

(Applause)

Dr. Bath:

It is so nice to be here, and I must say you folks in North Carolina really know how to make someone feel welcome, so I want to thank all of you for the invitation to come here tonight and share with you some of my ideas and philosophy. The song "Amazing Grace" has a special meaning for me, which is why I asked that we begin the program with that song. The poetic refrain "but saved a wretch like me" resonates in my being because I was sister to the so-called wretched of the earth. I stand before you tonight and celebrate that I was born in Harlem, that I grew up with the so-called wretched of the earth. The so-called have-nots and the wretched of the earth, they were my friends and neighbors. So as we begin this lecture tonight, we will start off in the Sankova posture; we're going to look back. And looking back in this journey tonight, we're first going to go back to my roots in Harlem. Second, we're going to look back to my inventions and discoveries. Then third, we will look forward to the future, molded by the vision of philosophy but propelled by our roots. As some of you know, my mother was born in North Carolina. She migrated to New York. She met and married my father, and I and my brother grew up in Harlem. We grew up money poor but amazingly rich. What is amazing grace? Amazing grace is the halo of love, so I can stand before you tonight and say, "Thank you, Mother, for working honorably as a domestic scrubbing floors so I could go to medical school." I want to say, "Thank you, Father, for working proudly as a subway worker so I could become a doctor and share the grace." So because of my roots, because of my heritage, I can share the grace and serve the needy. Looking back on my roots, had I not had that beginning, I doubt I would be standing here today talking to you about walking in the world sharing the grace and serving the needy. So that, I do not want to forget. I'm sure you remember that not so long ago all of Africa was considered the Dark Continent and its people were considered the wretched of the earth. All of the violin chords of my heart really weep for Ola Benga and Sarah Baartman. Next slide. Sarah Baartman was known as the Venus Hotentot. She became an object of curiosity and scorn, but she was tricked into coming to England. The image -- oh, could you go back to the first slide? Thank you. The image that you see is the photograph of her mortal remains as she was preserved and exhibited at the Paris Museum until 1995 even though she died in 1815. Ola Benga. Ola Benga was a pygmy from the Belgian Congo when he was brought to the United States in 1981. The pain and dehumanization of being exhibited in the monkey house of the Bronx Zoo led to his suicide. Next

slide, please. There are not only tragic stories in Africa, there are triumphant stories too. What else was in the dark continent of Africa? Well, there was enlightenment. Timbuktu was the citadel of 16th century enlightenment and education. Specifically, I would like you to look at the regional map here which shows Mali, Niger, and I want to share with you some history about the Dogon tribe. I cannot yet trace my roots to the Dogon Valley, but my father's Trinidadian ancestors certainly traced their heritage to West Africa. Next slide. Here is an image of the Dogons. They are an agrarian cliff dwelling people. Next. The interesting thing about the Dogon people is that they have a belief system dating back to 3200 B.C., which is intertwined with astronomical phenomena and observations. We have a diagram of the dark star. Next. Here is a satellite image of the dark star, and this being Sirius A. Next. I call it the Timbuktu Knowledge Center as we would call it today, but in the mosques, in the buildings, the priests were the gurus of astronomical knowledge. Next slide. The Dogon people were studied in the '30s, from 1930 to 1950, by French anthropologists Griaule and Dieterlen and they discovered remarkably that they had the knowledge of a distant star called Sirius B. Their knowledge of this star was long before it was discovered in 1862 by an American optician who was using a new telescope. Next. They were astronomical geniuses comparable to Copernicus, Galileo; and their cultural practices, beliefs, and artifacts predicted the existence of Sirius B. They also predicted the density of Sirius A, thinking that it was far heavier than anything on earth. Next. So these ancient Dogon predictions were validated in the 20th century by observations. Next. Let's go to the slides that -- this is an image of Sirius A and Sirius B but reflections of -- through the x-rays. Yes, we have an advertisement for Apex. Rush out and buy it today. Next. So why was it a surprise when I, a woman child from Harlem, invented Laserphaco? Did I not have the brink of knowledge from the Dogon people in my roots at least? Did I not have the divine inspiration to serve the needy and to share the grace? The purpose of Laserphaco was to improve cataract surgery. The purpose was to improve vision. The purpose was to give the gift of sight. I had very modest ambitions. I did not want to be Rockefeller or Donald Trump. It was my quest, my vision simply to walk in the world, to share the grace, to serve the needy, to carry the brick and to give the gift of sight. Next slide. Here is a rather simplified diagram of the human eye, and I want to direct your attention to this structure, the lens of the eye, which in combination with the cornea and the aqueous media, refract the light and bring it to a focus on the retina. Next slide. And as I discussed at lunch today, you would be able to say this is a cataract. Here we have an example of a normal eye, and as you look through the cornea and through the pupil, there is clarity. Next slide. This is an example of a cataract which is pretty obvious to see. A cataract is a clouding of the lens. By definition it is an opacity of the visual axis which obscures vision. Next. We're having

technical difficulties beyond our control. You know, if we can't pop out the slides, we can just show them one at a time. Great. I believe we missed a couple, did we not? Okay. Oops. Do you realize that that was my passion, that was my invention? That's the one we can't show?

