

A SIDEWALK ASTRONOMER

A FILM ABOUT ASTRONOMY, COSMOLOGY & JOHN DOBSON

photographed, produced and directed
by
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A SIDEWALK ASTRONOMER

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A Brief Synopsis

(78 minutes; photographed, produced & directed by Jeffrey Fox Jacobs)

On any given night around the world, thousands of people peer into deep space because of John Dobson. An 89-year old with a white ponytail and a knack for comedy, John Dobson revolutionized astronomy. *“Possessing a quicksilver wit, a gift for turning a phrase that makes scientific concepts accessible, and an energy that belies his nearly 90 cycles around the sun, Mr. Dobson is one of history’s greatest popularizers of science,”* (Wall Street Journal 9/1/04). He is the inventor of the Dobsonian telescope mount, which changed the field of astronomy dramatically, making telescopes accessible to the public on every continent.

A former Vedanta monk of the Ramakrishna Order, he is a co-founder of “Sidewalk Astronomers,” an organization that encourages amateurs to share their telescopes and knowledge with others on busy city streets and in national parks. As John says, “The Universe is bigger than the Earth; it’s bigger than the solar system; it’s bigger than our galaxy and we owe it to ourselves to notice it.” The film follows John as he tours the country from the sidewalks of San Francisco to colleges, universities, astronomy clubs, star parties and to Stellafane, a convention of telescope makers in Vermont. It features sequences on sidewalk astronomy, telescope making, the Moon, Sun, major planets, galaxies, Big Bang Theory, and the nature of time and space. We also get to know John Dobson, a fascinating thinker, philosopher, teacher, and inventor who encourages us to think about the Universe. This astronomical and cosmological journey is illustrated with actual footage and photos of space shot from satellites and spacecraft as well as animation courtesy of NASA, the Jet Propulsion Laboratory, the Goddard Space Flight Center and the Hubble Space Telescope Institute.

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Filmmaker's Statement

John Dobson looked at the three quarter moon through a telescope for the first time and thought, "Everybody's got to see this!" As a Vedanta monk living in California in the 1950s, he created an inexpensive telescope design. He devoted the rest of his life to designing and helping others build tens of thousands of inexpensive telescopes.

Now at age 89, he has lived his life by a simple and amazing calling; to give all the people on this planet a chance to see with their own eyes what the universe really looks like.

He urges all astronomers to share their telescopes with the public for free as often as possible. Sidewalk astronomy, a movement born in San Francisco in 1968, is now a public service endeavor that has grown around the world.

John travels extensively and speaks on telescope making, astronomy and cosmology to any organization that can pay his airfare and provide housing and meals.

I came to know of John first when I looked through a telescope of his design in 1986. It was a portal into deep space with images of our staggeringly large, beautiful and violent universe. "It's bigger than the Earth; it's bigger than the solar system; it's bigger than our galaxy and we owe it to ourselves to notice it," John says. He displays endless wonder. When I found out that no one had made a documentary about him, I knew what I had to do.

John Dobson has made and continues to make inspiring choices. I wanted to find out more about him and share what I learned with others. Happily, John was open to my filmmaking obsession. My hope is that viewers will have their sense of wonder stimulated, think about their place in the Universe and join us on the sidewalk.

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John Dobson

A Brief Biography

“John Dobson's life of public service has been an inspiration to a great many people. John and the Sidewalk Astronomers continue to serve the public with large telescopes, providing free "star parties" and slide shows under dark skies and city lights, encouraging the citizens of this planet to think and wonder about the Universe and give them a chance to see its beauty with their own eyes.”

John Dobson is arguably the most influential person in amateur astronomy in the last 30 years. He has almost single-handedly revolutionized amateur astronomy by making deep space accessible to millions. *“Possessing a quicksilver wit, a gift for turning a phrase that makes scientific concepts accessible, and an energy that belies his nearly 90 cycles around the sun, Mr. Dobson is one of history's greatest popularizers of science,”* according to the Wall Street Journal (9/1/04).

John Dobson was born in Beijing, China, on September 14, 1915. His maternal grandfather was the founder of Beijing University. His mother was a musician; his father taught Zoology at the University.

