# DOWNLOAD PDF PAINTING WITH A COMETS TAIL

## Chapter 1 : THE GREAT COMET OF

*Get this from a library! Painting with a comet's tail: the touch of the landscape architect on the Blue Ridge Parkway. [Harley E Jolley].*

Comets The Great Comet of  Kamaladdin written in the 16th century. The yellow Moon, stars and comet are shown against a light blue sky. It was taken on 12 January with the 1. Courtesy of the Hale Observatories. The eve of the deluge. People believed for centuries that unexpected appearance of comets was a premonition of war, death and other disasters. Here the arrival of a comet foretells the great flood at the time of Noah. The apparition of Comet Halley may have influenced the artist, John Martin, for he finished this painting a few years later in  Collection of Her Majesty the Queen. Comet Halley in AD. The Korean astronomers have been recording the appearance of comets and other unusual celestial objects for more than years. Apparition of Comet Halley in  The head region or coma of Comet Halley observed on 8 Mary with the 1. The return of Comet Halley in  Rays, streamers and kinks can be seen in the ion tail of Comet Halley during its return to the inner solar system. The broad, fan-shaped dust tail can also be seen. It is about ten trillion, or , times further away from the Earth than the comet is. Courtesy of the National Optical Astronomy Observatories. The Oort comet cloud. More than billion comets hibernate in the remote Oort comet cloud, shown here in cross section. It is located in the outer fringes of the solar system, at distances of about , AU from the Sun. By comparison, the distance to the nearest star, Proxima Centauri, is 0. The planetary realm therefore appears as an insignificant dot when compared to the comet cloud, and has to be magnified by a factor of 1, in order to be seen. This comet reservoir is named after the Dutch astronomer Jan H. Oort who, in , first postulated its existence. A repository of frozen, comet-sized worlds resides in the outer precincts of the planetary system, just beyond the orbit of Neptune and near the orbital plane of the planets. Known as the Kuiper belt, it is thought to contain million to 10 billion, or to , comets. Many short-period comets are tossed into the inner solar system from the Kuiper belt. Jupiter captures a comet. The most massive planet, Jupiter, must have captured some short-period comets in this manner. Three kinds of comet shapes. Comet Perrine III shows a transparent coma and tail left , Comet Finsler V exhibits a coma and tail that are unsymmetrical center , and Comet Morehouse III is remarkable for the rapid variations in the structure of its tail right. When a telescope follows a comet, stars move across the field of view, producing numerous short star trails. The path and changing shape of a typical comet as it enters the inner solar system. Note that the tail of the comet is oriented away from the Sun, independent of the direction of travel of the comet. A comparison of the visible image left of Comet Kohoutek with a far ultraviolet image right on the same scale, taken from Aerobee rocket flights on 4 and 7 January  The ultraviolet image shows a gigantic cloud of hydrogen nearly 10 billion, or , meters in size, or eight times bigger than the Sun. It is being fed by the comet nucleus at the rate of billion billion billion, or 5 x , atoms of hydrogen every second. The large size of the hydrogen cloud is due to the fact that hydrogen atoms are much lighter than the other atoms, ions, molecules and dust particles which produce the visible light of the coma. Courtesy of Chet B. Opal, Naval Research Laboratory. This photograph of Comet West VI shows a broad, curved, pearly-hued dust tail. Because dust particles scatter sunlight, the dust tail has a slightly yellow color. It has a delicate lacy structure, created by countless dust particles shed from the comet nucleus over many days. Its visible radiation is dominated by the fluorescence of ionized carbon monoxide, which gives the ion tails a blue color. Dennis DiCiccio took this photograph at 4: Interaction between a comet and the solar wind. Magnetic field lines entrained within the solar wind A are unable to penetrate the sphere of ions that envelop a comet nucleus, and so they pile up in front of it and drape around it B. An ion tail forms on the side of the comet facing away from the Sun C and D. The ions flow away from the Sun between the oppositely directed magnetic field lines in the tail. When a comet enters a region where the original magnetic field lines in the solar wind A changes direction, the comet loses its ion tail and soon grows another. Losing a comet tail. Photograph of Comet Halley taken on 6 June , showing part of its ion tail that has become disconnected and does not run into the coma. Courtesy of the Yerkes Observatory. Anatomy of a comet. What you see when looking at a comet depends on how you look at it. The nucleus of a comet is usually invisible,