(Laughter)

Basically the one that we can't show is the one over here. It showed the components of the Laserphaco invention. Laserphaco is a device which is the Laserphaco Probe, which consists of an optical fiber carrying laser radiation and the irrigation and aspiration sleeve. Here we have a compressed concept of that, which is just showing the entire probe without its components. What was missing is the aspiration sleeve, the irrigation sleeve, the laser. So here we see the Laserphaco Probe in the lens of the eye creating phaco ablation. Next slide. There are different types of lasers. Most of my research was with various kinds of excimer lasers, the argon fluoride and neon fluoride primarily. This is a slide I borrowed from a colleague of mine that shows the precision of 193-nanometer laser, and it's used to etch the surface. And it was the precision, the submicron precision of lasers, which stimulated my imagination and my desire to perfect the art of cataract surgery and to be able to precisely excise the cataract lens. Next. Pursuing excellence. Next. This is an experimental lens from the eye, an experimental cataractless lens, and drill holes were precisely etched through the cataract. This is the first time this had ever been done and proved that one could successfully create a delivery system to precisely remove cataracts. This was done in the laboratory. Next. This is an example of an excised bovine lens. The other was a human lens. And this shows the moment, the instantaneous moment of a laser pulse, which although I was using a UV laser, you can see some blue fluorescence here. Next. And this is also the Laserphaco Probe, but with the lights out you can see the blue fluorescence. It is in the human eye. Next. Now, I understand that Mario will assist me in articulating some things and thoughts about Laserphaco which I shared with my colleagues at the end of the scientific presentation to help them understand my passion for getting the laser cataract surgery device through the bureaucracy of the FDA, of approval, and to the marketplace. So Mario?

(Applause)

I've never shared the stage with a rapper, so I want to thank you. It's quite a pleasure. But these are the acronyms, some of the medical-ese or alphabet soup of medical acronyms to go with this.

Mario:

This was just given to me earlier today, so bear with me. I've got to figure out how to make the beat.

(Mario raps)

Dr. Bath:

Thank you very much. We are going back to the slides now. Laserphaco, of course, is a scientific innovation, but my quest to prevent blindness led me in the direction of humanitarian work as well. It was my quest to share the grace, to serve the needy, and to cure blindness that led me to Africa, to Asia, China to try and help. And I realized that preventing blindness was a lot easier than curing blindness. It was around that time that I invented, so to speak, or promulgated a new discipline for ophthalmology which I call community ophthalmology, and there's an article over here some place published in the "International Congress of Ophthalmology" when I presented that in the late '70s. So here I am in a village in Nigeria, in eastern Nigeria. Next slide. Now, this is a composite slide that shows some of the factors in blindness due to trachoma. The etiologic agent in trachoma is an organism called chlamydia trachomatis. And I remember at lunch Ms. Howard discussing how as she went further to the Saharan areas of Africa, she noticed so many individuals with scarred corneas due to chlamydia trachomatis, which starts in early childhood. Some of the conditions are overcrowding, lack of access to clean water, and sanitation issues which cause re-infection or scarring of the eyelid, which leads to scarring of the cornea. Next slide. Another public health type of blindness is blindness due to onchocerciasis, so-called river blindness. This is seen in places like Mali and Nigeria, and it's due to -- the causative agent is this filarial worm, onchocerca volvulus. And once it infects the cornea, the cornea scars. It also infects the skin, and people have horrible itching. The parasite is carried through, again, unclean water. Next slide. One of the most tragic causes of blindness is xerophthalmia due to a vitamin A deficiency, and this is most tragic because it affects children primarily. Many things are responsible, certainly population density and not enough food for the family, and it is the children and the women who usually suffer when there is nutritional problems, famines, and things like that. Next. We all remember the famine in Ethiopia, the famine in Sudan, the famine that's going on now. And when people don't have access to water for crops or when there is war, there will be malnutrition, and it is the children who will suffer. This is an example of a baby's eye where the cornea has melted because of vitamin A deficiency. Next slide. So as I traveled to many countries throughout the

world, another one of my activities was to teach ophthalmologists the art of surgery. My specialty was corneal surgery and using this device called the keratoprosthesis. It is a device that replaces the cornea. It consists of an optical cylinder, which is threaded, and a Teflon supporting skirt which is fenestrated; it has the holes in it. Next. Well, we missed one but that's okay. Here I am in the O.R. teaching some of the students some of the techniques in eye surgery. Next. And now here I am in Tunisia in '94 with two of the patients that I operated upon, having taught this gentleman and this gentleman here techniques of keratoprosthesis surgery. And now we are ready for the video.

