the cubic equation $x^3+mx=n$. His ambition is said to have been stirred up by Luca Pacioli, a member of the Minorite order. (Picks up a small piece of paper from his messy desk.) I got it! (thinking) No! this solution is wrong.

Mother: Let us dine, my sons.

(All sit around a table and say grace while the curtains fall.)

Act II

Chronicler: (Reading) Tartaglia knew that only Fior held the solution to the cubic equations and since challenges for the rank in the new line of mathematics were prominent in those days Tartaglia challenged Fior. Each was to set thirty problems for the other. The man who solved the greatest number of problems in fifty days was to become the victor. Being anxious to defeat Fior and knowing that his opponent had a scheme for solving a particular type of a cubic equation, Tartaglia devoted his time to devising a method for solving a cubic equation in which the first degree term was missing. Having done that he turned his attention to the type in which the second degree term was missing. In the meantime, another mathematician, Girolamo Cardano, was becoming famous.

I will now take you to Pavia, Italy. It is exactly a year later.

Scene: In a little village at Pavia a year later. A very old father is reading a book at a table in the center of the room. Girolamo is smoking up a piece of glass by the crude fireplace at the left. There is a door and a window at the rear.

Father: It is exactly fourteen years ago when I edited this book of Peckham's.

Cardan: You mean your *Perspective Communis?*

Father: Yes, what publicity it did receive in those days. I was then a professor of jurisprudence and a little later a physician at Milan and you, son, what do you have to say for yourself?

Cardan: Why, I practiced medicine at Milan, too, but that doesn't interest me.

Father: Why are you smoking up that glass?

Cardan: Father, if I smoke up the glass I will be able to look at the heavens and the sun will not hurt my eyes.

Father: Son, you are indeed quite intelligent, but it's evening now. You will not be able to use it now.

Cardan: (Walking over to the window) I can see the small dipper so plainly tonight. What a lovely night to study stars!

Father: The stars again! Why can't we discuss medicine for once?

Cardan: (Disregarding his father) By ram's head I bet that those stars predict the fates of our lives!

Father: (Aside) I was always afraid that my son would be a gambler. And his way of hurriedly wishing to make a bet certainly brings out the gambler's trait in him. (to Cardan) Son, how many times have I told you to stop that habit of yours. Always making a bet. (A knock is heard) Come in.

Messenger boy: (at the door) A message for you, sir.

Cardan: (walking over to the door) Here is a bun for you, son. Thank you for the message. (Reads the message)

"Fior challenged Tartaglia. Tartaglia spent two weeks in developing a proof for two important cubic equations. When he developed them he solved the

problems that were set before him in less than two hours."

So Tartaglia won the contest!

Father: I don't like Tartaglia. He was accused of plagiarism. Was he not?

Cardan: I think you're wrong, father. He worked on those cubic equations by himself. I'm sure he didn't get it from anyone.

Father: No! I know what I'm referring to. Tartaglia claimed the original discovery of applied mathematics in artillery and said that it was his own idea.

Cardan: Well! that is partly attributed to his ignorance of the literature of the subject. You know he is self-educated. (Sits at the table and scribbles something)

Father: (Walks over to the window) Cardan, your pupil is coming. He seems to be angry.

Ferrari: (Rushing in, tearing his hair) I won't forgive him, no, I won't!

Cardan: Lodovico, don't you let that ungovernable temper of yours get the best of you again. Come, I'll show you how to play with numbers. (Picking up a slate from the table.) Look! Make a square and divide in into nine parts. In each small square put a number, using one to nine. Arrange them so that each row would sum up to fifteen. Here! see if you can do it. (Ferrari takes it, and works it very quickly.)

Father: (Aside) If I were training that pupil, he would soon be a teacher at Milan, and I'd get rid of his blasphemous habits.

(Curtains close)

Act III

Chronicler: (Reading in front of curtain) Thus Girolamo Cardano was a man of remarkable contrast. He was an astrologer and yet a serious student of philosophy. He was one of the students of the well known clock problem. He is said to have been a gambler, a man whose statements were extremely unreliable. He was a father and defender of a murderer, an inmate of an almshouse, and a victim of blind superstition. On the other hand he is known to be a first class algebraist, a physicist of accurate habits of observation, a physician, a professor and rector of Medicine at Milan. "Always a man of genius, always a man devoid of principles."[1] As to his work, the most noted was *Ars Magna*, the first Latin treatise devoted solely to algebra. In this book he printed Tartaglia's cubic solutions, which were imparted to him under a secret oath. We now will show how he came to get the solutions and what happened then.

Scene: Cardan and Ferrari on stage. Home and furniture the same as in Act II.

Cardan: I've tried my best to get the solutions to the cubic equations from Tartaglia, but all in vain. He will not give them up. (He sits on a little stool and weeps. His face in his hands) All hopes are gone!

Ferrari: Master, do not weep. I'll try to help you. (He stops to think.) I have it! Why not go and tell Tartaglia that he is invited to some important meeting and I'll prepare the rest. He will have to give the secret up then.

