

(applause)

Dr. Abraham Nemeth:

Thank you very much. Where is the microphone? I usually talk without one. You have no idea how many thousands of people I kept off the street. In order to get people's attention, it's common practice to begin every speech with a little story. So I have to tell you a story of these two girls who were very good friends. They worked together and one girl said,

"I took a first aid course from the Red Cross and boy did it come in handy."

"The first aid course came in handy? What did you do?"

She said, "I was out for a walk on my lunch hour on Wednesday and I turned the corner and there was a crowd of people. And there was this guy lying on the pavement. He was writhing in pain and screaming and there was blood coming out of his ear and his nose."

"And the first aid course came in handy? What did you do?"

She said, "I sat down on a bench and put my head between my knees."

(laughter)

Well, I have to tell you my lecture will be in the form of biographical notes. Not that I have big superego that I have to tell you about my biography, but I think that many of the incidents that I bring to your attention will ring a familiar note in your life experiences. So let me begin with my preschool experiences. I was born totally and congenitally blind. On lower east side of New York City a rough tough neighborhood where people either made it big or they wound up in Sing Sing. I grew up in an environment of pure love. I had two wonderful parents, I had four grandparents whom I knew and loved. I had uncles and aunts and cousins by the dozens and we all got along very well. Now just to give you the kind of culture we were in, I grew up in depths of the great depression of the 1930s and when we could afford a bottle of milk, we kept it under the running tap water because we could not afford the ice. Just to say, my father and his brother were partners in the garment industry. They used to put fancy stitching on pieces that would later become skirts and dresses for ladies. They embroidered, pleated and so on. If they ever had a very good, there was never really a good week but a fair week, my father would steal his sister's pocketbook and put a five dollar bill in there. And she never knew how it got there. She thought she had overlooked it. She never found out how it got there until 25 years later. My father was a very caring and observant person. He would walk me through streets of the lower east side and wherever he was going, go by a different route each time. He would say things to me like, "We are now walking west and when we come to the corner we will make a left turn and then we will be walking south. And my father would let me touch the lettering on mailboxes, police call boxes, and fire call boxes, and he even let me touch the neon tubing on the outside of store windows to learn how script letters were formed. He let me read the letters on license plates and I learned

about print. That made it possible for me when I taught mathematics to write on a blackboard. I told students that I am only one who can't see what I wrote but on the other hand, I'm also the only one who doesn't have to take the quiz. My mother was equally helpful. My mother would send me on a shopping spree. She would give me a list of six or seven grocery items, not only the name of the items but the quantities, and I had to go to the grocery store. She was not fearful of my going to the grocery store at the age of six or seven because I had no streets to cross, I just walked to the end of the block and around the corner, and furthermore the grocer was my grandfather. And I had to bring back all the items in the quantities specified and the right change. So one time my mother gave me a penny and they had a little vending machine in front of the candy store. You put a penny in, turned the knob, and a gumball would come out. But to my luck not only did a gumball come out but so did the penny. So I put the penny in again and I got another gumball. And I kept doing this until I had a pocket full of gumballs. And I went back to my mother and I told her of my great fortune. And my mother gave me some kind of a lecture about honesty, confiscated all the gumballs except one, and the penny.

(laughter)

My uncle was handyman and he used to like to take me with him. He did electrical work, plumbing work, carpentry work and so on. And he showed me all the tricks of the trade. So that today I am able to fish a wire through a wall and make an outlet. And when I had my own home I hung up all my own chandeliers. Anyway, I had a wonderful, wonderful grandfather who even today after he has been dead for 60 years is a role model for me. He taught me and guided me and told me many times that it was better to light a candle than to curse the dark. And so I had that grandfather. My other grandfather was the grocer. I would have free reign of the store. So I went in the back of the store to the ice box. Not a refrigerator but an ice box with a block of ice in it. As the ice melted it ran into a hose and the end of the hose was in the sink and the water would run down the sink drain. I was examining this sink with the hose in it. And I said,

"A piece of hose unconnected?"

What I learned from my uncle is it doesn't make any sense to have an unconnected piece of hose.

"Where does it fit? It belongs somewhere."

Well the drain hole was too big for the hose and the only other place that was possible was the faucet. I'm trying to put the hose on the faucet and it was a nice good tight fit and I said,

"Ah-ha! That's where it belongs."

I want you to know an hour and a half later my grandfather came looking for me.