In 1927, John's parents moved the family to San Francisco due to political and social unrest in China. After completing a degree in Chemistry at the University of California at Berkeley in 1943, John took defense-related jobs that he held until he joined the Vedanta Monastery in San Francisco in 1944, becoming a monk of the Ramakrishna Order. He spent the next 23 years in the Monastery. When he joined the Order, known for its intellectual rigor and public service, he was given the assignment of reconciling the teachings of religion with those of science.

Having graduated from the university as a chemist, he wanted to see for himself what the Universe looked like. John built his first telescope in 1956. It was a 2-inch (in diameter), made from a lens he got in a junk store, and an eyepiece from an old pair of Zeiss binoculars; through it, he could see the rings of Saturn. One of his fellow monks told him that it was possible to *grind* a telescope mirror, so John then made his first mirror out of a marine-salvage 12" porthole glass. When he looked at the third-quarter moon with his finished telescope, he was surprised and deeply moved by what he saw. His first thought was, "Everybody's got to see this." So began John's long commitment to public service in astronomy.

John was transferred to the Vedanta Monastery in Sacramento in 1958 and started getting seriously involved in telescope making. The first telescope he made at Sacramento was a 5-inch reflector; the mirror was made from the cutout bottom of a

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discarded gallon jug. It was John's greatest delight to share the beautiful things he saw through the telescopes with others. One of his friends was so amazed by what he saw through the 5-inch telescope, that he told John, "You've got to make something bigger!"

He continued to build larger and larger telescopes without attracting the attention of those members of the monastery who felt that public service astronomy was not an appropriate pursuit for monks. The noisy job of grinding mirrors had to be done *under water* to deaden the sound. Since John was a monk and had no money, he had to find a way to mount the mirrors using scrap materials that could be gathered up at no cost. His telescopes were made from discarded hose reels, lumber core cutouts and other scrap wood. This was the humble origin of what has come to be known as the "Dobsonian" mount.

These are Newtonian telescopes. A Dobsonian mount is really a type of alt-azimuth telescope mount based on the design of most cannons; it can be pointed up or down and it can turn on its base. "It's like re-inventing a cup. We've had cups all along, and if you try to patent a cup with a handle, you can't."

The desire that drove John to make more and larger telescopes, and to put himself in increasing peril of expulsion by monastic authorities, was to give everybody the opportunity to see the Universe first-hand. He put discarded wagon wheels on his telescopes to facilitate moving them around the residential neighborhood surrounding the monastery - delighting children and adults with the views of the night sky.

Naturally, when people started to look through John's telescopes some of the neighbors and their children wanted John to help them make their own telescopes. He realized that this would cause his AWOL hours from the monastery to increase. Nevertheless, he continued and expanded his activities, until he was asked to leave the monastery in the spring of 1967, after 23 years as a monk. He was not expelled just because the monks questioned his telescope making, but because they could not imagine that that was all he was doing when out late night after night.

John decided to dedicate the rest of his life to public service and hitchhiked to San Francisco. Then as now, John had many friends, and they helped to keep him fed, clothed, and sheltered. He retrieved some of his telescopes from Sacramento and set them up at the corner of Broderick and Jackson streets, in San Francisco, every clear night.

Thousands of people looked through the telescopes while John talked to them in detail about what they were seeing. (This practice is still an integral part of *Sidewalk Astronomy*: the telescope operator must supply astronomical information so the viewers can understand what they see.) Eventually, John was able to support himself by teaching classes in telescope making and astronomy at the Jewish Community Center,

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the California Academy of Sciences and San Francisco's Randall Museum, where, among other places, he still teaches to this day.

In 1968, some of the young people who had made telescopes under John's guidance, and who joined him in setting up scopes at Jackson and Broderick, started a public-service organization named the *San Francisco Sidewalk Astronomers*. As the organization grew, larger telescopes were made and taken out to the streets. By 1970, the *Sidewalk Astronomers* had a 24-inch telescope, which was freeway portable. The possibility of showing deep sky objects to large numbers of people through very large telescopes led the growing band of *Sidewalk Astronomers* to National Parks and Monuments, Native American reservations, and to other locations where "dark skies and the public collide."