unless a spacecraft is sent in to take a glimpse. A comet first becomes visible when it develops a coma of gas and dust. When the comet passes closer to the Sun, long ion and dust tails become visible, streaming out of the coma in the direction opposite to the Sun. When looking at a comet in ultraviolet light, the hydrogen atoms in its huge hydrogen cloud are detected. Nucleus of Comet Halley. A composite image of the nucleus of Comet Halley right obtained using images taken in March with the camera on board the Giotto spacecraft, from a distance of 6. It is compared with a schematic drawing left that highlights the major features recognizable in the photograph. The nucleus is about 16 kilometers long and 8 kilometers wide. Dust and gas geyser out of narrow jets from the sunlit side of the nucleus, but about 90 percent of the surface is inactive. The gas is mainly water vapor sublimed from ice in the nucleus, while a significant fraction of the dust may be dark carbon-rich matter. A dark surface crust, which insulates most of the underlying ice, is blacker than coal, reflecting about 4 percent of the incident sunlight. Nucleus of Comet Borrelly. A camera on board the Deep Space 1 spacecraft peered into the icy heart of Comet Borrelly on 22 September , taking this image from a distance of 3. The nucleus is shaped like a gigantic bowling pin, with a length of about 8 kilometers and a width of roughly half that size. A dark veneer of material covers most of the nucleus, reflecting only 4 percent of the incident sunlight on average. Rugged terrain is found on both ends of the nucleus, while bright smooth plains are present in the middle. This photograph of Comet Halley shows jets of dust ejected from a rotating nucleus. Stephen Larson and David Levy took the image on 6 January with the 1. How to make a jet engine out of a dirty ball of ice. In this illustration, the ejected material pushes the comet in the opposite direction to its motion, causing the comet to arrive closest to the Sun at a time later than expected. If the comet had been rotating in the opposite direction, the jets would have pushed the comet along in its original direction, resulting in an early arrival time. The splitting of the nucleus of Comet West photographed left to right on 8, 12, 14, 18 and 24 March , in yellow-green light using a 0. On 18 March, the diameter of the four features was about 10 million meters. This interplanetary dust particle is probably of cometary origin. It is a mere one ten thousandth, or 0. The particle was collected at 20 thousand meters altitude by a U-2 aircraft, and then photographed with a magnification of 16, using a scanning electron microscope. The embedded rod-shaped crystals were probably formed in the primeval solar nebula from which the planets formed, or perhaps in the pre-solar interstellar environment. Courtesy of Donald E. Two couples portray meteor showers or falling stars in this picture painted by Jean-Francois Millet in  They soar through the skies, perhaps illustrating the transcendental nature of erotic love. Courtesy of the National Museum of Wales, Cardiff. A glowing meteor streaks across the stars near the constellation Cygnus. The curved structure left center , known as the Cygnus Loop, is an expanding shell of material thrown off during the supernova explosion of a massive, dying star. Comets produce meteor showers. Annual meteor showers are created when the Earth enters the intersection point, such as the August Perseids produced by debris from Comet Swift Tuttle. The apparent paths of shooting stars on 27 November  Meteor showers are named after the constellation in which their radiant appears. This meteor shower is called the Andromedids meteor shower because its radiant appears in the constellation Andromeda.

## Chapter 2 : Halley's Comet - Wikipedia

*Painting with a Comet's Tail [Harley E. Jolley] on calendrierdelascience.com *FREE* shipping on qualifying offers. Civilized man has been prone to conjure up a maxim or saying to reflect the prevailing philosophy of the day.*