(laughter)

Now I went to grade school of course. My grade school was a regular public school. The New York City public school system had a school with a resource room for blind children in every burrough. The resource room for the school that I went to was within walking distance from where I lived. So I would walk to school every morning and walk home every afternoon. Not by myself of course. My aunt took me and walked me home. My other courses, my arithmetic course, my history course, my geography course, I was integrated into the regular side of the school. I was not put in a separate classroom with a computer and a Braille writer and all that kind of equipment. There was no such a thing. I was in the regular classroom with all the other kids. We learned geography and history and I guess in those days I was too dumb to learn if you are blind that you have to read slower. So I didn't read slower. I read at same rate other kids did. And that was a very good experience for me. My resource teacher was a lady by the name of Ms. Roberts. And when the regular classroom kids had penmanship, art, things which were entirely visual, I went to Ms. Roberts' room. There she taught me Braille and typing. I could type at the age of 9 years. She had a big globe of the world maybe 36 inches in diameter. The oceans were flat, nice and smooth. The land masses were raised and a little bit rougher. The mountains were raised even higher. I remember having a lot of fun running my fingernail through the Panama Canal. One day my arithmetic teacher said she was going to give me an arithmetic test. So she sat me down and she said,

"How much is 3 and 3?"

Well I thought for a moment and I said 3 and 3 are 6.

She said, "Oh that was very good. I'm going to give you 100%."

And she left. And I'd never heard of this 100%, I had no idea what it is, but when you're six years old, a 100% is a big deal. So I waited for her to come back with this 100%, whatever it was. She didn't come back and I thought well, it must be something she has to get during her lunch hour. I fantasized that when I had a hundred of these percent, whatever they were, I would be able to give a few to my friends and still keep a lot of them. But at the end of the day I got nothing and so I went home to tell my father that my teacher promised me a 100% but gave me nothing.

(laughter)

So that was the beginning of my concept for this. My father explained to me carefully about 100% and I understood. I had another resource teacher and that was Ms. Burke. She worked the same way but this time the school was in the Bronx and when I went to high school I had another resource teacher. This teacher was exactly the same. I went to regular classes for all subjects but the resource teacher had all sorts of Braille books and the equipment for doing raised line drawing and so on. His name was Mr. Leskowitz and I remember I used to visit him many years even after I graduated from school. And he said Abe, it's time to retire and I said why. He said a girl came to me and she said my grandmother had you.

(laughter)

Now then I went to college, Brooklyn College was a city sponsored school. And there was no tuition to pay. It was free. Believe it or not. It was very high quality teaching. Those of you who know psychology, having been in the field of psychology, will be interested to know that my psychology professor was Dr. Abraham Lazlow and a very inspiring instructor he was. Now I want you to know that my integration at the elementary school level and the high school level prepared me very well for attending college. Because I had to fend for myself the same that I had to do in elementary school and high school. I didn't have to go through a period of adjustment. Very often I saw my friends who came out of schools for the blind, and the way that they handled college courses was entirely different from what they knew from schools for the blind. But I had been dealing with it since I was six years old so I was prepared for it very well. I was always interested in math. As a matter of fact, I had a buddy who was one year younger than me. So when I was studying algebra I taught him the algebra that they taught me in freshman high school. He was in the 8th grade. He was one year behind. So when he entered high school and they wanted him to take algebra and he said "but I know algebra". They didn't believe him so they gave him a test and he passed the test. And maybe this was the first case of advanced placement. I don't know.

(laughter)

Anyway I wanted to take math courses. My counselors said it was not a viable option for a blind person. There is no way to write mathematics, there is no way to read mathematics and you better pick a different field so I picked psychology. I took all the psychology courses they offered. But when I had the opportunity to take an elective, guess what? I took as many math courses as they offered. When I graduated I continued at Columbia University and earned a Master's degree in psychology. And then I tried to get a job but I could not get a job. And so I did unskilled work at the American Foundation for the Blind. And one thing that I did at the American Foundation for the Blind was that all Helen Keller's Braille itineraries and menus and things, I did in Braille for her. I knew Helen Keller because I had to communicate with her about the Braille that she needed and I didn't know Anne Sullivan basically, the lady you saw what was that play... She was the teacher of Helen Keller but I knew Polly Thompson her next companion. And so I knew her. Meanwhile, I could not get job in psychology and my wife's name at that time was Florence. She said,

"Tell me the truth. Wouldn't you rather be an unemployed mathematician than an unemployed psychologist?"