Several years ago, as members of the original *San Francisco Sidewalk Astronomers* spread out into new areas of the country and new chapters started to form, it was decided to remove the "San Francisco" from the name and call the organization simply the *Sidewalk Astronomers*.

Millions of people all over the world have looked through the telescopes of the *Sidewalk Astronomers*. John has helped to simplify the art of mirror making enabling thousands of children and adults with no previous experience or special training in optics to experience the joy of turning slabs of glass into powerful *eyes into the heavens* with their own hands. The "Dobsonian" mount has made large, "user friendly" telescopes affordable and accessible to the general public. Thousands of people have made their own sturdy, low-cost telescopes under John's direction or on their own by using his simple design. Telescopes with lightweight mirrors previously considered unusable, long focal ratios previously considered unmanageable, and apertures previously considered unthinkable are now in the hands of lovers of astronomy around the globe.

John Dobson's life of public service has been an inspiration to a great many people. John and the *Sidewalk Astronomers* continue to serve the public with large telescopes, providing free "star parties" and slide shows under dark skies and city lights, encouraging the citizens of this planet to think and wonder about the Universe and give them a chance to see its beauty with their own eyes.

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Jeffrey Fox Jacobs biography (producer, director and cinematographer)

Jeffrey Jacobs is President of Jacobs Entertainment Inc, a film buying, production and marketing firm. He has 35 years of experience in the production, distribution, marketing and exhibition of American independent and international cinema. He was the founding film buyer for the Angelika Film Center in New York City that he programmed from opening day in 1989 until 1997. Since 1998 he has been the Managing Director and Film Buyer of the Paris Theatre, the longest continuously operating art cinema in the U.S. He also programs BAM Rose Cinemas in Brooklyn, New York and 45 additional screens across the country.

“A Sidewalk Astronomer” is Mr. Jacobs’ first feature film. Prior to his work in exhibition and distribution, Mr. Jacobs worked in freelance film production as an editor, production manager, and assistant director where he amassed over fifty production credits. After studying at UCLA Graduate School of Film and Television he worked on several documentaries as a cameraman and editor for National Public Television. He became the editor of ethnographic dance films for Alan Lomax and the Choreometrics Project at Columbia University. He worked with John Marshall as the assistant director of BITTER MELONS, a film about Kalahari Bushmen in South Africa and on a film about the Yanomamo tribe of Southern Venezuela. He edited an hour-long documentary for PBS entitled “Take Me Out Of The Ballgame” for director Peter Scarlet with co-editor Barbara Kopple. He was an assistant cameraman to Albert Maysles on documentaries and films for industry. In 1971 he was the assistant director for James Ivory on a feature entitled “Savages.” In 1973, he wrote a management survey for the Film Department of WGBH-TV, Boston, one of public television's largest production facilities.

Prior to his work on behalf of the Angelika, Mr. Jacobs was Vice President of Theatrical Sales and Marketing for the International Film Exchange where he was responsible for national distribution, advertising, and publicity on numerous films, including the Academy Award Best Foreign Language Film MOSCOW DOES NOT BELIEVE IN TEARS, and Academy Award Best Feature Documentary BEST BOY.

As director of Theatrical Sales and Marketing for Macmillan Films, he handled distribution of a repertory library that included films by Truffaut, Kurosawa, Ray, Bunuel, Antonioni, and Fellini, among other famous international directors. He was also Assistant National Sales Manager at New Yorker Films, a co-programmer and manager of the Orson Welles Cinema in Cambridge, Massachusetts and owner/operator of the Odd Fellows Cinema in Waitsfield, Vermont.

He is a graduate of Brandeis University and received an M.F.A. from the Graduate School of Film and Television at UCLA. He lives in Westchester County with his wife Heidi. His son, Matthew, is a student at New York University and his daughter, Rebecca, graduates from Columbia University this year.

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Detailed Synopsis of 'A Sidewalk Astronomer'

'A Sidewalk Astronomer' begins with an evening of observing the first quarter moon from the corner of 24th and Noe in San Francisco. John Dobson, one of the founders of sidewalk astronomy, is showing anyone who wants to look the moon through a high-powered telescope. The public is astonished by what they see. John keeps up a running commentary as people look through the telescope.