Turning Star Trails into Comets with Twinkles! Star trails can get boring. Something to do with it being a terrible idea. We were there for the showing. The moon behaved, the clouds were great and the sun hit the spot perfectly. The only downside was the complete lack of water. So rather than fire falls, we got a nice red stripe on the cliff wall. Still it was pretty. This tutorial is about how we turn those few hours of star catching in to comet trails and make the boring fire falls at least a tad more interesting and unusual. It contains a horse and introduces our new, shiny, professional ish title sequences. The basic principle is that when stacking star trails you blend images using the Screen or Lighten blending mode. When making comets you also lower the opacity of each layer â€" making the trail fade away. Batch processing star shots Here you see Adobe Bridge showing all the star captures we made. To process them, select the first one and open it in Adobe Camera Raw. The settings you use will depend on the night. Was the moon out? How much ambient light was there from the nearby town? In our case, we were in the middle of nowhere and so need to make the sky a little bluer and a little brighter. Before Processing We also play with the Clarity to make them pop. So, just process for the sky. After Processing Now we have to process the other 84 negatives. To do this, select them all in Bridge, right-click and select Develop Settings. Then select Previous Conversion. Your menu will look different from ours. Ours has been expanded with a bunch of pre-sets we occasionally use. Mass Processing Negatives It takes a while we fast-forwarded this bit of the video but eventually, Bridge will update to show you 85 newly, identically processed negatives. Processed Negatives Making star trails Now we need to load those negatives into Photoshop as layers. Whatever method you use to load the files, the important thing is that you set the Layer Blending Mode to Lighten or Screen. Stack-o-matic setting blend mode and mask And bingo! Boring 1 hour 25 min star trail Converting trails to comets Turn off the layers in your picture until you see star trails about the length of the comets you want. This will highly depend upon your foreground. For this image, we selected just 10 minutes worth of images. Choosing the comet length Delete the unwanted layers. For the remaining layers, we now need to adjust the opacity. The opacity is a range of 0 to  And now you have comets. As a side note, you should really take the time to play with this idea. You now know how to make comets! Bear with us, while we finish the rest of the image. Using the selection tool, set the feathering to 5 pixels or some other small number and draw a line of marching ants around the offending area. This patch offends us Patching errors Next use the Edit, Fill tool to replace the offending area with new content. The system will get this wrong several times. If you look at your image YOU can see where the content has been made up. Patched stars Removing noise When taking night pictures you always need to remove the noise. Photoshop has in-built tools for this but we prefer the one from Topaz. Select your paintbrush and push the down arrow in the top left corner of Photoshop where it shows the brush size. Now press the little gear and get the menu up. Change your brush selection to Assorted. Changing the Brush style See that? All those boring round brushes have been replaced with cool shapes. Select one you like and set its size to large-ish. Perfect starburst brush Create a new layer and using a white brush paint a star somewhere. Now select the Move tool the little arrow top left , and move the layer until the star is roughly over a comet. Hit Command-J to duplicate the layer and again move it to other another comet. Repeat until you have the perfect number of stars. The perfect number of stars Now for some variation and refinement. Select a star layer, and hit Command-T. This loads the Transform tool. From here you can rotate, squash, enlarge, and generally vary your star. Hit Enter to make the changes. Selected a new layer and repeat. Varying star bursts Two other variations for you. Lower the layer opacity of smaller stars to make them dimmer, and for the larger ones, again hit Command-J and just double up the star layer. Completed comets with twinkles! Completed image Now all you need to do it work on the foreground. And remember to tell your friends you had a nice time here. Final recoloring done in Topaz because I was feeling lazy. Upper Yosemite in motion.

## Chapter 3 : Hyakutake: Comet with a Long, Long Tail

*Harley E. Jolley explores the Blue Ridge Parkway through the history of its landscape architecture. As Roger Martin states in the introduction, "The design and construction of the Blue Ridge Parkway is an illustration of the kind of quality possible in an enlightened democracy.*

