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Revisiting Independence
by   Martin Horejsi

Way back in the summer of 2002 in this very ezine I wrote a piece about the Independence, Missouri chondrite, an observed fall from 1917. The single 880g mass was recovered shortly after it fell by Edward Keesling who “heard a hissing/buzzing sound, and then observed a dark object falling to the ground on the side of a dirt road.”

One of the few views of the oriented side of the almost-complete mass of Independence, MO.
A scale view of the interior of Independence prior to it’s slicing.

**Keesling** kept the stone until his death whereby it became property of his son. Some time later, Alan Shaw learned of the stone and was able to purchase it from the family.
Edward Keesling
the sole witness to the fall of
the Independence, MO meteorite.
Independence is listed as an L6 chondrite, and was oriented in form. In the past decade, much of Independence was sliced up and distributed across the collecting community. I was lucky early on to acquire a nice complete slice of the fall. At the time, it was one of the largest slices of Independence in any collection. More recently, however, I was able to add the “main mass” of Independence into my collection.
The main and largest cut face of Independence denoting one side of the current main mass.

A beautiful mottled patina offering a classic L6 visual texture sprinkled with both occasional round chondrules and ample metal flake.
A few nice larger inclusions grace the massive (for Independence) cut face of this almost-200g main mass.

An oriented stone has a leading edge or side, and a trailing side. The fact that the stone was not tumbling on an axis perpendicular to its direction of travel allows the atmospheric shaping of the stone to become pointed on one end, and flat on the other. Generally the leading or pointed end of the stone is the most exciting, and happily the slicing of Independence preserved the most active portion of its exterior.
A gorgeous leading edge that punched through our earth’s atmosphere with no regard for its own personal safety, or for the sole witness on the ground.
The single flaw in the exterior of the main mass of Independence; only a mildly natural fracture.

At the moment, the main mass of Independence is just shy of 200g, or about one quarter of the initial mass (assuming a 10% cutting loss). Given many main masses, a twenty-five percent stake in any given meteorite is a serious commitment, but such a large relationship with a historic witnessed fall is truly a match made from Heaven. I cannot say it with certainty, but at the moment I am guessing that “till death do us part” will be when I let go of Independence.

The year 2017 is not too far off meaning that in four years I will raise a toast to Independence celebrating the 100th anniversary of its fall! And also to Edward Keesling who had not only had the good fortune of witnessing a meteorite hit the earth, but also the wherewithal to preserve it for future generations.

Until next time…. 
As I write this it has been a week since the gathering of the California Meteorite Club down at Escondido. It was a great party. Sort of similar to what Paul and I did years ago. But, this had a much larger group of attendees and was an opportunity to personally meet many of the Facebook and email friends we have corresponded with.

As the group picture below taken by Richard Garcia shows there was a good turnout for this first event. Several of the guests brought show and tell items. I had thought about it but could not decide what to take. I will definitely take a few meteorites next time. Many of the attendees were meteorite hunters and they had stories to tell of adventures. It was great to hear their exciting close shaves and moment of discovery tales. The only thing missing was the campfire to gather around.

There was a nice spread of food and the superloaded pizzas arrived at just the right time. Paul and I got a great opportunity to have a long conversation with Richard Garcia about astrophotography. He is quite the expert and has attended a lot of imaging conferences that we have not. Paul is always a little up on me with making the most of software programs. I have been working hard with the equipment and the software trying to make it up a steep learning curve. We have five new pieces of
software that we have to master to make all of our investment in equipment give back the best results. It was good to talk to Richard and learn a few more things and see some accessories he carries with him.

I restrained myself to just a few cookies but there was a grand assortment of desserts there too. We left in the early evening for the drive home pretty happy to have met so many more nice new friends.

I think we are all looking forward already to the next gathering and I know there will be a lot of hunting going on with the desert cooling off.

