

## A New Picture of an Old Comet

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December, 2003

In the summer of 1965 I was a 15 year old amateur astronomer full of excitement about the starry sky. I had just joined the National Capital Astronomers in Washington, DC and they were hosting the Astronomical League convention. I was in heaven. But the most exciting part of the convention was that everyone was talking about a newly discovered comet that, because of its "sun grazing" nature, was predicted to become a spectacular sight in late October of that year. The comet was named "Ikeya-Seki" after the two co-discoverers. I waited with great anticipation reading everything I could find on comets and practicing taking photographs with my newly acquired second hand Miranda 35 mm camera.

The housing development I lived in was near some open farm land that offered a clear eastern horizon but there was a stretch of forested land between me and the open area. On the morning of October 27<sup>th</sup> I woke up early, walked thru the woods and waited until sunrise. No comet. The next morning was cloudy. On the 29<sup>th</sup> I decided to try one more time so I got up at 4:00 AM (again) and started walking thru the woods. As I was nearing the clearing I saw thru the trees what looked like a searchlight coming up from the horizon. I started running and suddenly I broke out of the woods and into pure amazement. The searchlight was the upper two thirds of the comet's tail! By the time the head rose above the horizon, the sky was getting very bright. But this comet was moving away from the sun very quickly so I had high hopes for the next morning. On the morning of October 30<sup>th</sup> my Dad got up with me. We walked back thru the woods using that searchlight as our guide. He still talks about that sight!

I set up my camera and started making some exposures. I was pretty new at this but I knew I needed fast film, a steady tripod and 10 to 20 second exposures to avoid star trails. I snapped away as the comet's head cleared the horizon and then I noticed a beautiful tree that hadn't lost its leaves yet, and in a rare moment of artistic insight, I moved my tripod and kept shooting. I was so excited I could hardly push the cable release to take the pictures. The sun rose, the show was over and we walked home knowing we'd witnessed something very special.

I think my dad went back to bed but all I could think about was that comet and the pictures waiting on that roll of Tri-x. A few minutes later I was holding the wet filmstrip up to the light and my heart sank. "Where is the comet?" "Oh yes, there it is... I think!" The negatives were, like many astro images, very "thin". The comet was there but at very low contrast. For the next year or so I tried to get a good print. Then a friend told me I needed to use Agfa's highest contrast paper, grade 6. That was the ticket. After lots more time in the darkroom chasing specks of dust around the negative and trying different exposures I

finally got a few half decent prints one of which has been a fixture on my various walls ever since.

Then some time passed. I graduated from high school, went to college, got drafted, finished college, became an engineer, worked for 27 years and, thru the magic of changing economies, found myself back in college again! I had been interested for years in image processing so I worked out an independent study class with the graphic arts department of North Idaho College to study and learn to use Adobe's Photoshop software. After going thru a number of "canned" lessons, I was looking for something "real" to do for my final project and I thought about those old negatives of comet Ikeya-Seki. "Do you suppose I could give that old image a new life?" I dragged out the negatives and saw that I did, indeed, have two almost identical images taken a minute or so apart on October 30<sup>th</sup>. These were the best two I ever recorded so they would have to do. I searched the "Sky and Telescope" indexes and found two good articles (Jan, '98 and Oct, 99) on combining astro images in Photoshop. My main goal was to reduce the grain in these (pushed) Tri-x negatives. Anything else would be frosting on the cake.

I started by gently washing the two negatives in Photo-Flo solution since they had gotten pretty dirty in 38 years! After remounting them in slide mounts and scanning them at 1950 dpi I was ready to put my new computer skills to work. Starting on the first negative, I rotated it slightly to straighten it up. I then noticed there were still numerous dust specks and other flaws. But, thanks to Photoshop's amazing "Clone Stamp" tool, these were gone in a flash of digital magic. I then loaded the second negative and dragged it into a new, partially transparent layer on top of the first negative. Now, using a trial and error method of alternate move and rotate commands I got the two images aligned perfectly with each other. According to theory, the graininess (photographic noise) of a combined image should reduce as the square root of the number of combined images. So, for two images, you should get about a 30% reduction in grain. As I flipped between the combined and single image views in Photoshop I was pleased to see this happen before my eyes. Although still grainy, it was much better than before. I now spent hours fixing a large flaw in one of my original negatives. An airplane had flown thru the left third of the frame during the original exposure and I had attempted to remove it with a Q-Tip and acetone. (Hey, I was 16 years old!) Fortunately, I didn't throw the "ruined" negative away and, after many attempts with the "clone stamp" tool, the acetone disaster was reversed and the airplane trail gone!

Now I had another big challenge. In the minute or so between when the two exposures were taken, the Earth had rotated a bit. (Don't you just hate it when that happens?) And now, since I had effectively reversed that effect for the stars and comet, the foreground wasn't aligned any more for the two images. That's OK. "We have the technology" to deal with planets and skies that don't move in sync with each other. By using Photoshop's "Extract", "Magic Wand"

and trusty “Clone Stamp” tools, all the fine detail of the second image’s foreground now lines up perfectly with the first image. At this point, a quick “Invert” turns the negatives into positives and there it is, my old reluctant picture has a new life. Cleaned up, contrast boosted and grain reduced! But why stop there? I decided to see if I could add the missing magic that I remembered like it was yesterday. Of course I’m talking about color. The actual scene was a pearly comet against a deep blue sky and a reddish-orange glow starting to leak from a soon to rise star we call our sun.

Using the same selection I used to move the foreground tree, fence, etc but inverting it to select everything else allowed me to add blue to the sky and orange to the sunrise without touching the inky black foreground silhouette.

I was now looking at an image of an old friend in a whole new light. I could hardly have imagined how this picture would be brought back to life when I was pushing the cable release on that cool October morning 38 years ago. I took down the old, grainy, black and white image from the wall and swapped the print for a new 11x14 inch color version brought to life again thru the wonder of technology.