"Come see the moon."

"That is the way the moon would look one hour before you landed on it."

"As I always say, the exterior decorator does lovely work."

"That crater you are looking at is as big as Texas."

"The Sea of Tranquility is as big as Oregon."

"There is nothing on the moon that is not a crater."

"Of course, you can look again. This isn't like ice cream. You can have as many servings as you like."

"The universe is mostly hydrogen and ignorance."

John explains that, "One reason we do this is so people can see beyond their genetic programming."

John is at the Stellafane Amateur Telescope Makers Convention in August of 2003. It is Saturday night at the "main talks." David H. Levy, discoverer of 21 comets and a leader of the amateur astronomer community, thanks John for the "incredible contribution that John Dobson has made. He stands right next to Newton in his role in creating a telescope ..." John tells a story about one of his hosts who said, "There are Newtonian telescopes and there are Dobsonian telescopes. I thought Dobson died a long time ago."

John explains that when he first started showing people how to make telescopes, he was asked, "Who is John Dobson? Is he an astronomer?" John replied, "No, but when it comes to making telescopes out of junk, I'll stand my own ground."

John talks to David Seidel from the Jet Propulsion Laboratory Office of Public Education in a 1994 JPL production about the creation of the Dobsonian telescope mount and sidewalk astronomy. John says, "As soon as I saw what you can see through a telescope, I thought, 'everybody has got to see this because what we ordinarily see is nothing like what the universe is really about.'" He also says, "We are not backyard astronomers. We do it in the front so everybody can see."

Amateur astronomers testify to John's importance in creating an inexpensive, flexible and lightweight telescope mount that opened up a scale of astronomy that hadn't been available before. People were able to build large aperture telescopes that they never thought would be possible. John makes it clear that he wasn't trying to start a revolution. John says, "We just wanted to see what was going on out there."

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At Booth Park in Fairfield, Connecticut, John is conducting one of his many slide shows on astronomy for the public. “This is the crater Copernicus, and you have to ask yourself what happens when you have an asteroid coming in so hard that it leaves a hole big enough to put Los Angeles in the hole.” Following John’s slides of the moon is actual time lapse footage shot from the Galileo spacecraft 3 million miles from Earth on its way to Jupiter. It shows the first quarter moon moving around our planet over a period of 12 hours.

Dobson describes the thousand-mile-long rays made of glass beads that radiate out of the crater Tycho. “How do you know that they are made of glass beads,” a student once asked him. He said, “When the astronauts went there, they brought that stuff back.” “Someone went there?” she asked. She asked him twice.

There is a montage of moon footage showing orbiting, landing, walking and driving the lunar rover on the surface and finally ascent, shot by the crews of Apollo 8, 10, 15, 16 and 17.

John tells a joke about Adam asking God why he made Eve so attractive. “So you’d like her.” “Well, how come you made her so stupid?” Adam asks God. “So she’d like you.” John also tells a joke about scientists who think they can create life. God is curious, so they take him down to the lab. The scientist says, “First, you take some dirt.” God says, “Get your own dirt.”

John describes why he became an atheist and how he became interested in joining a Vedanta monastery. While a monk, he became fascinated with what you can see through a telescope. As a monk, he took a vow of poverty, so he improvised and learned how to make telescopes out of marine salvaged glass porthole windows, cardboard tubes and scrap wood. After sharing his telescopes with neighbors of the monastery, he started teaching them how to make their own. He still teaches telescope-making classes like the one at the Randall Museum in San Francisco where students are just beginning to polish their glass for making mirrors.

He was asked to leave the monastery in 1967 having been reported AWOL one too many times. In 1968, he and two young telescope enthusiasts founded the San Francisco Sidewalk Astronomers.

An amateur astronomer from Hong Kong has come to Stellafane and is talking about his sidewalk astronomy experiences with John. John explains he was born in Beijing. “If there were a million people with telescopes willing to get them out for the public there would be a chance for the people born on this world to see where the hell they are.”