**Summer Summary and Fall and Winter Plans**

It has been a wonderful summer. I have been super busy having tremendous fun. I have cut a huge pile of meteorite material for orders and for friends. I cut some Alamo Breccia this morning to send back East to a collector at an observatory. You cannot sell Alamo Breccia but I had enough to give this guy some. By a huge pile I mean huge. I used up three blades in two days something I have never done before. It was hundreds of cuts and nearly 15 hours of total cutting time on just the one job. But, the hardest day of cutting meteorites is way better than the best day at a job working for someone else. Every cut reveals something that no other person has ever seen before. And every cut is on material that was once roaming around the solar system.

Along with all the meteorite work the last couple months I have been working at night with my other love; astrophotography. I have posted some of the experimental pictures taken in town on Facebook and Google+ Now I am really getting excited about returning to the desert to take some shots from there. There are just a few objects I can even take pictures of from town. And the signal to noise ratio is quite poor. With stacking and a lot of processing you can bring out a nice shot sometimes. I am eager to get some good long exposures under a dark sky. The experimental shots from town have helped work out most of the bugs in my set up. Plus I have all the software working while I am still learning to use it. So when our yearly adventure to the desert for meteorite hunting and astronomy comes I will be ready to bring back some nice shots of galaxies, nebulas, globular clusters and anything else that is up there.
This an image made from a registered stack of about 30 individual shots totaling about 40 minutes. It was taken from my backyard here in town. The object is M27 the so called Dumbbell Nebula. It is a planetary nebula, which means it is actually the blown off gas shell of an old star.

I really don’t know how much meteorite hunting we will do this year. We will be up late doing astrophotography and will spend the day sleeping and processing image files. It has been a long time since we went on vacation without doing any hunting.

We have been waiting for Comet ISON for almost a year and getting ready for six months to shoot it, hoping that it would be the spectacular comet predicted early on. But, there are some thoughts being offered now by scientists that it may not be very exciting after all. Well, comets are like that we have been surprised both ways before. I remember another Sungrazer that was touted as being the Comet of the Century which fizzled out. But, I remember some truly wonderful comets too. They were back in the time of film. I am excited about getting images with my digital cameras of Comet ISON regardless of how spectacular it is.

Since this article is always about meteorites I don’t think I have told the story of going out to our astronomy club dark sky site to get pictures of comet Hyakutake. It had come out of deep space with no warning and was going to pass Earth close and fast. Paul and I were both members of the same club (that’s where we met) and we were already doing a little meteorite hunting together. We were both astrophotographers too. I was still raising four children and paying lots of bills. I did not have a lot of money and there were really not many choices for equipment to
track a camera for long exposures. There was one commercial camera tracker and I could not afford it at that time. So I put my mind to the problem and made my first windup clock movement camera drive. I have collected antique clocks most of my adult life and restored them. I had accumulated a good supply of old 24 hour wind up timing mechanisms. They were used before synchronous motors to turn on switches and things during a one day cycle. I knew they could never pull the weight of a camera. However, I was sure that the gears and shafts of the movements were strong enough to support the weight of a camera and lens so it could smoothly fall under gravity as the movement turned. All I had to do was mount the clock drive so that the one turn per day shaft could be aligned to Polaris and lengthen the shaft so a camera clamp could be attached.

The final version of my clockwork trackers is pictured here. It has a nice covered movement. The main drive gear is a pair of gears stacked and loaded with a heavy spring to take out backlash. I could go as long as 10 minutes at 270 mm with little tracking error. Of course it was impossible to do any kind of guiding adjustment. I could go as long as an hour on wide angle shots.

I went through about three version of the device each getting more accurate and using better clock drives. I got to the one pictured below that I used as recently as a three months ago on Orion (while it was still in the evening sky). It still worked and I got some good shots, but, it is not as good as the Vixen Polarie that I now have for
wide angle work. After taking hundreds of great shots at wide angle and telephoto over several years Comet Hyakutake suddenly came into the sky. It was a Saturday night and we caravanned out to the desert. I pulled the truck into a spot at the observing site and got out and looked up. There hanging in the sky was a spectacular comet. Bright, teal blue and bigger than the span of your hand with your fingers spread apart. I set up my rig and started taking pictures. Everyone else needed electricity and telescope mounts to do their shots. I just set my tripod with the tracker down and used an alignment scope to sight in Polaris, and I was ready. Of course I had to wind it up. All across the area the ticking of my rig could be heard among the opening and closing shutters. I shot several rolls of film and could not wait to get back to town to get them processed. The color I could get in an hour, but the black and whites would take a few days. I had gotten a lot of good shots. Comet Hyakutake was going to be visible for one more week and it was going to be bigger and closer. So I got more film and wound up my clock movement and retaped the focus ring on my lenses so they were at real infinity not where the symbol is on the barrel. I did everything else to get ready to go the next weekend again.

