WHAT DO WE KNOW

about the material composition of UFOs ?

Work in progress: a status report

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Three categories of UFO-related materials

(A) Metallic samples recovered from molten masses observed to be ejected by unidentified aerial objects, generally in situations where they become unstable. They are the topic of this presentation.

(B) "implants" ranging from bits of wire to small structured devices, sometimes encapsulated in organic material, extracted from the body of witnesses following a close encounter.

(C) Large structural pieces claimed to have been found at the site of catastrophic crashes of craft, including what appears to be part of the "skin" of the object. The literature speculates about the recovery of propulsion systems, interior devices and even biological entities associated with these craft.

- While the Roswell case remains the popular prototype of such stories, a dozen other sites are quoted by various authors. The bulk of this material is said to be sequestered in aerospace facilities under special categories of security, outside the ordinary clearance system.

- **Several studies by private parties identify significant components with terrestrial isotopes in radically altered ratios : a fundamental challenge and an opportunity in terms of high-technology frontier R&D**

Isotopes

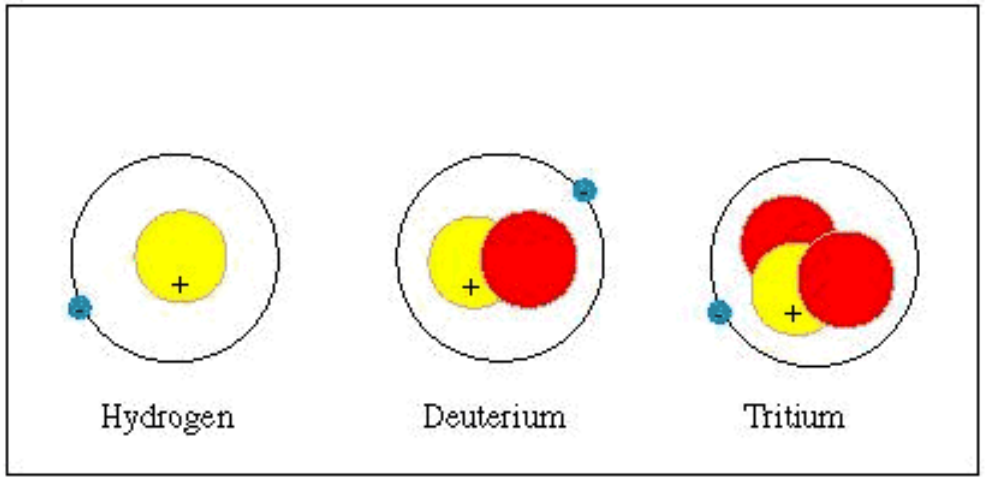
What are Isotopes ? Some definitions

- In order to understand what we are about to discuss in this document it is not necessary to know complex notions of chemistry but it is useful to begin with a review of a few definitions.

- Isotopes are different forms of a single chemical element.

- Isotopes are atoms with the same number of protons in the nucleus, but differing numbers of *neutrons*. In other words, they have different atomic weights. There are 275 isotopes of the 81 stable elements. There are also over 800 radioactive isotopes, some of which are natural and some synthetic.
- The chemical properties of isotopes of a single element are nearly identical.
- BUT the physical properties of isotopes are different from each other since these properties often depend on mass. This difference may be used to separate isotopes of an element from each other by using distillation and diffusion.

Simple example: Hydrogen



Blue: electron
Yellow: proton
Red: neutron(s)

- There are three natural isotopes of hydrogen, the simplest chemical element.
- One of them, Tritium, is radioactive.

Why are isotopes important?

- Chemical elements formed outside the Earth are not expected to have the same common isotopes as terrestrial elements.

- Isotope ratios are largely determined by nuclear processes inside the stars. While a survey is obviously not possible beyond materials from our solar system, there are certain predictable boundaries for the isotope ratios of a given element.
- Within our solar system isotope ratios of most elements will not generally differ by more than a few percent.

- Even if the elemental compositions are similar, a change in the RATIO of the various isotopes might indicate that the material was manufactured in a sophisticated fashion, possibly (***but not necessarily***) outside the Earth.

- Isotope separation wasn't possible on Earth before the 1940s when it was developed for Uranium in the Manhattan Project. Until the mid-1970s the process was extremely complex and costly.