(Video plays)

We can stop the video. Now, I know there is someone who wants to -- are you going to do "The Gift of Sight?" Okay. In addition to writing the rap lyrics, I also created this song.

Ms. Jones:

(Sings "The Gift of Sight")

Dr. Bath:

All we need to do now is burn it and sell it. In closing, looking back on our journey tonight, we have come a long way. We have come from our roots in the Dark Continent, the Middle Passage, the Enlightened Continent, through trials and tribulations of modern science, and back to the African American Culture Center here. In closing tonight, I ask that each of you remember my story. But deep within, remember your story. From the beginnings of your own roots, I ask please share the grace. Out of the goodness of your hearts, please serve the needy, and with the excellent education that you receive here at North Carolina State University, carry those bricks of knowledge as you walk in the world. The builder needs a good engineer. The builder needs a good nurse. The master builder needs a good teacher. Keep the fire and the torch lit, and please do not forget.

(Applause)

Ms. Howard:

I have a little gift for you. As you know, it is traditional in the South and in a lot of different cultures, African American culture in particular, that we share not only food and conversation with people who visit us, but we also like to offer you a gift. So the gift we have for you this evening is a small one that we imported from West Africa.

Dr. Bath:

Very good.

Ms. Howard:

It is often referred to as a Shadow or Shadow Angel. The West African carvers tell us that it depicts a person with raised hands to the Creator, giving thanks for the blessings received and asking for continued blessings. And this is exactly what we feel towards you, Dr. Bath. We thank you for your scholarship, we thank you for caring, we thank you for the grace and we wish you Godspeed in all that you do.

Dr. Bath:

Thank you so much.

Ms. Howard:

Dr. Bath is happy to take a few questions from students, so if you will -- and others. I shouldn't say just students; students and others. So if you will stand, please, and address your questions loudly so that all can hear, we'd appreciate it. Yes, sir.

Guest:

Would you say that your research in laser cataract surgery has had any effects on recent developments in LASIK eye surgery in patients?

Dr. Bath:

That's an excellent question. For LASIK, they are using the argon fluoride 193-nanometer excimer laser. My research was originally based on the 308-nanometer xenon fluoride excimer laser. Very interestingly, it was -- do you remember the slide I showed you with the straight edge etchings? Okay. It was that phenomenon that led to two paths of research. One was to get that position on the surface of the eye with the corneal work. LASIK emanated from that. And the other was to get that perfection and precision with the lens. I cannot claim that my research propelled them because we both came from the same route, which was the precision of lasers in the industrial world to precisely etch. So LASIK -- in fact, my colleagues in that field, they were working on the cornea. I was working on the lens.

Guest:

What inspired you to become an ophthalmologist? When did you know that that's what you wanted to do with your life?

Dr. Bath:

I didn't know I wanted to become an ophthalmologist until I was in medical school. I always knew from the early days, early childhood days, that I wanted to be a physician, and I had many role models for that: My family physician who was a friend of my father then, Albert Schweitzer. But in medical school I learned about the precision of ophthalmology and I felt that I had the gift with my hands and I felt that I could be an excellent surgeon, and I looked upon ophthalmology as the height of the art of surgery. I wanted to pursue that because in ophthalmology, unlike some other specialties which would be like oncologists, for example; however, I wanted to be able to have the outcome based on my skills and knowledge and not have the outcome determined by other factors that were beyond my power to effect. And in the area of ophthalmology that I specialize in, there's a lot of technology and it requires a lot of skill, and those were the things that I wanted to be involved with. Any more questions?

Ms. Howard:

Thank you again, Dr. Bath.

Dr. Bath:

My pleasure.

(Applause)

Guest:

On behalf of the African American Culture Center and Disability Services for Students, we thank you for sharing this evening with us. We thank Vice Provost Woodard and all the faculty and staff, students, and family for sharing this evening with us. We would also like to thank our vocalists. We are very grateful, Dr. Bath, for your dedication in making this world a better place for all people, so thank you.

(Applause)