

Bob's Findings

by Robert Verish

Why the term "Gold Basin AREA"

Because there has been more than one meteorite fall in the Gold Basin area of northwestern Arizona.

It all started when they discovered the White Elephant [Wash] meteorite at Gold Basin. Actually, other meteorites have been found there as well, including Golden Rule, King Tut, Temple Bar, White Hills, and still others that are awaiting classification. But it was the White Elephant Wash stone that changed everything.

The White Elephant (L4) was recognized as being different from the "Gold Basin (L4)" fall only when the results of Carbon-14 age-dating (by Tim Jull of Univ. of Ariz) revealed it to be from a "recent fall"! (By comparison, this same age-dating technique has shown the "Gold Basin (L4)" fall to have occurred ~15,000 years earlier.) The reason the White Elephant stone was picked to be age-dated was because it had been analyzed, classified, and deemed "a Gold Basin stone" worthy of testing to determine the age of the "Gold Basin (L4)" fall. Is this just a case of serendipity, or are there many more White Elephant-like meteorites masquerading as "Gold Basin" stones?

Remember now, the "Gold Basin (L4)" strewn field is about 15,000 years old. And one of the LARGEST (which may explain why Gold Basin Area meteorites are so "variable";-). The sheer size of this strewn field precludes that there should be many more meteorites, from other falls, yet to be found within its extent. But the Golden Rule, the Golden Mile, and the other "different" meteorites are mostly unweathered! So if the other "different" meteorites from this area are mostly from comparatively recent falls, shouldn't there have been even many more "different" meteorite falls during the previous millennia? Wouldn't they have accumulated on top of the same surface where all the "Gold Basin (L4)" stones are found? So, where are they?

The most apparent conclusion is that they have been found, but have not been recognized.

Consider this: that after centuries of weathering, these "unrecognized", unpaired meteorites would all look alike - they would all have exteriors that are indistinguishable from all the other Gold Basin Area stones. In which case, they may already have been found, but are "hiding in plain sight"! They are masquerading in our collections and are labeled as "Gold Basin (L4)"!

What this means is that, aside from age-dating, there is no way to distinguish "Gold Basin" stones from the more recently fallen stones. This also means that we no longer have the luxury of calling any weathered meteorite found in that area a "Gold Basin" meteorite. Hence, the broader, more inclusive term "Gold Basin AREA meteorite" is now preferred.

Since then, I have attempted to find some characteristic that might distinguish between these similar weathered, yet internally different, chondritic stones. But it wasn't until I cut one particular stony for my friend the well-known meteorite hunter, Donald O'Keeffe, that I recognized an interior pattern different from other stones from this area. It was classified by UCLA as being "L6", and is now known as:

- Hualapai Wash - L6, S4, W3 (found by Donald O'Keeffe)

Soon afterwards, while cutting many more "Gold Basin AREA stonys" I encountered several more with this particular interior fabric. These too were classified and the following names were submitted to the Nomenclature Committee for approval:

- Hualapai Wash 002 - L6, S5, W3 (highly shocked)
- Hualapai Wash 003 - L5, S4, W2 (high - shock) - Finder Donald O'Keeffe
- Hualapai Wash 004 - L5, S3, W2 (metal veined) - Finder Donald O'Keeffe
- Hualapai Wash 005 - L6, S3, W2 (unweathered)
- Hualapai Wash 006 - L6, S4, W2 (hi-shock * petrologic grade)
- Hualapai Wash 007 - L6, S4, W3 (hi-shock * petrologic grade)
- Hualapai Wash 008 - L5, S5, W1 (impact-melt breccia)
- Hualapai Wash 009 - L6, S4, W4 (highly shocked * weathered)
- Hualapai Wash 010 - L6, S4, W1 (2.35kg mass)

And then subsequently, the following specimens were classified:

- Specimen #MRF-011 - L6, S4, W1 (Fa 24.0+/-0.3%)
- Specimen #MRF-012 - L6, S4, W3 (Fa 24.2+/-0.2%)
- Specimen #MRF-013 - L6, S4, W5 (Fa 23.8+/-0.4%)
- Specimen #MRF-014 - L6, S4, W3 (Fa 24.3+/-0.3%)
- Specimen #MRF-015 - L6, S3, W4 (Fa 24.3+/-1.5%)
- Specimen #MRF-016 - L6, S3, W1 (Fa 24.0+/-0.7%)