Summary of alleged ejected materials (15 known cases)

-	17 Apr. 1897	Aurora, Texas	83% Al 16% zinc with Mn, Cu	No sample available
-	21 Jun. 1947	Maury Island, WA.	Ca, Fe, Zn, Ti with Mn, Al+	No sample available
-	1952	Washington, DC	magnesium orthosilicate	No sample available
-	14 Dec. 1954	Campinas, Brazil	Tin, others?	No sample available
-	11 Nov. 1956	Väddö Is., Sweden	Tungsten carbide	No sample available
-	7 Sep. 1957	Ubatuba, Brazil	« pure » magnesium + traces	**Multiple samples + 2 new ones**
-	13 Jul. 1967	Maumee, Ohio	92% magnesium +	No sample available
-	Early 1970s	Kiana, Alaska	« light material » (??)	No sample available
-	1975 ot 1976	Bogota, Columbia	Al (93.7%) P (4.8%) Fe (0.9%)	**One large sample**
-	17 Dec 1977	Council Bluffs, Iowa	Fe with traces of Ni and Cr	**One large sample**
-	1978	Jopala, Mexico	Fe with silicon (1.13%), Mn, Cr, C	No sample available
-	Open	Sierra	Fe and Ti (preliminary)	**Two samples under study**
-	Summer 1996	Newark, Ohio	Al with Si, C, Mg and Ca	No sample available
-	1996	Nevada (NIDS)	AL (85%) with Si (9%), Fe(2%), Ca	No sample available
-		Gatheau case (France)	No information released by CNES	No sample available

Washington, D.C. 1952

- Witness: Navy pilot chasing object
- Bright fragment detached itself and fell
- Report by Wilbert Smith of Canada
- **Confirmed to us by top US Intelligence official**
- Fragment said to be “a matrix of magnesium orthosilicate”

- No sample available to us – second-hand reports only

Campinas, Brazil 14 December 1954

- Witnesses: many local people
- Three disk-shaped objects flew over
- One object started wobbling, lost altitude
- Thin stream of silvery liquid ejected
- Analysis by Brazil government lab and Dr.Maffei
- 90% tin, plus other elements

- No sample available to us – second-hand reports only

Ubatuba, Brazil 7 September 1957

- Witnesses: local people near the beach
- Disk plunged, rose again, exploded
- Analysis by Dr. Olavo Fontes, Barbosa, Apro (Lorenzen)
- **Highly pure magnesium (over 99.8%)**
- **Personal interview by JV with Dr. Fontes**
- **Analysis confirmed by Dr. Sturrock (Stanford) and French Govt labs**
- Traces: Ca (3230 ppm), Sr (568), Ba (248), Si (156), Mn (59), Al (57)
  in sample SU-H
- Multiple samples available and first-hand reports of analyses
- Note: continuing arguments about the date (1933, 1934?)