When I stepped from the truck that second Saturday night I almost passed out from the sight of the comet. It was so bright everything around me had a cast of blue-green. It stretched all the way across the sky. There was no way I could get a whole picture of it. I had no wide angle lens to do that. I could get a big piece though. A long night and a few rolls of film later I was back on the road to a camera store to get film developed again. I had done ok. I have put a couple pictures here to show you what that really great comet was like.

This is a wide angle shot of Comet Hyakutake about five minutes of exposure with a 50mm f2 lens using 1000 ASA Kodak Royal Gold.
This is a five minute long exposure shot of the head of Comet Hyakutake using a 135mm lens and doubler for an f3.5 focal ratio. TMAX 3200 was the film of choice for this shot developed without any pushing.

So Comet ISON is coming and I have traded in my old handmade camera tracker for an astrograph telescope on a fine heavy mount with autoguiding done at subpixel accuracy using software on my laptop. That’s a big change from a wind up clock movement. We do a lot of meteorite hunting on most of our vacations and I think we will do at least some later this year too. But, we have been working hard to get our telescopes, mounts, and guiders set up. I have spent a couple days getting the electricity components all packaged into a plastic container so I just plug things into it. I am operating with battery power too now days.
Here is a picture of my current set up ready for a night of imaging in my backyard.

Regardless of how good or mediocre Comet ISON turns out to be there will be plenty of other objects to photograph if the sky is clear. We have our fingers and toes crossed that we get good weather and don’t forget any crucial parts or cables at home.

One of my Spring cutting projects

During my cutting of meteorite material I came across a nice stone that I sent off for classification. It is chondrule rich and really cool. It is not the freshest of meteorites, but it looked like it could be a Type 3. It is shown below so you can have some meteorite eye candy in this article. I got the classification results and it was a Type 4 (nuts), but it is still a very nice meteorite. It is NWA 8008 and its complete classification is L4 W5 S1 olivine Fa 24.6±0.9 (n=15) low-Ca pyroxene Fs20.5Wo1.8 (n=15).
Meteorite Market Trends
by Michael Blood

This Month’s Meteorite Market Trends

by Michael Blood

Please Share and Enjoy:
At least once a month since 2003, a Nevada meteorite has been showcased on the “NevMetPoM” website.

The above image is the first one that started it all. And a decade later, I’m still highlighting Nevada meteorites on that webpage. At least once every month, I’ve posted a picture of a different Nevada meteorite (along with a description and any available information), covering a span of ten years. Admittedly, some meteorites like Battle Mountain (which was Nevada’s first and only observed/recovered fall) got more than a couple months’ worth of attention. I think that’s understandable. Also, a couple of bona-fide DCAs (Dense Collections Areas) like Tungsten Mountain may have garnered more than 12 months worth of attention, but that is only a reflection of the diversity of classifications from that locality. And if you “do the math”, I’m sure you’ll realize that there are many more “months” in a ten year period than there are “classified” meteorites allocated to Nevada, which shouldn’t be your first clue that there will be a fair-share of “unclassified” finds depicted on my NevMetPoM. But you
have my personal guarantee (no matter how badly weathered the find) that every image is of a real meteorite.

What is truly remarkable is that there are still so many more meteorites in Nevada that NevMetPoM may still be going strong 10 years from now!

In any case, it was my initial hope that my “pictures” would be informative, if not actually instructional, for people who wanted to see what a meteorite “looked like”, or who wanted to know “what to look for” when meteorite-hunting.