This happened in to Comet Holmes. The X-rays are generated by the interaction between comets and the solar wind: This exchange or transfer of an electron to the solar wind ion is followed by its de-excitation into the ground state of the ion by the emission of X-rays and far ultraviolet photons. As the comet approaches the Sun, increasing outgassing rates cause the coma to expand, and the sunlight ionizes gases in the coma. When the solar wind passes through this ion coma, the bow shock appears. These observations were all made near perihelion when the bow shocks already were fully developed. This young bow shock was called the "infant bow shock". The infant bow shock is asymmetric and, relative to the distance to the nucleus, wider than fully developed bow shocks. Comet tail Diagram of a comet showing the dust trail or antitail , the dust tail, and the ion gas tail, which is formed by the solar wind flow. In the outer Solar System , comets remain frozen and inactive and are extremely difficult or impossible to detect from Earth due to their small size. Statistical detections of inactive comet nuclei in the Kuiper belt have been reported from observations by the Hubble Space Telescope [61] [62] but these detections have been questioned. Once the particles have been ionized, they attain a net positive electrical charge, which in turn gives rise to an "induced magnetosphere " around the comet. The comet and its induced magnetic field form an obstacle to outward flowing solar wind particles. Because the relative orbital speed of the comet and the solar wind is supersonic, a bow shock is formed upstream of the comet in the flow direction of the solar wind. In this bow shock, large concentrations of cometary ions called "pick-up ions" congregate and act to "load" the solar magnetic field with plasma, such that the field lines "drape" around the comet forming the ion tail. This leads to a "tail disconnection event". The longer the period the more elongated the ellipse. List of numbered comets and List of Halley-type comets Periodic comets or short-period comets are generally defined as those having orbital periods of less than years. Short-period comets with orbital periods less than 20 years and low inclinations up to 30 degrees to the ecliptic are called traditional Jupiter-family comets JFCs. Jupiter is the source of the greatest perturbations, being more than twice as massive as all the other planets combined. These perturbations can deflect long-period comets into shorter orbital periods. Occasionally the gravitational influence of the outer planets in the case of Kuiper belt objects or nearby stars in the case of Oort cloud objects may throw one of these bodies into an elliptical orbit that takes it inwards toward the Sun to form a visible comet. Unlike the return of periodic comets, whose orbits have been established by previous observations, the appearance of new comets by this mechanism is unpredictable. List of long-period comets , List of near-parabolic comets , and List of hyperbolic comets Orbits of Comet Kohoutek red and the Earth blue , illustrating the high eccentricity of its orbit and its rapid motion when close to the Sun. Long-period comets have highly eccentric orbits and periods ranging from years to thousands of years. The future orbit of a long-period comet is properly obtained when the osculating orbit is computed at an epoch after leaving the planetary region and is calculated with respect to the center of mass of the Solar System. By definition long-period comets remain gravitationally bound to the Sun; those comets that are ejected from the Solar System due to close passes by major planets are no longer properly considered as having "periods". The orbits of long-period comets take them far beyond the outer planets at aphelia, and the plane of their orbits need not lie near the ecliptic. Single-apparition or non-periodic comets are similar to long-period comets because they also have parabolic or slightly hyperbolic trajectories [93] when near perihelion in the inner Solar System. However, gravitational perturbations from giant planets cause their orbits to change. Single-apparition comets have a hyperbolic or parabolic osculating orbit which allows them to permanently exit the Solar System after a single pass of the Sun. Some authorities use the term "periodic comet" to refer to any comet with a periodic orbit that is, all short-period comets plus all long-period comets , [] whereas others use it to mean exclusively short-period comets. Early observations have revealed a few genuinely hyperbolic i. If comets pervaded interstellar space , they would be moving with velocities of the

same order as the relative velocities of stars near the Sun a few tens of km per second. If such objects entered the Solar System, they would have positive specific orbital energy and would be observed to have genuinely hyperbolic trajectories.

## Chapter 4 : Two Ways to Make a Comet | Creekside Learning

*These include the blue-glowing streamers of the ion tail, and the more diffuse pinkish streamers of the (somewhat offset) dust tail. The black shape in the middle is the diffuse shadow of the peanut-shaped comet nucleus, cast through the dust of the coma.*