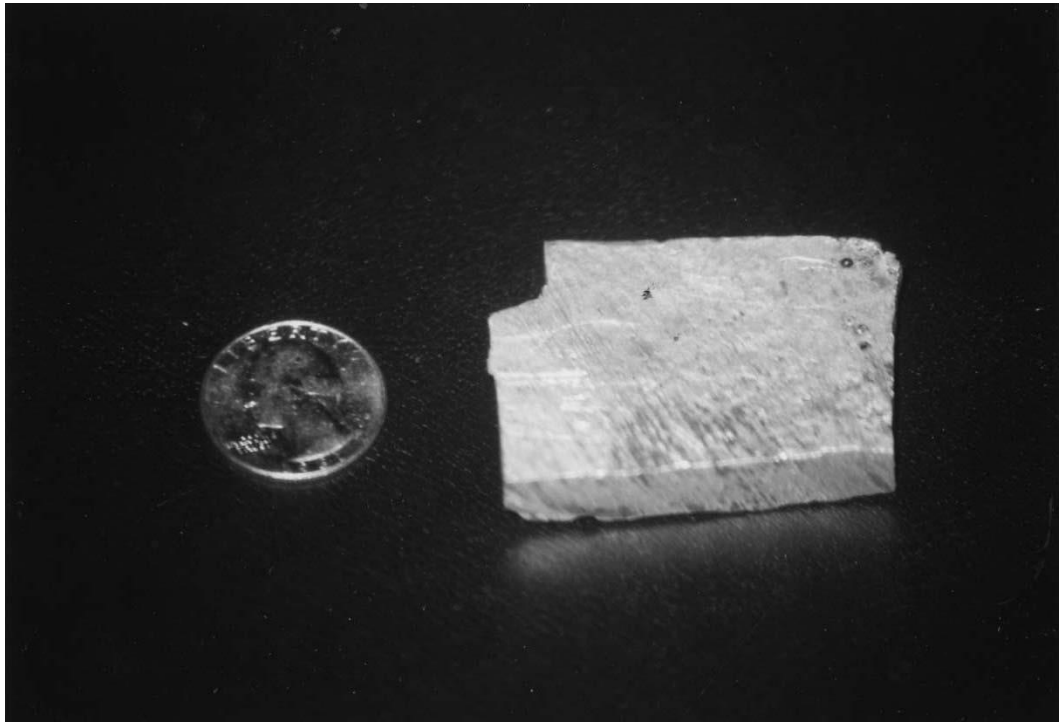
Maumee, Ohio 1967

- Witness: car driver involved in collision
- Fibrous material found on car
- Reports by Lorenzen, Condon Project (U. of Colorado)
- 92% magnesium

- No sample available to us – second-hand reports only

Bogota, Columbia 1975 or 1976

- Witnesses: Two University students
- Metallic sound heard, 4 am, raining
- Disk, 12 ft diameter, in difficulty
- Four other objects came over
- Spouts of liquid ejected
- **Sample handed to me in Costa Rica**
- **Analysis: Vallee, Puthoff (UT Austin)**
- 93.72% Aluminum, P=4.75%, Fe= 0.91%



Council Bluffs, Iowa 17 December 1977

- Witnesses: Eleven, in several groups
- Hovering red object with lights around
- Metal ejected, fell on levee, in molten state for hours
- Police and investigators on site immediately
- **Samples given to us by case investigators, chain of custody**
- Classical explanations ruled out after investigation
- Major component: iron (Fe)
- Other elements: nickel, chromium, manganese, silicium and titanium

Council Bluffs case details

- Site: levee in Big Lake park
- Time: 7:45 pm on 17 December 1977
- Weather: 2,500 ft ceiling, visibility 10 miles temperature 32 deg. F, wind from WNW 16 mph, gusts to 25 mph.
- Metal was “running, boiling down” (police on site within minutes)
- Remained warm to the touch for two hours

Hypothesis A: Hoax by persons pouring metal ?

- Every metal firm in the area was checked
- Griffin Pipe has product capability
- Works manager Mr. Linton Stewart stated melting point of carbon steel is 2,500 degrees F.
- It would have to be transported in special oven with a large truck

- Conclusion: NOT A HOAX

Hypothesis B: Hoax by persons using thermite ?

- Material was in molten state as witnesses arrived
- Ground was frozen to a depth of 4 inches
- The air was at 32 degrees F
- Water cooling would have generated ice
- No source of thermite in the area

- Conclusion: NO THERMITE WAS USED

Hypothesis C: Material falling from aircraft ?

- Proximity to Eppley Airfield (10mi) and Offutt AFB (30 mi) noted
- No abnormal aircraft activity at the time
- Airlines stated they had no landing at the time
- Aircraft would be low, falling metal could not be warmed up by the atmosphere to a molten state.
- Even B-52s don't carry large furnaces…
- Does not explain glowing disk seen

- Conclusion: DID NOT FALL FROM A/C

Hypothesis D: Space debris ?

- Air Force Space Systems contacted
- reentering debris is not molten when it hits
- This 35 to 40-pound mass left no indentation
- visual sighting was at altitude 500 to 600 ft where debris would not be glowing
- no structural indication found