That still is my hope, but now I have an additional, more urgent hope. I hope that the sheer number of these Nevada meteorite finds will lend some credence to those researchers who are suggesting that more attention (funding) be given to these rocks from space that are falling on us in frequency of numbers and SIZES that may be UNDER ESTIMATED.

All I’ll say is, how certain can we be of the frequency of Tunguska-style impacts, which leave no evidence of their occurrence in the geologic record? Yet, should it re-occur even in the next 100 years over a densely-populated area, it would obviously be a major cataclysm, but we couldn’t call it “unavoidable”, let alone “unexpected”. It may seem quite a stretch relating the little weathered chondrites that I depict monthly on the NevMetPoM to huge “city-smashing bolides”, but I see all of these space rocks as a continuum where the number of small meteorites that have landed on this planet is relational to the number of large meteoroids yet to hit us.

On a lighter note, before I sign-off, I would like to thank all of those that attended our little Meteorite & Tektite Party in northern San Diego County on August 24th. It was a lot of fun and we are hoping to make it an annual event (and possibly have a Meteorite Auction next year, if Michael Blood has his way;-).

This small fete was held at the same venue where my 65th Birthday Party was held last year, and is where I got the idea to resurrect the old Annual Tektite Party (hosted
by Paul Harris and Jim Tobin) that I used to attend 10 years ago in Torrance, California.

This year the “Meteorite & Tektite Party” was an open event to anyone that was “in the area” or was willing to travel down the Interstates to San Marcos, California. But all of the credit for organizing and running this event goes to my better-half, Monika Waiblinger. She initiated this function shortly after she formed a Facebook Group called the “California Meteorite Club”. Originally this was an “open” Group, but shortly after its formation the members voted to limit membership to California residents only. At least, that’s what they tell me. Because, I’m still NOT on facebook!

**California Meteorite Club**

The above image shows the members of the Facebook Group called the “California Meteorite Club”:

(Left-to-right) Richard Garcia (he took this picture), Roy Miller, Jim Tobin, Angie & Bryan Couch, Michael Blood, Moni & Bob, Doug Ross, Jason Utas & Michelle Myers.

(Kneeling) Anthony Ferrari, Cuco Gonzalez, Lan Crutcher, Michael Mulgrew, Paul Harris, Martha Why Glez

Moni had set up tables for meteorite displays, and it seemed that everyone brought a meteorite with them to share. There were some fulgurite-looking rocks displayed and people were asked to vote “yea or nay” (the vote was “thumbs-down” on it being a fulgurite). And there was a California Meteorite display that I pieced-together from my collection. But the hit-of-the-party was the whole-stone Lunar rock (NWA 7022
prov.) that Jason Utas carried in his pocket. There was some discussion about having a “slab exchange” (trade specimens), or a “silent auction”, or even talks and presentations at next years Meteorite Party.

Memorial for our friend and fellow meteorite finder John P. Wolfe

Among the various displays and “show&tells” was this Memorial to John P. Wolfe that I set-up in remembrance of our recently departed friend and colleague.

If you would like to pay your respects, I have published an on-line memorial at this website: http://www.imorial.com/JohnWolfe/

If you would like to post some “Comments”,
Feel free to contact me by email:
Posted originally on 2013/09/06 | by Robert Verish

REFERENCES:

For a “Directory” of past Nevada Meteorite Picture of the Month | click on ARCHIVE at the bottom of each NevMetPoM webpage.
My previous articles can be found *HERE*

For more information, please contact me by email: Bolide*chaser
Meteorite Times Magazine

Allende Special
by John Kashuba

The Allende CV3 meteorite contains many components. Here are some less common chondrules, a collection from three Allende thin sections. Except for the last two, the views are 3.1 mm wide. The others are 0.9 mm and 1.1 mm wide details. All are in cross-polarized light.