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“Back in the 60’s the telescopes were too small to show galaxies...if you let them see through a 10-incher they go bananas...they can’t believe that the exterior decorator hung something like Saturn out there.”

Saturn stills from the ground and from space are shown, followed by actual Saturn footage and JPL animation. Then comes Jupiter with its Great Red Spot. “Jupiter is big enough to put 1,300 earths inside and spins around in less than 10 hours.”

“Don’t go to Venus. It rains sulfuric acid.”

“This is the Grand Canyon on Mars, and it would fit all the way across Australia, or all the way across the United States.”

“This is the big volcano on Mars and it’s big enough to cover the whole state of Oregon. The lava pit on top is bigger than San Francisco Bay with all the surrounding towns thrown in.”

The sun sequence begins with close-up photography of the whole spinning sun, photographed through a variety of filters. “If the sun were the size of a basketball, Jupiter would be the size of a grape, and the Earth would be the size of a very small grape seed.”

“There is room inside the sun for the moon to orbit the earth with a quarter of a million miles left to spare outside the moon’s orbit.”

John shows and discusses sunspots and flairs and the history of the sun. “If the sun didn’t have a governor on it so it stayed at the same temperature, English would never have arisen on this stupid planet.”

The death of stars is shown in a montage of planetary nebula including the Ring, Dumbbell, Eskimo, Ant, Helix, and Veil nebulas. “This is the kind of stuff out of which the earth and our bodies are made. If you give this cloud another 10 billion years, it will go to school and chew gum.”

John stands on Haight Street in San Francisco with a sun telescope that he made, showing sunspots to passersby. “The sun is big enough to put 1,300,000 earths inside.”

In Golden Gate park, he tells people who have stopped to look through the sun scope “You see that very dark spot? That’s as big as the Earth in case you have any delusions of grandeur.”

“Most of the public is not interested in the nature of the real world...they are not concerned with how the universe runs.”

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“When you find out there is information connected with this thing then, oh my God, look there’s all this other information. But if you don’t look at all, you don’t notice. Once you come to the conclusion that what you know already is all you need to know, then you have a degree in disinterest.”

“People have no idea what’s going on in this universe.”

John sits at his kitchen table in his modest San Francisco apartment folding Sidewalk Astronomer leaflets.

“Why should anybody stop to show them the Sun? Don’t you see how ridiculous it is? Who would do that?”

He tells a story of a young neighbor who always saw him on the corner with his telescope and thought he was a “dirty old man.” After the young woman learned about John’s background, she told him he was now her “favorite dirty old man.”

At one of his lectures, Dobson explains to the audience the derivation of the word ‘galaxy’ from the Greek word ‘galaxi’ which means ‘milky way.’

“The number of stars in our galaxy is equal to the number of grains of wheat three feet deep over an eight acre farm... and the Andromeda galaxy is twice that big.”

A montage of galaxy images follows and includes the Andromeda galaxy (M31), the Whirlpool Galaxy (M51), a spiral galaxy (NGC253), the Sombrero galaxy (M104), and finally, an image of the Milky Way gathered by the Two Micron All-Sky Survey. He is asked to name his favorite galaxy. “I suppose our own, but if you mean outside, I’m very fond of NGC4565 ... if you see it in very dark skies with a good sized telescope ... the dust lanes are so conspicuous.” (M stands for the Messier Catalog, created by the 18th Century French astronomer. NGC stands for “New General Catalog,” a much larger index of deep-sky objects.)

After seeing the Hubble Deep-Sky Survey photo, John says, “You know the Hubble telescope took a picture of a section of the sky where they couldn’t see anything. There are all these thousands of galaxies in there. It’s a piece of sky that’s as big as a grain of sand held at arm’s length. The universe is a lot bigger than the earth and it’s a lot bigger than the solar system and it’s a lot bigger than our galaxy and we owe it to ourselves to notice it.”

Asked by a student the age of the universe, he discusses red shift and the Big Bang theory, making it clear that he believes the theory to be wrong. “There are too many problems. Getting everything out of nothing, that’s the worst problem.”

He explains several objections to the Big Bang theory.

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“We used to change the model to match the physics. That is *not* what they’re doing now. They’re changing the physics to match the model.”