- Conclusion: NOT SPACE DEBRIS

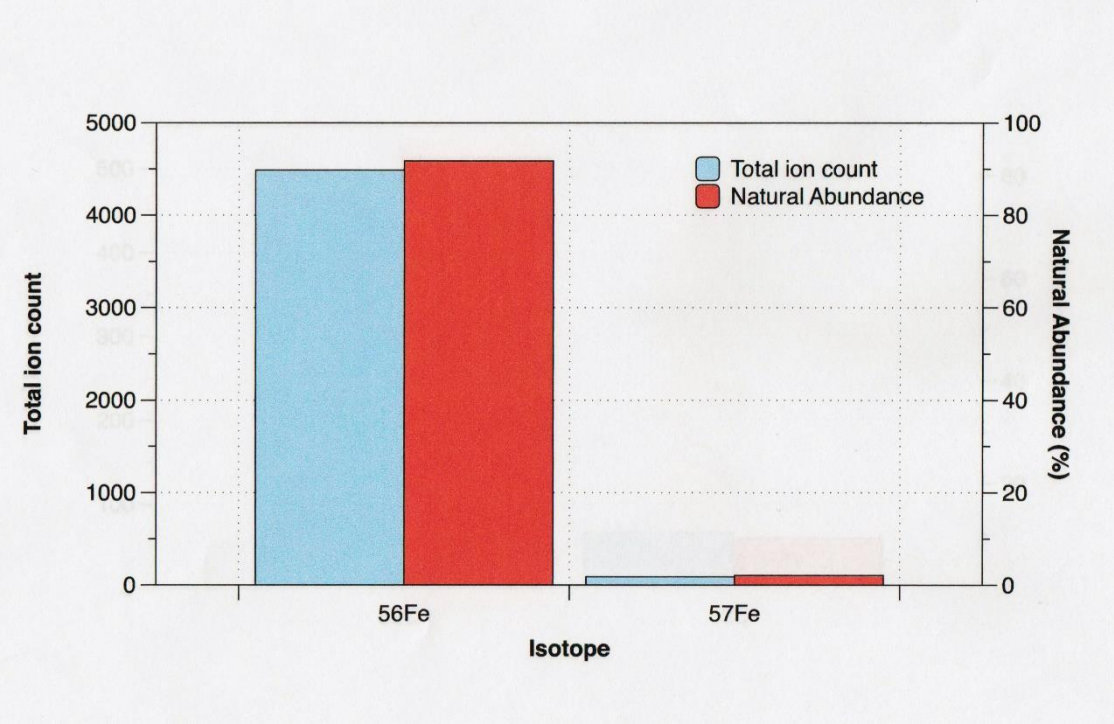
Hypothesis E: Meteorite impact ?

- No significant crater
- Material in molten state for hours
- Low nickel composition
- Incompatible with meteoritic nature

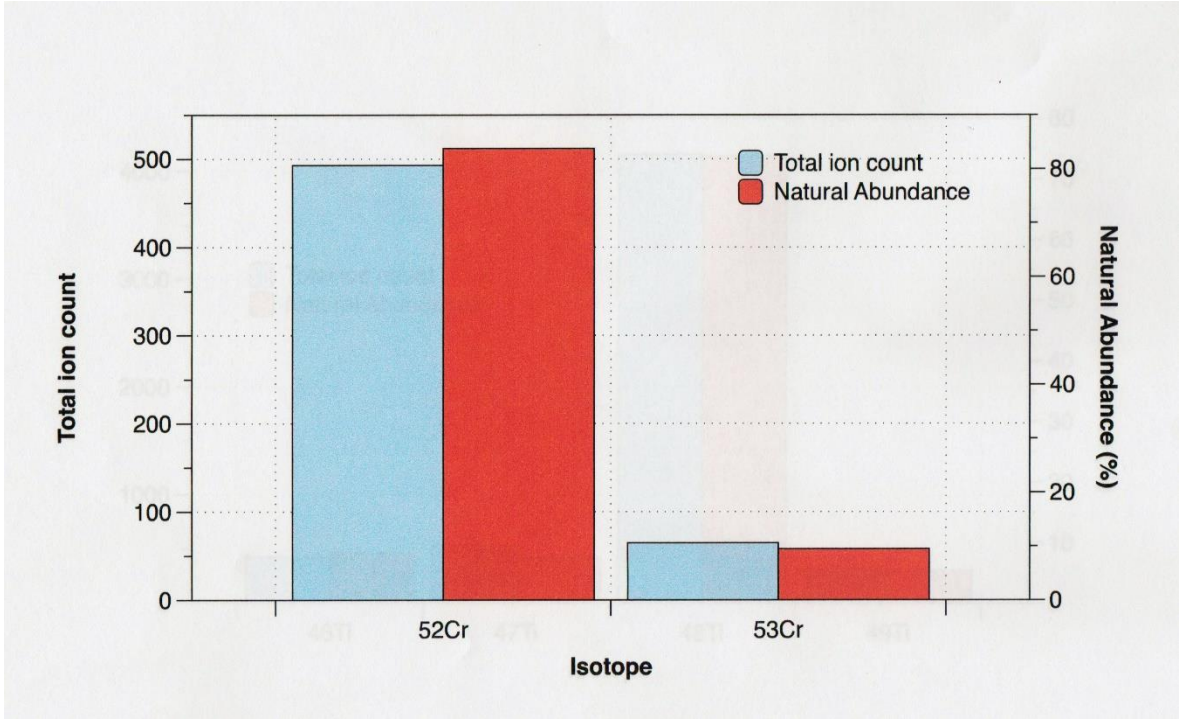
- Conclusion: NOT A METEORITE
- *THE CASE REMAINS UNIDENTIFIED*