- Specimen #MRF-017 - L6, S5, W3 (Fa 25.0+/-0.4%)
- Specimen #MRF-018 - L5, S4, W1 (Fa 24.6+/-0.5%)
- Specimen #MRF-019 - L5, S4, W1 (Fa 23.9+/-0.2%)

All of the above stones "look like Gold Basin (L4)", when judging them only from their weathered exterior. It is no wonder then, that before these stones were cut, they were all "deemed" by collectors and dealers as being "Gold Basin (L4)"!

Because of White Elephant and Hualapai Wash, it is abundantly clear that no UNCLASSIFIED stone can be called, with any certainty, "Gold Basin (L4)".

If usage of the term "Gold Basin AREA meteorite" isn't more appropriate, now, then here is another reason:

In April of 2002 the Nomenclature Committee held a recall vote to rescind their approval of Hualapai Wash 002 thru HW 010. In light of subsequent classifications by Alan Rubin (UCLA), it was noted that the fayalite (Fa%) values (see above) were too narrow and overlapping with Gold Basin, for all of these stones not to be paired with each other.

Essentially, this will reclassify Gold Basin as an (L4-6). This will allow all L4, L5, and L6 stones to become members of the Gold Basin meteorite fall. What this means is that all Hualapai Wash (L6) stones are now termed "(L6) members of the Gold Basin meteorite".

The exception would be "that a specimen undergoes additional testing" (e.g., terrestrial age dating) as in the case of White Elephant (L4). Then the Nomenclature Committee would accept a request for a new name. This "special criteria" only applies to finds made within the Gold Basin strewn field. As the editor of the Meteoritical Bulletin explained to me, "This obviously puts the Gold Basin AREA in a different category to most other meteorite find sites, but it is an unusual situation."

But even if Gold Basin (L4) is eventually changed to Gold Basin (L4-6) "officially", this will still be too misleading, because no one GB stone is partly L4, AND partly L5, AND partly L6. Each individual stone has (so far) been EITHER all L4, OR all L5, OR all L6. Besides, it would require testing in order to prove otherwise. So, because of White Elephant and Hualapai Wash and the reclassification of Gold Basin, this still means that the term "Gold Basin AREA" is preferred!

Yes, it's true that there will be some L4, L5, and L6 stones, that are legitimately unpaired to the Gold Basin fall, that are going to be called Gold Basin. But I think this is a better way to deal with this situation. What I mean by "situation" is this - Gold Basin is an unusual and very interesting Ordinary Chondrite that needs more attention drawn to it, in the hope that additional research will reveal its true story.

Gold Basin is somewhat strange in the way it exhibits its various metamorphic grades. It is so gradational, going from L4 to L5 to L6, that no one stone ever displays more than one grade. This means that no one specimen of Gold Basin (L4-6) will be a mix of L4 thru L6 clasts. It just simply hasn't ever been observed. So far, each specimen has been either all L4, or all L5, or all L6. Yet, the designation "Gold Basin (L4-6)" is generally accepted by petrologist to mean that it is a breccia. But there are all kinds of breccias. Maybe Gold Basin is a new kind of breccia? Gold Basin was such a large meteoroid that maybe it could have more than one metamorphic grade? Even David Kring calls Gold Basin a breccia "but evidence of [brecciation] is not visible in thin section"! (Kring D. F. et al. (2001) Meteorit. Planet. Sci., 36, p1060)

My point is, that assigning Hualapai Wash names to all these "different" stones is akin to ignoring all of this contradictory (yet potentially important) data, and "sweeping it under the rug"! By reclassifying Gold Basin to (L4-6) it may bring it to the attention of more researchers. Additional research may yet reveal a single stone that exhibits metamorphic grades 4 through 6, while not showing any evidence of brecciation. Granted, nobody has ever described type 4 material smoothly grading into type 5, and then into type 6 on a hand-sample scale. But, if such a "missing link" stone could be found, it will have great significance in terms of understanding metamorphic processes on asteroids

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