Cut strips from the edge of the garbage bag to the edge of the circle to make the streaming tail of your comet. Place ball in center of circle. Tie a piece of ribbon or yarn tightly to secure the ball inside the garbage bag. Now you have a comet. The important thing is, the kids will believe it is a comet and will be very excited about it. Tie on the rest of your ribbons and yarn. If you use curling ribbon you can curl it to make more swirls, just like a real comet tail. Some were a bit lengthy but the important thing is that the kids got to see some video of actual comets. We used the internet links in the Usborne book to learn even more about comets. And when darkness came, we were ready to take them for a space flight. It was an amazingly warm night for February so we went out in the driveway to test them out. We used clear packing tape and taped them to the streamers. Lastly, snap the glow sticks so that they start glowing. They just looked like blurs of light. But the kids had fun. They were zinging them up and down the driveway for a while. This was also a good time to take note of the night sky. I was glad we got to do this tonight. We spotted a gorgeous crescent moon, some constellations and even a planet, which we are pretty sure was Jupiter. Then the kids went to bed with their new creations to enjoy the glow-in-the-dark comets until they drifted off to sleep. Make a comet nucleus. Put some crushed ice and sand onto your work surface and mix it up. Add some water to fuse the ice together. Scoop it into a bowl and pour some more water over top. Not much, just enough to fuse it all together. Then stick it in the freezer for a couple of hours. Finally, remove from freezer, dip the bowl into a larger bowl of warm water to loosen it. Turn it upside down and your comet nucleus should pop right out. Unless you have actual snow and dirty ice around that you can scoop up and play with, here is how you can make some to create a small version of a comet. This was a great sensory activity for my kids, who range in age from 3 to nearly 8. They spent a lot of time mixing and molding the ice and sand mixture into the bowls, touching the cold ice and the gritty sand. We talked about how this was just a very tiny version compared to a real comet. Next up in our astronomy studies: If you blog about science, you can pin with us, too. Contact me for more info. My Latest Videos Handwriting battles?

## Chapter 5 : Comet - Wikipedia

*The Sun's Magnetic Influence Helps Shape a Comet's Tail Newfound, Tiny Sun is Among the Oldest Stars in the Universe Oldest Figurative Cave Painting in Borneo Challenge Eurocentric Views of Art.*

This idea was disproved in by Tycho Brahe , who used parallax measurements to show that comets must lie beyond the Moon. Many were still unconvinced that comets orbited the Sun, and assumed instead that they must follow straight paths through the Solar System. His work on comets was decidedly incomplete. After a rough estimate of the perturbations the comet would sustain from the gravitational attraction of the planets, he predicted its return for  It did not pass through its perihelion until 13 March , the attraction of Jupiter and Saturn having caused a retardation of days. It was also one of the earliest successful tests of Newtonian physics , and a clear demonstration of its explanatory power. It was necessary to use ancient Chinese comet observations to constrain their calculations. Its aphelion , or farthest distance from the Sun, is 35 AU roughly the distance of Pluto. The passage was at a relative velocity of  Halley is classified as a periodic or short-period comet ; one with an orbit lasting years or less. Periodic comets have an average inclination to the ecliptic of only ten degrees, and an orbital period of just 6. Those resembling Halley, with orbital periods of between 20 and years and inclinations extending from zero to more than 90 degrees, are called Halley-type comets. It may be a member of a new population of small Solar System bodies that serves as the source of Halley-type comets. These orbital changes cause delays in its perihelion of four days, average. These studies showed that its dynamics were chaotic and unpredictable on long timescales. The dark coloration of the nucleus can be observed, as well as the jets of dust and gas erupting from its surface. Like all comets, as Halley nears the Sun, its volatile compounds those with low boiling points, such as water , carbon monoxide , carbon dioxide and other ices begin to sublime from the surface of its nucleus. Gas molecules in the coma absorb solar light and then re-radiate it at different wavelengths, a phenomenon known as fluorescence , whereas dust particles scatter the solar light. Both processes are responsible for making the coma visible. Giotto showed that this model was broadly correct, [49] though with modifications. A comet was recorded in ancient Greece between and BC; its timing, location, duration, and associated meteor shower all suggest it was Halley. He described it as brown in colour and the size of a wagon load. Chinese records also report it as the "broom star". In , the comet was seen in England and thought to be an omen: The comet is represented on the Bayeux Tapestry and described in the tituli as a star. Surviving accounts from the period describe it as appearing to be four times the size of Venus and shining with a light equal to a quarter of that of the Moon. Halley came within 0. Eilmer of Malmesbury may have seen Halley previously in , as he wrote of it in  It is long since I saw you; but as I see you now you are much more terrible, for I see you brandishing the downfall of my country. The apparition was recorded by the monk Eadwine. In , the humanist scholar Bartolomeo Platina wrote in his Lives of the Popes that, [77] A hairy and fiery star having then made its appearance for several days, the mathematicians declared that there would follow grievous pestilence, dearth and some great calamity. Calixtus, to avert the wrath of God, ordered supplications that if evils were impending for the human race He would turn all upon the Turks, the enemies of the Christian name. He likewise ordered, to move God by continual entreaty, that notice should be given by the bells to call the faithful at midday to aid by their prayers those engaged in battle with the Turk. In the 18th century, a Frenchman further embellished the story, in anger at the Church, by claiming that the Pope had "excommunicated" the comet, though this story was most likely his own invention. City of Light and made it his capital for the remainder of his reign. The three apparitions from to were noted by Edmond Halley, enabling him to predict its return.