Council Bluffs : Iron & Chromium at normal levels
(but more work needed)

Isotopes of Iron



Isotopes of Chromium



More about Ubatuba: Colorful history

- **History of Samples:**

In Sept.1957 Columnist Ibrahim Sued (O Globo) received three fragments in a letter from an eyewitness. Dr. Olavo Fontes cut sample 1 into subpieces for studies in Brazil Govt. laboratories.

One subpiece went to the Mineral Production Laboratory where chief chemist Dr. Feigl did the first analysis. Another subpiece went to Dr. Louisa Laria Barbosa who did spectrographic analysis. Dr. Elysuario Tavora Filho of the Crystallography lab did x-ray diffraction.

Fragments 2 and 3 were not tested in Brazil, unfortunately.

Fragment 2 was sent to APRO in Arizona and subpieces were tested at Oak Ridge, Dow Chemical and the USAF, who destroyed their sample accidentally (and asked for more!)

Fragment 3 was sent to the Colorado (Condon) UFO project

Later APRO also sent subpieces to Dr. Sturrock at Stanford.

One sample was stolen from his safe deposit bank vault…

- **Density Anomaly:**

Dr. Olavo Fontes has reported that a chemist named A. Batista, from the Laboratory of Crystallography, **determined the density to be 1.866 g/cc versus 1.741 g/cc for terrestrial magnesium, suggesting a higher concentration of the heavier isotopes of magnesium, Mg25 and Mg26, normally representing 10.1% and 11.3% of the element, respectively.**

Density was measured on a small chip from the center of « Sample 1 » that was carefully polished to eliminate contamination.

If the sample was entirely composed of Mg26 the density would be 1.862 (Paul Hill, 1995) matching the measurement.