Cardan: (Looks up and becomes very thoughtful) I'll go. I'll tell him a wealthy nobleman wishes to arrange a meeting at Milan between mathematicians and his would-be patrons. And you Ferrari stand behind that open door and when we walk in, shut it. This will be my last hope. (Cardan leaves)

Ferrari: What was I doing. Oh, yes, this treatise. Aha! so it belongs to Tartaglia. (He sits down and picks it up) Here he explains his theory of complements. (Reads) 8×6 is the same as 10×6 minus 6×2, the complement of 8. (Thinks) 8×6 is 48 and 10×6 is 60. (Counts on fingers) 6×2 is twelve. Then $60-12$ is 48. Why! that's remarkable. (Reads to himself. Getting up rather shocked.) I'd better arrange the room for the mathematical meeting. (laughs aloud) Ha! Ha! Ha! What a joke this will be. (He cleans the room a bit)

[1] D. E. Smith, *History of Mathematics*, I, 196.

Now this looks more like a meeting. Doesn't it? I better hide behind the door. It's about time that they were coming. (He leaves. The stage is silent for a time.)

Cardan: (Outside) Here we are, Nicolo, at the home of the nobleman. (They walk in.)

Tartaglia: Your noblemen aren't so wealthy as I thought. I would estimate this to be a nobleman's barn. Say! (hears the door being locked) What do you want to do to me?

Cardan: (Laughs) Ha! Ha! Ha! Now you must give me the solutions to the cubic equations.

Tartaglia: I can't, I left them at home.

Cardan: Oh, no, you didn't. You can work them without referring to the written solutions. Here is a paper and pen. You must work them if you wish to live.

Tartaglia: (Rushing to the door) I won't work them. Not for you. (Bangs with his fist on the door)

Cardan: (Laughing) It's locked. Come, come, settle down. Come take a seat here on the bench near me and let us talk like friends.

Tartaglia: But I tell you, I will not give you the solutions!

Cardan: Forget the solutions for a while. Come, let's talk our problems over.

Tartaglia: All right, but remember, I won't give you any solutions. (Comes towards Cardan slowly and sits down)

Cardan: It certainly is remarkable how mathematics, and especially algebra, seems to progress in Italy.

Tartaglia: Ahem!

Cardan: Why is it that you conceal the secret of your solutions. You are getting old and what good will it do you to keep it away from the world.

Tartaglia: Ahem!

Cardan: Now, if you would give it to me I would add to it, and pass it on to other young lads. I promise you that you will still have the credit of being the discoverer of such an important solution.

Tartaglia: Ahem!

Cardan: Come, come, write the solutions on this paper (Presents a piece of paper to him.)

Tartaglia: All right, but not until you take an oath before God that you will keep it a secret.

Cardan: Settled! If you want it to be a secret, it shall be so. I won't be afraid to take an oath.

Tartaglia: Say after me, "I promise before God never to reveal the secret of these solutions."

Cardan: I promise before God never to reveal the secret of these solutions.

Tartaglia: If God wills it to be so, so it shall be. (Takes a paper from his pocket and hands it to Cardan) Here it is, but remember the oath. It will not be I who will punish you, but God. Now, let me go!

Cardan: Lodavico, open the door. (The sound of a door being unlocked is heard.) Good day. Thank you for the solutions!

Tartaglia: Good day. (Exits) (Ferrari enter)

Ferrari: Do you have the solution?

Cardan: Yes, the plan has worked. Now I can continue with my book. With these solutions, the book will be ready for publication.

(Curtains drop for a few seconds)

Chronicler: (Reading) Thus *Ars Magna* was completed and published. Cardan claimed the solutions to the cubics for his own. Let us see what will happen now.

(Curtains rise)

Cardan: So! I am challenged to a duel. Well, Lodavico, I have always been your good master. Furthermore, your ideas have saved me many times. Now I ask of you to answer my duel.

Ferrari: I won't be afraid. I'll get all our friends to stand for me and believe me, Tartaglia will not escape alive this time. (Laces his sword on.)

(Ferrari leaves)

Cardan: (Sits down and studies. A knock is heard. He goes to the door) What is it? Oh! Lodavico. Home so soon! What has happened?

Ferrari: We met Tartaglia for the duel, but he escaped. Thus we were forced to leave.

(Ferrari shuts the door and begins to unlace his sword. A knock is heard.)

Ferrari: I'll answer it. (Opens the door) A message. Thank you, son. (Hands the message to Cardan)

Cardan: (Reads) "Since you refused to have a duel, let us dispute the question by a contest. I challenge you and Lodavico Ferrari. I will present thirty-one problems for you to work in fifteen days. You may do the same for me." (Lays aside the letter) All right! Two against one may not be fair, but he asked for it! We will accept his challenge!

(Curtains fall)

Chronicler: And thus Ladies and Gentlemen, Cardan presented thirty-one problems and Tartaglia did the same. Tartaglia rejoiced at the end of seven days, but Cardan and Ferrari spent five months working their thirty-one problems. Having finished them, they found the work all in vain. All but one solution were wrong. Thus ended the contest.