The first chondrule is also shown in Richard Norton’s The Cambridge Encyclopedia of Meteorites, page 131. The caption there reads:

An anorthite-forsterite-spinel chondrule from an Allende CV3.2. The large white crystals along the edge are plagioclase. Spinel is scattered through the chondrule as very small opaque crystals. The darker blades are forsterite. Note that the forsterite and plagioclase are radially arranged with respect to the center. A sparse olivine aggregate is in the lower left and upper right corners. Viewed in crossed-polarized light. The chondrule is 1.6 mm diameter.
At 35.5 million years, Bediasites are by far the oldest surviving tektites that still retain a significant amount of their original glass. One might well expect that they should be deeply etched over their long history, and indeed, a few are. But the vast majority consist of relatively smooth, abraded pebbles, often with glassy chips. They have had a hard life.

To the best of my knowledge, no Bediasites have ever been found in situ within the host formation in which they first fell. The upper Eocene dates match a stratigraphic sequence in the Bediasite homeland northwest of Houston, Texas, that includes marine sandstones, siltstones, and interbedded non-marine lignites, suggesting that the tektites rained down on a swampy coastal environment at the conclusion of their 1300 mile flight from the impact crater that formed Chesapeake Bay. They may have been locally reworked by channel scours, but most were likely incorporated
quickly into marine sediments where they rested undisturbed for tens of millions of years. I know little of the more recent geomorphic history of that region, but in broad strokes, the host stratigraphy was lithified, upturned, and gradually eroded. Sparsely scattered tektites were progressively liberated and subjected to surface processes that wore them into smooth pebbles and redistributed them through the reworked sediments where they are found today.

In Australia, where there has not been a great deal of change since the Australites fell, one can wander for days without seeing a tektite. I used to consider it a successful mission if I found one per hour in known productive areas (although we once found over 800 in two days!). There are thousands of square kilometers where there are none at all. Imagine if you will, covering that surface with the sediments of a marine transgression, converting it to solid rock, then tipping it up on end and eroding it into a new world. How often would that knife-line-thin interface yield a tektite?

Bediasites are found in a stripe about 5 miles wide and some 140 miles in length where surface erosion is nibbling into their resting place in upper Eocene sediments. A remarkable few, probably the most recently liberated, still show the deeply-sculpted skins of a very, very long life. Those shown in the photo are some of our best, the other 99% were worn smooth (and are still very, very rare and special!)
INTRODUCTION

Oscar E. Monnig was born in Fort Worth, Texas on September 2, 1902. Although he received a law degree from the University of Texas in 1925, he worked for the family business, a chain of dry goods stores all his life and eventually became the President of the Company, before selling it in 1981 as his health and sight started to deteriorate.

His scientific background was limited, as he liked to tell, to enrolling in an astronomy class that was promptly cancelled since he was the only student. He had also tried without success to convince the Smithsonian Institution, the Field Museum in Chicago and the American Museum of Natural History in New York to allow him to study their meteorites, so he then decided to create his own collection, collection that grew to thousands of specimens and that he eventually donated to Texas Christian University in his home town of Fort Worth.

Oscar Monnig was a very busy businessman so he had very little time to write or publish anything during his lifetime, however he left files upon files with the correspondence he maintained throughout his life with hundreds of people from “Dust Bowl” farmers who might have found a meteorite, to H. H. Nininger, his friendly competitor when it came to acquiring meteorites.

I was kindly given access to these files by Dr. Arthur Ehlmann, and Dr. Rhiannon Mayne, and they will be the basis for this series of articles as I let Mr. Monnig tell you the history of some of the famous or not so famous meteorites in his collection.

SOMERVELL COUNTY
Somervell County is a tiny county (by Texas scale!) some 40 miles (65 km) southwest of Fort Worth. Early in his career of Meteorite Collector, Oscar Monnig heard rumors that a meteorite had been found there, and on April 3, 1937 he drove to Glen Rose where he met Mrs. L. E. West who knew all about it and gave him directions. He kept detailed notes about this trip:
On that day he had acquired all of the Somervell County pallasite, until very recently the only pallasite known in Texas. He had even obtained the fragment he had spotted imbedded in the base of the bandstand in the town of Glenn Rose; he had asked for it and the mayor of the town had allowed him to remove it under the condition that it would be replaced by a similar size stone.
(The gentleman in the picture is not identified). All documentation is Property of the Monnig Collection – TCU.
As was already his habit, the Somervell was sent to the Smithsonian Institution for cutting and in December 1942, he received this letter (abridged), with some timeless advice on the care of iron meteorites:

Dear Monnig:

The Somervell County pallasite was cut without the slightest difficulty and the face polished. We find that it is best to polish these and not etch them because the etching reagents once introduced are most difficult to remove, hence the cause of most of our grief. The polished face is in fine shape this morning, which is four days after it was polished.