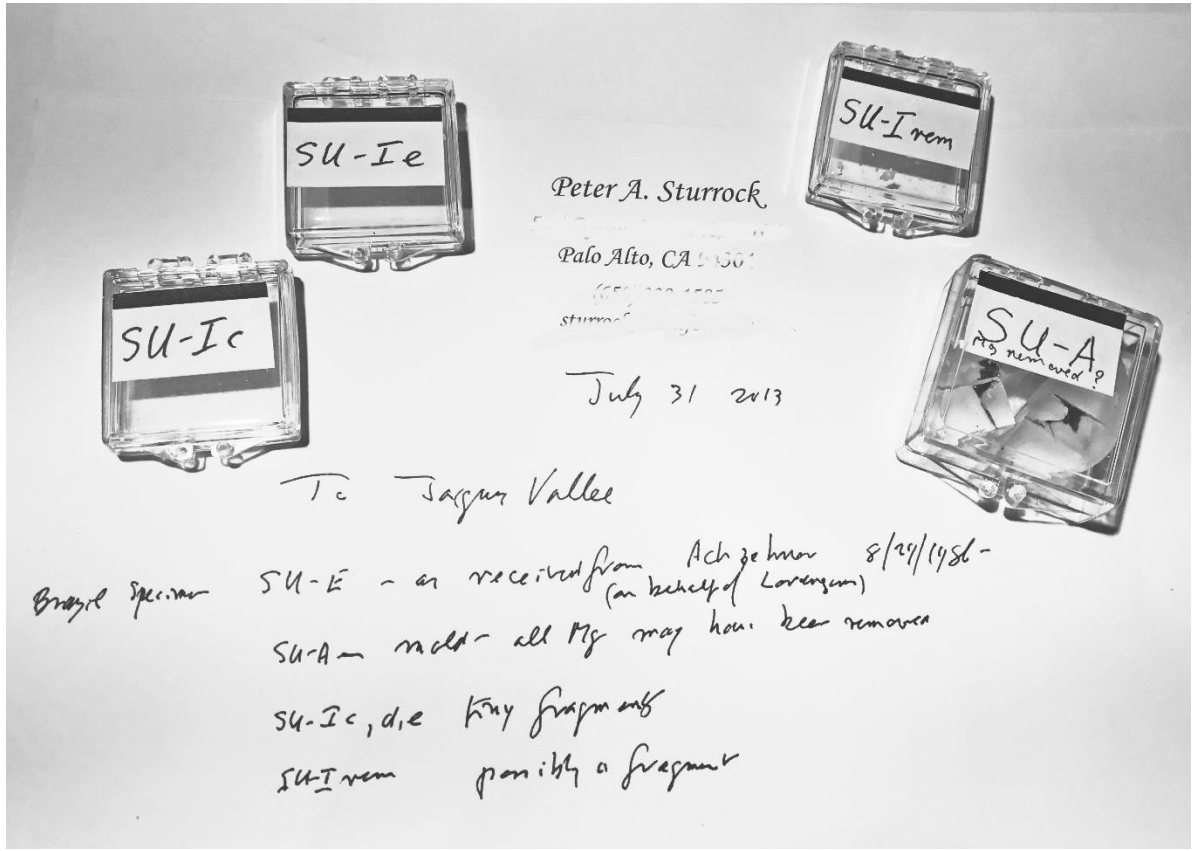
The Condon report challenges this conclusion, however

Unfortunately « Sample 1 » was destroyed in Brazil.

Ubatuba: Status of surviving samples

The samples shown on the right are among those that were transmitted to JV by Professor Sturrock in July 2013.

Selected portions of these materials (and others) were extracted and mounted for new analyses.



Ubatuba: Two more samples found

- While in Argentina in Sept. 2016

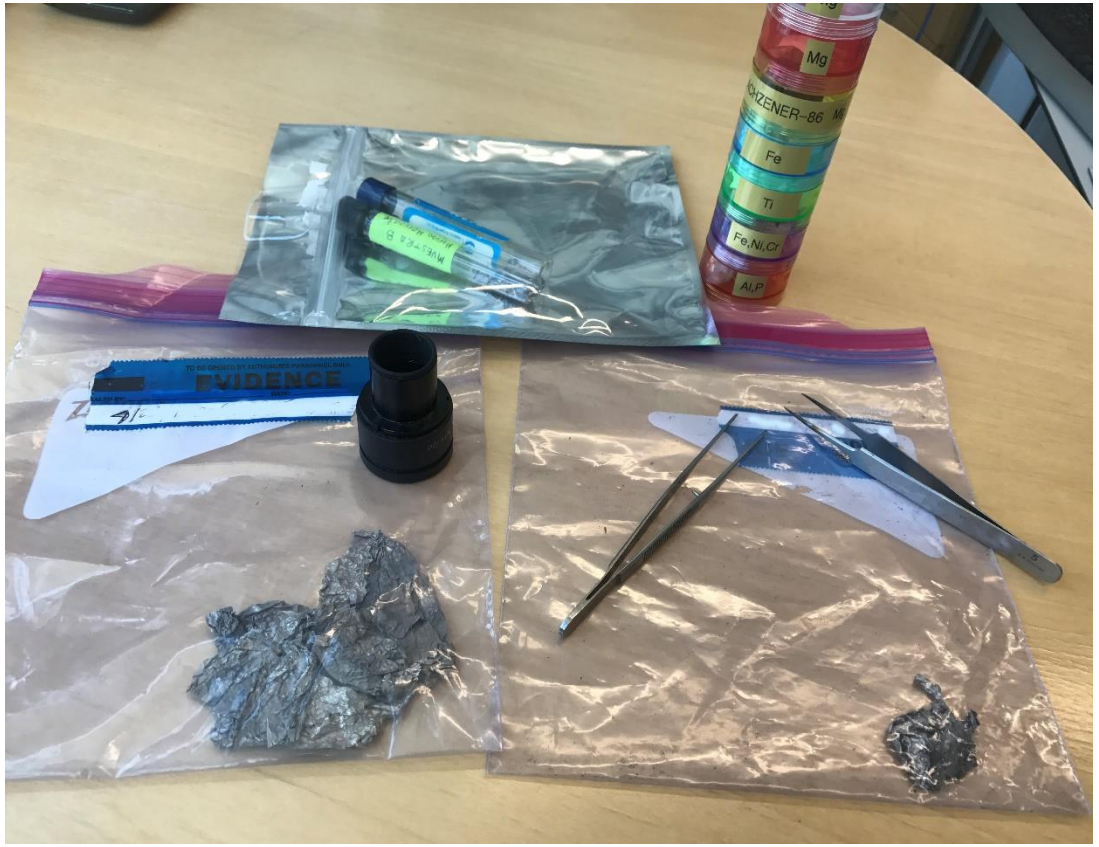
JV visited a site in **Victoria** (Entre Rios) that preserved two samples from Ubatuba:

- One from Dr. Olavo Fontes (« Muestra-A ») through Sr. Nicolas Ojeda
- The other (« Muestra-B ») from an Argentinian sailor named Hercente.

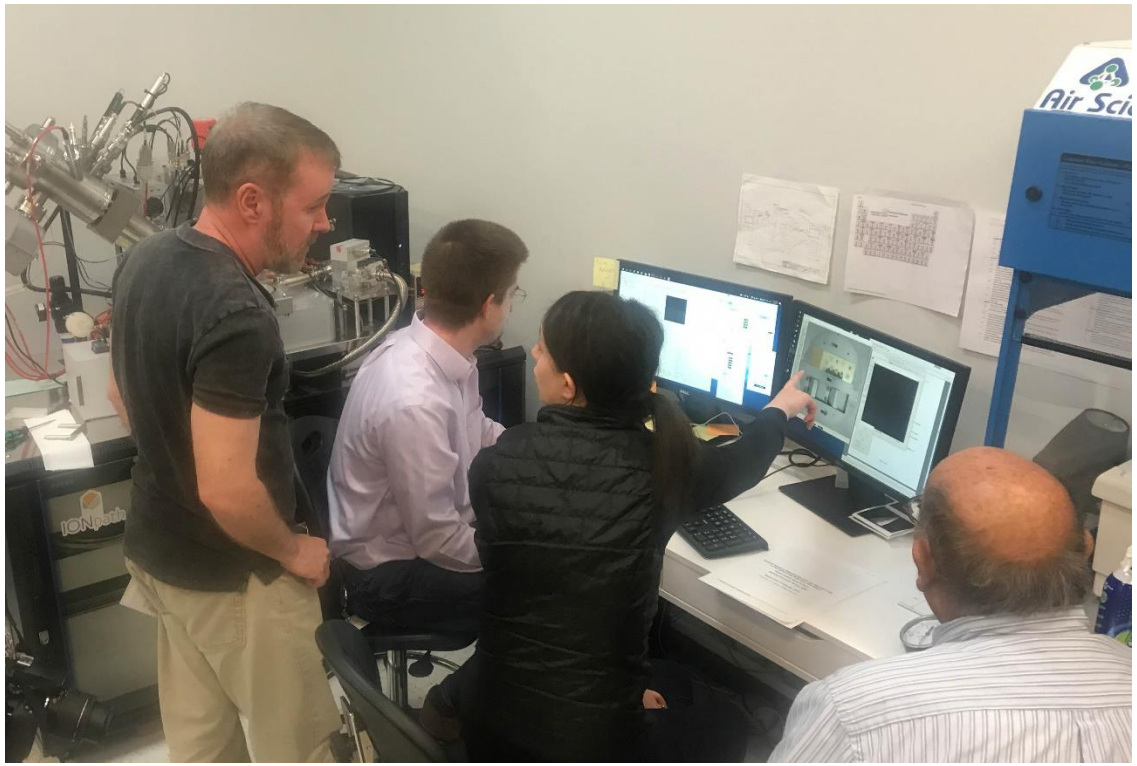
Chain of custody: Buenos Aires, 2016

- Sra. Andrea Simondini brought portions of both samples (Muestra-A and Muestra-B) from the depository to Buenos Aires on 21 September 2016.
- They remained in JV's custody as he flew back to San Francisco.