## Chapter 6 : Tutorial: Turning Star Trails into Comets (with Twinkles!) #Photoshopscaresme

*The Great Comet of Rotterdam, Painting by Atlas van Stolk. This is a painting of a beautiful comet with a long, golden tail. This comet was so bright it could be seen in the daytime, not just at night.*

March 22,  The direction of the tail comes to mind first, always away from the sun. Changes in color, at times, and also changes in the size of the coma. Astronomers have a tough time forecasting the brightness of incoming comets. Ballyhooed " comet of the century " candidates sometimes fizzle out, as Kahoutek did in , while some icy wanderers put on a surprisingly good show for skywatchers. Why is it so difficult to predict comet behavior? For starters, comets are like snowflakes â€” no two are alike. Comets appear to have rocky surfaces which in most cases are probably not much more than several miles across. Such comet "snow" is composed of ordinary water ice plus frozen ammonia and some other more exotic compounds, with dust grains of different sizes and compositions mixed in. Heyer When a comet nears the sun , its frozen gases react to the increasing heat by vaporizing and expanding into a huge tenuous cloud around the nucleus called the coma. The nucleus and the coma make up the head of the comet, which may swell to more than , miles across. New comets might be covered with a load of very light, volatile material such as frozen nitrogen, carbon monoxide and carbon dioxide. Such ices can vaporize far from the sun, giving a distant comet a short-lived surge in brightness that can raise unrealistic expectations. This happened with ultimately disappointing comes such as Cunningham in , Kohoutek and Austin in  But some new comets live up to the hype. In January , for instance, Comet McNaught became the brightest comet in over 40 years, eventually becoming luminous enough to be visible in broad daylight. Gabriel was finishing his night shift as support astronomer at the Paranal Observatory when the comet rose over the horizon just before dawn. Some small, faint comets have suddenly and unexpectedly become incredibly bright literally overnight. In October , Comet Holmes brightened by a factor of , in less than two days, going from an object visible only with very large telescopes to becoming easily visible to the naked eye. Incredibly, this all took place far out in space when the comet was nearly million miles million km from the sun. When the comet was discovered in June , forecasts indicated it might get as bright as first or even zero magnitude â€” in other words, as bright as the brightest stars. Then, it was surmised that the comet was "new" and might possibly lag behind the original optimistic predictions. Some suggested it might not get much brighter than third magnitude, which would be less than half as bright as Polaris, the North Star. Then without fanfare, in late February, it made a surprising comeback, reaching first magnitude as it rounded the sun on March  While you might have gotten the idea by now that comets are notoriously bad actors and do not always follow their scripts, I should stress that many of them are well-behaved and do what is expected in a broad sense. Still, caution is advised when reading any predictions of their brightness. Great ballplayers can hit for average, hit with power, field, run and throw. But then again, like countless numbers of young ballplayers who had unlimited potential but failed to make the big leagues, ISON too could falter. It could unexpectedly exhaust all of its volatile material, leaving just a small, dark solid lump to ultimately swing around the sun â€” meaning we may not see it all. The saga of ISON is not yet fully written, and it could still go either way. In the meantime, it might be worth ending with an oft-quoted axiom by the legendary comet expert Fred Whipple:

## Chapter 7 : Returns of Halley's Comet

*dust tail - up to 10 million km long, it is composed of smoke-sized dust particles driven off the nucleus by the escaping gases (this is the most obvious part of a comet to the naked eye); ion tail - up to million km long, it is composed of ions that interact with the solar wind.*