(laughter)

From that moment on I regarded myself as a mathematician and worked toward getting a job in that field. I went back to Brooklyn College and just like some people go out one night a week to play pinochle, go bowling, or whatever, I went to Brooklyn College and took math courses. That was my recreation. I enjoyed that. As I took these math courses

of course I had to do assignments and I had to figure out how to write these things in Braille. That is how I began to develop the Nemeth code for myself. Let me tell you how I got my first job. It was 1946 and all the boys were coming home from the war. They had already taken and passed the first course of calculus. And now they were reentering school and they were eligible to take the second course of calculus. But can you imagine how much first year calculus they remembered after a war. So we had set up a large room to help these students. There were panels of blackboards all around the room. We circulated around the room. I was one of the volunteers. I tapped this student on the shoulder and I said,

"Read the problem that you are trying to solve."

And he did.

I said, "What do you have so far?"

He said, "nothing".

Anyway, I talked him through the problem and when I got to the first formula I picked up a piece of chalk and I wrote the formula on the board. And then I talked a little more and wrote the second formula, and so on. I didn't know it but the department chairman for mathematics was watching me. On Friday night I got a telegram from the department chairman, and as my brother was looking at the telegram I said,

"Oh Lord, what did I do?"

But the telegram said one of his staff became ill and would be out for the semester and asked me to take his classes. So that is how I got my first job. The first course that I had to teach in mathematics was a group of students who were social science majors. They were taking a required course of math. They didn't want to take math but it was a requirement. And I did not choose the syllabus, I had to teach the syllabus that was handed to me. One of the topics on the syllabus was convergent and divergent series. That is fancy talk for people who are not mathematicians. But everybody played around with the series one plus a half, plus a quarter, plus an eighth, plus a sixteenth, and so on. You get closer and closer to 2, and you could get as close to 2 as you wish, but could never equal 2. And I told my students that the limit is 2 and the series converged to 2. And said now you can go home and make your father feel good about the tuition because you knew all this fancy language. But anyway, I then proposed the series one plus a half, plus a third, plus a quarter, plus a fifth, and so on. And does it converge or diverge? Well, these were social science students so a lively discussion ensued. There were thirteen students in the class and I said,

"Well, since you are social science students, let's put it to a vote."

So we put it to a vote and 8 to 5 that the series converged. Then I went to the board and I put a proof on the board that the series diverged. I said the lesson that I want to teach you

in this: math class is not whether it converges or diverges, because 3-5 years from now you won't care. But what I want you to teach you is you put things to a vote only when no one knows the answer.

(laughter)

So that was lesson I gave social science students in mathematics. Ok. How I got the teaching job in Detroit. I went to the library with a sighted assistant and the library had a college catalog for all the schools in country. I looked at the offerings in the mathematics departments in all those schools, and I chose those schools that offered the kinds of courses that I could teach. And I chose them not by alphabetical order but by geographical preference. I like the warm climates, Hawaii, North Carolina. Anyway, I wrote maybe 150 letters. I did not do actual typing. I had volunteer. She was crackerjack typist. She typed all those letters letter perfect. For her trouble my wife and I bought her, she had a bracelet with all kinds of charms, and we bought her a gold charm that represented a typewriter.

(laughter)

Most of responses I got were negative.

"We don't see how a blind person can teach the kinds of math courses that we offer."

Some of them were more conciliatory -

"We will keep your letter on file, if a position opens we will contact you,"

and so on. However, two letters I got were offers for an interview. One from the University of Detroit and one from the University of Colorado in Boulder. But I was told the position in Boulder did not lead to tenure whereas the position in Detroit did. Request from University of Detroit asked me to bring my wife for the interview. We went for the interview and when it was all over I was told they would let me know by end of the week what the outcome is. And I deliberately let them know that I had another interview in Colorado. At 7:30 following morning I got a telephone call. It was from the Dean of the School of Engineering and he said,

"I apologize humbly for calling you so early, but I wanted you to know if you want the job here you have it and that you may cancel your trip to Colorado."

So that's how I got the teaching job at the University of Detroit. I progressed from a regular instructor to assistant professor, associate professor, full professor and so on.

The first semester that I was there, there was going to be a meeting of the Mathematics Association of America. My department chairman, I don't remember the language he used, but it sounded like it was required that I go there and give a paper. So I went there, I prepared a paper and gave a paper. It was a 15 page table of logarithms. I won't go

through the details of how I did that. But with this table and with a calculator you could find the logarithm of any number with precision and I distributed that paper there. My department chairman was very happy. I completed my Ph.D. at the state university. I did most of the work at Columbia but at the time I tried to get a thesis advisor he was off on a full scholarship to Europe. I got the job at University of Detroit and completed Ph.D. at Wayne State University. They were anxious to nominate me as alumnus of the year and I wrote the president of university and I now have lifelong access to the computer system at Wayne State University. In 1972 I got call from state department and I said to them,

"What can I do for you?"