I am going to return it as is, and feel that it will be in good condition upon arrival. I advise that you warn people to keep their fingers off the polished metal because finger marks seem to stick and rusting starts. It's a fine way to make an iron oxide fingerprint. If there is a slight film of rust on the surface when received, suggest that it be removed with a block of art gum. It usually cleans off easily. Our experience has been that a film of lacquer does not protect the meteorite as well as keeping it cleaned off with art gum and now and then polishing.

I certainly appreciate getting a sample of this meteorite which, as you know, is new to the collections. Thanks a million.

Cordially yours,

E. P. Henderson,
Associate Curator,
Division of Mineralogy and Petrology.

However O. Monnig was bound and determined to preserve this meteorite. A new miracle product had recently appeared: Plastic and he carefully considered that option. He first turned to a friend, Mr. B.F. Faris of Wilmington, Delaware, who happened to work for DuPont.
Mr. B.F. Farris,  
University Club,  
Wilmington, Del.  

Dear Mr. Farris:

The piece is not inherently fragile, but is badly weathered. It represents a piece of a meteorite which fell, not merely tens, but probably hundreds of years ago, and was dug up near Glen Rose, Tex., about 1919. Added to the weathering and oxidation it had received at Nature's hands were the rough treatment of its finders, who used a sledge hammer and a wedge to break it into three pieces, two of which were cemented into ornamental walls. I still have two larger pieces.
Mr. Oscar Monnig
1010 Monnigville Drive
Fort Worth, Texas

Dear Mr. Monnig,

Yesterday I shipped the piece of meteorite embedded in Lucite to you. The job did not turn out quite as well as I had hoped since there are three or four fairly large air bubbles adjacent to part of the meteorite; most of the surface of the meteorite, however, is still covered with air-free Lucite. I did not attempt to machine all the top of the bubble-filled Lucite casting, but it can be removed fairly easily if you think it would improve the appearance of the casting. The air bubble areas caused by air trapped within the meteorite did indicate that all the cracks were very likely filled with Lucite.

The meteorite was suspended in a partially

If Mr. Monnig was upset or disappointed, his letters do not show it and it kept on trying to improve the appearance of the Somervell pallasite. A few months later he updated his friend about the condition of the meteorite already encased in Lucite and, despite the problems and defects he had decided to send the other two fragments.
Mr. Farris responded a couple months later. Things have changed; he is no longer in Wilmington but at the University of Chicago, in the Metallurgical Laboratory. He still has the two fragments of Somervell, but now there is another problem; we are in 1943 and preserving a meteorite, even a pallasite is no longer a very pressing issue, there is a war going on, laboratories have new jobs and priorities.
Dear Mr. Moomig,

you are very likely wondering what has happened to your meteorites.
Excellent care has been taken of them.
We have held up indefinitely in placing them in "Lucite" when the Government took over the control of the manufacture of methyl methacrylate monomers. They would not allocate one drop to research work, and all of it went into the fabrication of airplane turrets, optical instruments, and other products used by the Army and Navy.

Only recently has the supply situation eased up a little, and...
There are no further letters and notes in the file but Dr. Ehlmann tells me that eventually those two pieces were also encased in Lucite, and returned to Mr. Monnig, but the process did not preserve the meteorite as intended, the cracks kept right on growing and widening and eventually the whole mass fell apart. And it is all in a big box in Dr. Ehlmann’s office, minus a few fragments that have been salvaged.
Our Meteorite of the Month is kindly provided by Tucson Meteorites who hosts The Meteorite Picture of the Day.

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Once a few decades ago this opening was a framed window in the wall of H. H. Nininger’s Home and Museum building. From this window he must have many times pondered the mysteries of Meteor Crater seen in the distance.

Photo by © 2010 James Tobin