February 28,  First spotted through binoculars, the comet remained visible to the naked eye for three months and was the brightest comet seen in 20 years. Its tail was perhaps its most spectacular feature, stretching out more than degrees as seen from Earth, according to NASA. Thousands of images of the comets were posted on the Internet, then a young but popular phenomenon. A close approach by Earth Yuji Hyakutake first spotted the comet in January using 25x binoculars. The amateur comet-hunter had quit his newspaper job in specifically to move to an area with less light pollution and dedicate more time to searching the skies. According to Sky and Telescope magazine, he spent four nights a month scanning the stars from about 2 a. The more famous discovery came just five weeks later. It would skim very close to Earth at about a tenth of an AU, or 9. In statistics released by Harvard University at the time, the university said that was the closest of any comet since and the fifth-closest in a century. By some reports, Hyakutake was so close that you could see it move among the background stars in a single night. Comet Hyakutake soars above a mesa. The Southern Hemisphere got a look at the comet as it made its faint approach to Earth. Then, it arrived in the Northern Hemisphere just as it began to get close and interesting. By mid-March, the first signs of a tail were visible by amateurs. As it reached its closest approach to Earth, the tail began to extend far across the sky. Astronomers made several discoveries during the months that Hyakutake was visible. The first X-rays emitted from a comet. In May , an instrument on the sun-pointing Ulysses spacecraft " suddenly went haywire " for several hours, according to an account in Physics World. Comet-watchers in , however, have a potentially bright comet to look forward to. Comet ISON could be as bright as the full moon if it performs as advertised.

## Chapter 8 : The Comet Tail - Windows to the Universe

*At over two astronomical units in length, it was the longest known cometary tail until measurements in showed that Comet Hyakutake's tail was almost twice as long. There is a painting in the National Maritime Museum that was created by astronomer Charles Piazzi Smyth.*

This comet was so bright it could be seen in the daytime, not just at night. A cross-staff was an instrument used in navigation to determine angles. It was probably used here to determine the altitude of the comet and approximate the length of its tail. Excerpt from The History of Kingston, by Marius Schoonmaker, , at page 70 On the 9th of December , there appeared an extraordinary comet, which caused very great consternation throughout the province, with forebodings of dreadful happenings and divine punishments. Undoubtedly, God threatens us with dreadful punishments if we do not repent. And here is what the residents of New Amsterdam on Manhattan Island observed! Excerpt from The Dutch and Quaker Colonies in America , by John Fiske, Edition, Vol II, at page 59 Late in the autumn of the good people of Manhattan were overcome with terror at a sight in the heavens such as has seldom greeted human eyes. An enormous comet, perhaps the most magnificent one on record, suddenly made its appearance. At first it was tailless and dim, like a nebulous cloud, but at the end of a week the tail began to show itself and in a second week had attained a length of 30 degrees; in the third week it extended to 70 degrees, while the whole mass was growing brighter. After five weeks it seemed to be absorbed into the intense glare of the sun, but in four days more it reappeared like a blazing sun itself in the throes of some giant convulsion and threw out a tail in the opposite direction as far as the whole distance between the sun and the earth. Sir Isaac Newton, who was then at work upon the mighty problems soon to be published to the world in his "Principia," welcomed this strange visitor as affording him a beautiful instance for testing the truth of his new theory of gravitation. But most people throughout the civilized world, the learned as well as the multitude, feared that the end of all things was at hand. Every church in Europe, from the grandest cathedral to the humblest chapel, resounded with supplications, and in the province of New York a day of fasting and humiliation was appointed, in order that the wrath of God might be assuaged. The comet as seen from London and Germany! It was a magnificent object, having a tail 90,, miles in length. A month previously it had been seen at Coburg, in Germany, but it was not then very bright, and had only begun to throw out a tail. When seen in England it was receding from the sun, having passed its perihelion on the 8th of December. Now, the most interesting thing about this comet was its near approach to the sun. The heat which we receive from a tropical sun at midday is considerable, but the comet must have experienced 25, times that amount. It is difficult to form any conception of such a temperature. Suffice it to say that every known material would be vaporized under it. How the comet behaved when thus heated can never be known, for it was lost in the glare of the sun at the time. When it did reappear, after wheeling round the sun with a speed of 1,, miles an hour, it had developed an enormous tail, and we must look upon that as one of the results of the heating process. But the step made at this point did not refer to the physical constitution of comets. Borelli had thought that the parabola might be the form of their orbits; but Dorfel , a German astronomer, after carefully considering all the observations of the comet of , came to the positive conclusion that it did move in a parabolic orbit with the sun in its focus. Halley went further. Adopting the great theory of gravitation, just then conceived and worked out by Newton, he sought, and ultimately found, an ellipse which satisfied the observations. Attributed to The Reverend Robert Law approx  Astronomers throughout Europe tracked its position for several months. It was visible in the Northern hemisphere and by the end of that year the comet became bright enough to be seen at noon as it completed its hairpin turn around the Sun. The long, golden tail of the comet of was estimated to be 30,, miles in length. Originally thought to be two comets, the comets of late and early were in fact a single comet observed before and after perihelion, a situation that hindsight reveals as critical in the determination of the cometary trajectory. Upon examining the course of comets, it is easy to believe that some of them must occasionally fall into the sun. The comet approached so near, that, at its perihelion, it was not more distant from the sun than a sixteenth part of its diameter; and, if it returns, which some predict, in the year , it may then fall into the sun. Its tail extended 70