They wanted me to go to Soviet Union. I said,

"The Soviet Union? What is in the Soviet Union for me?"

It turns out they heard you developed this code and that it's being used in several countries around the world and they would like to know about it. Well I said to them I was very happy to go there but who is paying for this little junket? They said the Soviet Union has anticipated this and will pay all expenses for you and your wife. So I went there at the invitation of Soviet Union and they indeed paid all expenses for me and my wife. Four years later I got another call from the state department.

"Do you want to go back to the Soviet Union?"

I said "Why?"

He said he they had a request from the Soviet Union. They wanted to know how the hell a blind person can access the screen of a computer. I went back in 1976 and I told them. Anyway when I got there that time I went to two cities. In those days it was Leningrad but it has now become Saint Petersburg. It was June and long days and daylight almost all day long. They assigned a chauffeur guy to me and my wife. And that was the only responsibility for the duration of our stay. They told us just give 30 minutes notice and we will have the driver and an English speaking guide and he will take you anywhere you want to go. They did. The guide was telling me some current jokes. At that time Breshnev was the president of the Soviet Union. She said some guy broke into the Kremlin and he was yelling up and down the hall,

"Breshnev is a fool! Breshnev is a fool!"

Well, it didn't take long for the KGB to get ahold of him and arrest him. He had a speedy trial. Quicker than you get in the US. And she said they sentenced him to thirteen years: three years for creating a disturbance in a public building, and ten years for revealing a state secret.

(laughter)

Then she told me about this poor guy who was sitting on a park bench and he had his hat on his lap, reading a newspaper and a bird flew over and left a little calling card on his lap. As he scraped it off with newspaper he was muttering...(unable to make out over noise).

(laughter)

Anyway, the community of Detroit they thought I would be a good representing on the Commission for the Blind. So one day I got a call from the Governor of the state of Michigan, a republican. He wanted to appoint me to the Michigan Commission for the Blind. I said I would be honored and pleased to serve and all that stuff. And he said he was not supposed to ask me but he was curious about my political party affiliation. I said,

"Well, I'm a Democrat."

He said, "Oh, in that case I will make you the chairman."

So I became the chairman of the Michigan Commission for the Blind. I served there for two years. Politics is not my cup of tea. I had to go to talk with senators and legislators who were trying to pass a literacy bill at that time to make it mandatory for blind people to be taught Braille. And many teachers were opposed to it. At one time I had to read something that I had prepared and I was reading it from Braille. One of the teachers who was there said,

"You mustn't go by him, he's a genius."

I said, "I'm not. But you can test whether I'm a genius or not. But my ability to read at the competency of a high school student is not one of the criteria of being a genius."

Anyway, we eventually did get a literacy bill passed in the state of Michigan. During my course of studies in school and as a new professor I needed math read to me. Everybody read math to me in a different way. I devised a system called mathspeak. Mathspeak is a standardized way to pronounce math formulas. Because what I found was the more complicated the formula was, the more arm waving and shouting there was. So I devised a standard unambiguous way of reading math called mathspeak. I now work for an organization called GH and they have taken to automate mathspeak so it can be read using a synthetic voice instead of a live reader. They got a grant to develop that somewhere in the amount of 1 million dollars. I also work for Jewish Braille Institute in America translating prayer books into Braille. Not just putting them into Braille but arranging them in such a way that a worshiper who is sitting in synagogue would have in one volume everything he needs for that particular section so I was knowledgeable to be able to do that. Now I want you to know that in recent years I have read two obituaries of myself. The first time when my brother passed away I was very well known at the Jewish Braille Institute and my sister called them to inform them of my brother's death. My brother's name was Aaron. And the busy secretary wrote down A. Nemeth died. The following month my obituary appeared in the Jewish Prayer Review. I was very flattered.

And I called the secretary and I said tell Dr. Freid to sit down because I'm calling him. I borrowed a phrase from Mark Twain. He said that the premature reports of my death are greatly exaggerated.