After de-bunking the Big Bang, he feels obligated to replace it, and describes in detail his recycling model of the universe. “If the stuff recycles from the border, we don’t have to have a beginning. It could be going on like this all the time.”

A wave on a beach comes in and goes out illustrating “recycling from the border.”

“It’s alive. The whole universe is alive. The defining characteristic of a living organism is that it directs a stream of negative entropy upon itself and, damn it all the universe does the same thing.” There is a montage of aurora including one shot from space looking down on the North Pole.

John explains his view that matter is sentient, smart, knowing. He claims the only reason we as a species are sentient is because the matter from which we are made is sentient.

A montage of deep-space dissolves into sparks at a campfire and a discussion of energy. “We simply do not see what’s going on here at all ... what we see as matter is energy ... there’s only one thing here.”

A discussion of the speed of light follows, in which he explains that it is not a speed, but the ratio of space to time.

A discussion of time and space begins with Dobson saying, “The universe is like a television show. We all came in in the middle and no one is staying for the end.” He continues that the universe is, “a little bit like a theatrical performance. If you go to a theatrical performance, there are several things you want to know. Who are the actors? Hydrogen and helium. What is the name of the play? Falling. Where is the theater? In space. When should you go? In time.”

He shares with his students a humorous definition of time as “nature’s way of keeping everything from happening at once.” Time-lapse footage of Uranus shows the planet’s rings and many moons. He continues, “Space is nature’s way of keeping everything from happening in the same place.”

He describes the geometry of relativity, whereby space and time is a pair of opposites, and when one is subtracted from the other, the remainder is zero. “That puts a very different look on this universe. The notion that the universe is out there inde-goddamn-pendent of us observers is based on the fact that we see things ‘out there’. And it turns out that the evidence that we have for it’s being ‘out there’ is all wrong.” There is a

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montage of nebulae including NGC 6369 (Little Ghost Nebula), IC 418 (Index Catalog – Spirograph Nebula) and NGC 6543 (Cat’s Eye Nebula).

Another student asks, “Is there more beyond [the visible universe] that you can’t see?” John explains the Vedantan view first proposed over 4000 years ago. Their word for the universe was ‘the changing.’ “If the universe is ‘the changing,’ damn it all, there has to be something against which it’s changing.” There is a montage of galaxy images with computer animation illustrating how galaxies interact over billions of years. He continues with the Vedantan explanation. “If you ask what is beyond the observable universe, it has to be the changeless, the infinite, and the undivided.” These are represented in our physics by inertia, electricity and gravity. A slow motion drop of water illustrates gravity; a lightening storm illustrates electricity and Mercury crossing the Sun illustrates inertia. John continues on the topic of defining what is beyond the visible universe. “We think there’s a big empty space out there. That’s entirely guesswork.”

He reminds his students to always stay curious, wonder, and ask questions. A student asks about the depletion of the ozone layer. Actual film footage of the whole earth spinning shot from an outgoing spacecraft is seen as he reminds his audience that all habitats are temporary. “There are no permanent habitats in this universe.” The earth appears filmed from the shuttle.

John wants to bring physicists closer to a Vedantan perspective, and wants to bring Vedantans back to physics. “There is only one thing here.” An image of the spinning Whirlpool Galaxy (M51) appears.

John demonstrates his prowess at rope spinning.

There is time for one last question. “Do you have any advise for living a long creative life?” “Eat,” he replies. “But you have to be careful what you eat.”

John shows people the moon through his telescope at Ninth and Irving in San Francisco. Two young people, who have heard of him from their astronomy professor, recognize him. “I thought you were a myth,” says the young woman. “I am not a myth,” replies John. Another woman asks, “Why are you here?” To which he replies, “Well, who else will?”

At his home, John accompanies himself on the harmonium as he sings a hymn. “Thou has lifted all of my sorrows with the vision of thy face/And the magic of thy beauty has bewitched my mind.”

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CREDITS

for additional information go to
sidewalkastronomers.us

hubblesite.org
jpl.nasa.gov

astronomy.com
skyandtelescope.com

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Burnham's Celestial Handbook
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(more)

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