degrees, and was very brilliant. This comet, of all those which have been observed, approaches nearest to the sun. Descending with immense velocity in a path almost perpendicular to his surface, it proceeded until its distance from his centre was only about , miles. Sir Isaac Newton computed that, in consequence of so near an approach to the sun, it must have received a heat times greater than that of iron almost going into fusion; and that if it was equal in magnitude to our earth, and cooled in the same manner as terrestrial bodies, its heat would not be expended in less than 50, years. Three observations on comets are recorded in history, agreeing in remarkable circumstances with the comet of  These dates are nearly at equal distances of times, namely, years; which is also the period between and  Edmund Halley conjectured that these might be successive appearances of one and the same comet, revolving about the sun in the period of about years. If this conjecture is well founded, this comet may be expected again, after finishing the same period, about the year  Further reference to the influence of a comet on the Great Flood was offered by Abraham Rockenbach. A scholar of the late Renaissance and the chair of Greek and of Mathematics at the University of Frankfurt. In he published a short treatise in Latin, De cometis tractatus novus methodicus, which had the following entry concerning the Deluge: In the year of the creation of the world , after Noah had attained the age of years, three days before the death of Methusalem, a comet appeared in the constellation Pisces, was seen by the entire world as it traversed the twelve signs of the zodiac in the space of a month; on the sixteenth of April it again disappeared. After this the Deluge immediately followed, in which all creatures which live on earth and creep on the ground were drowned, with the exception of Noah and the rest of the creatures that had gone with him into the ark. About these things is written in Genesis, chapter 7. Modern scholars disagree with Newton and Halley on the period of the Comet and have proposed that its orbital period is actually 9, years. There seem to be different opinions on which is correct. A new comet named ISON has just been discovered! The orbital elements of ISON are so surprisingly similar to that of the Comet of that it has caused speculation in the astronomy community that the two bodies may have once been one comet. If predictions hold true there is a chance this comet may be at its finest on Christmas Eve  What a spectacular sight that would make! Nov , it will be clear of the SUN and glow brighter each day there after. If it makes it passed the SUN? Night clouds or noctilucent clouds are tenuous cloud-like phenomena that are the "ragged-edge" of a much brighter and pervasive polar cloud layer called polar mesospheric clouds in the upper atmosphere, visible in a deep twilight. They are made of crystals of water ice. ISON might not survive passage by the Sun. The dust reflects sunlight to make it bright. Is there a trend here? This should make it very observable to the people of the Earth if it makes it around the Sun. That seems to be a lot of mass lost each day for a small comet. This visitor must be bigger than they are trying to say. Aphelion and Perihelion refer to the elliptical orbit of a comet about the Sun Aphelion: The Point in which a comet passes farthest from the Sun. The Point in which a comet passes closest to the Sun. If permission is granted, I ask that credit is given and a link to this site is provided. Werner All photos and text are the copyright of either this site or their respective owners.

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*"They got the idea from that comet â€" and this is a fact, that UFO that is following it is sending off signals." I responded with a swift swipe of my wet paintbrush and explained that the only thing that followed Comet Hale-Bopp was its tail â€" and then only when it was heading towards the sun.*