(laughter)

So next time was about two years ago. No, four years ago. My wife died in March of the year 2000. And somebody mistook her death for my death and published an obituary for me in the Journal of Visual Impairment and Blindness that is published by the American Foundation for the Blind. They had to publish a retraction and labels for the libraries. So anyway I was very pleased with both obituaries. Now to tell you a little about the code and why I needed it. When I began studying mathematics there was no way to write math notations. You could write x square and x cube and x to the fourth power but after that, that was the end. It was just bad. So I devised this code for my own purposes. When I worked with the American Foundation for the Blind there was a gentleman there by the name of Dr. Clifford Butcher was blind and he had a Ph.D. already in physics from Columbia University. He asked if I had a table of integrals and I said yes but it is in private code. He asked me to teach him my code. He said,

"I'm desperate, teach me your private code."

And so I did. Now at that time there was an organization called the Joint Uniform Braille Committee. It was staffed by people both from the USA and England. They had a subcommittee on mathematics and Dr. Whitcher was the chairman. He said I had this great code and they invited me to write short report on the code so I did. It was not as short as they would have liked. They looked at it. They invited me to come and present it to them one Friday morning. By the afternoon the code was approved. That was in 1952. That is how we first got the code started. Now my advice to student and teachers, if you want to do math, do it, if you are Braille person, do on Perkins Brailier. A Perkins Brailier can simulate the format of a math problem that you would do if you could use print. Don't try to do it in your head. Your mental capacity is limited. Don't try to devise your own code, you'll never remember what you wrote two weeks later. Work on the Perkins Brailier. A notetaker is not adequate. A notetaker has only one line of display Braille and that's all you can do. Do it on a Perkins brailier. Do not attempt mental gymnastics. If you are teacher acquaint students with raised line drawings. I find that students are steered away from raised line drawings many times until no amount of verbal description will do, you have to see the picture. By that time it is a complicated picture and the student having had no prior experience with raised line drawings can't make it out. You have to grow up with it. Now, as you may have heard, there is competing code called UEBC stands for Uniform English Braille Code. It was devised almost completely by Joe Sullivan, the principal in the Duxbury system. The problem with it is it is based on upper numbers. It got started because I and a friend of mine, Tim Cramer, who is deceased now, wrote a letter telling them that the situation currently is intolerable. We have one way of writing it down that is literary code, another way in the computer code, a third way in the Nemeth Code, and we hear about the UEBS. They appointed an all American committee and that committee became internationalized with other countries.

South Africa, the United Kingdom, Australia, New Zealand, Nigeria, all the principle English speaking countries around the world. The problem with UEBC is that it uses upper numbers. Trying to write 3a plus 4b you have to write a # sign before the 3, a letter sign before the a, and a # sign before the 4 and a letter sign before the b and mathematical notation becomes so cluttered with # signs and letter signs. There are other problems. Misalignment. Imagine trying to have in columns 3a + 4b, another 345b, the number of # signs and letter signs is not the same in both so the digits do not fall into columns. So it is impossible to work with. Misalignment is another problem with that system. I decided to revise the Nemeth code. I call it NUBS, the Nemeth Uniform Braille System. The literary code has many shortcomings. You can't write anything but numbers, letters and punctuation. No Greek letters. Can't show which accent it is, can't write plus sign have to write p-l-u-s. You can't write the = sign. You have to write e-q-u-a-l-s. And things of that kind. Sighted people don't have that problem. Blind people should be able to do same thing. I devised this system to do that. On Thursday I go to National Braille Association in Memphis and there is a committee there who will evaluate the part of NUBS that I have already submitted, which is most of it, and they will promote it. Anyway that is situation today. Now in conclusion I was once told by a rabbi that when I said in conclusion don't pay much attention.

(laughter)

I hope I have given you some useful information. All of this has been from personal experience but I think you can relate to many of the situations I have described, whether you are a student or a teacher or a counselor, and see what the implications are. I read article by a gentleman who was applying for a job as a physiotherapist. At end of interview lady said she would let him know. On his way out she handed him piece of paper and when he asked his wife what it was she said it was a five dollar bill. She was giving him charity not an opportunity for a job. We often have problems with attitudes of the public. When I used to go to a restaurant with my wife, the server would ask her what I wanted. She would tell him to ask me what I wanted, that I knew better. Anyway I would just like to say I want to make myself available to answer any questions that you may have. Not only now but during the time that I am staying here and I want to thank you very much for listening to me.

(applause)

Before I take questions I want to add a P.S. My mother confided a dream that she had. In her dream I had just finished addressing a large audience and I was being given a tumultuous standing ovation. And she heard in her dream two women talking behind her and one woman said "Wasn't that a wonderful speech?" And the other woman said "Yes, but who is the mother of that boy?"

(laughter)