The next step : Back to the Nolan private Lab

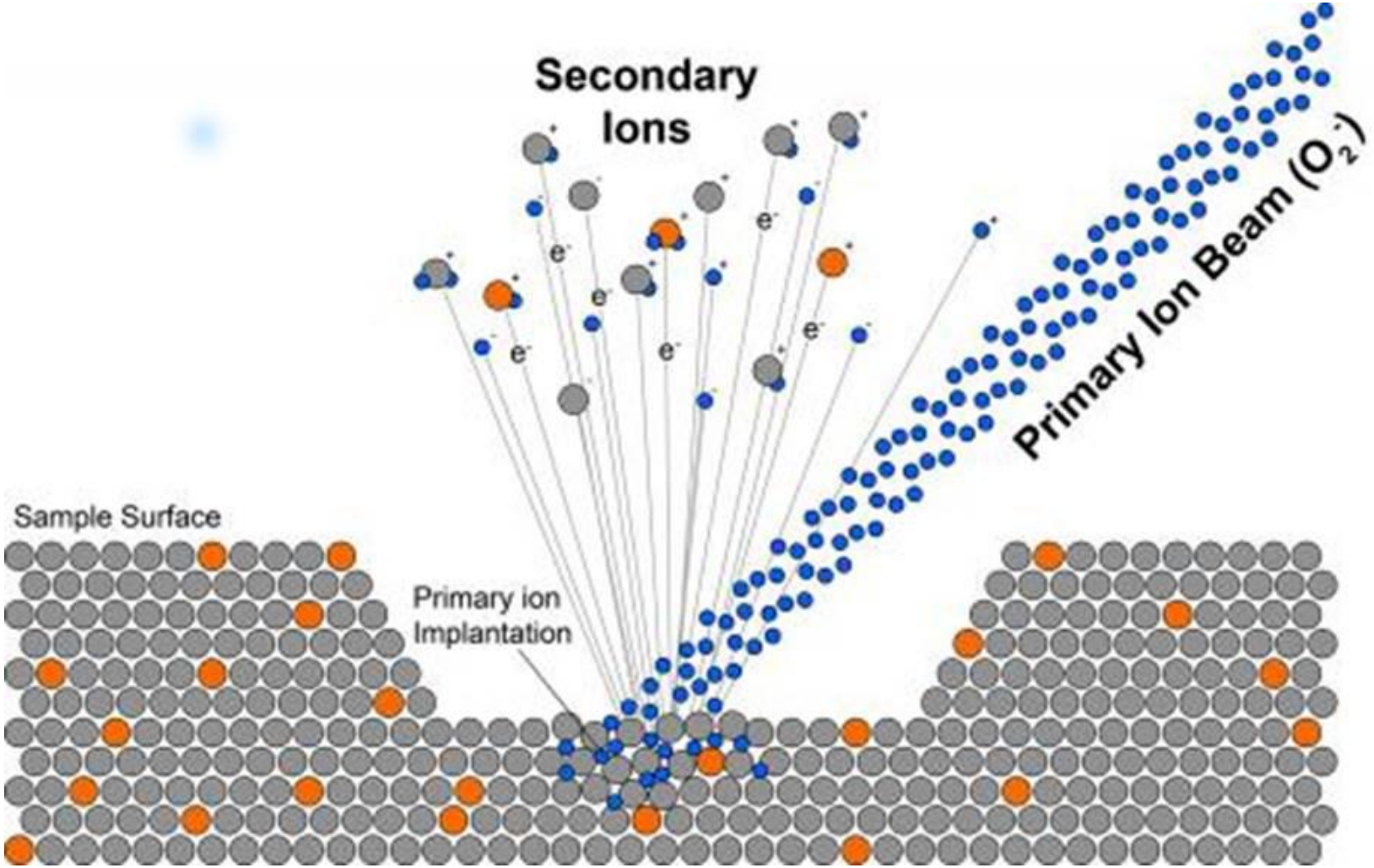


New instrumentation in Silicon Valley



- A Silicon Valley startup made its instruments available for testing of unknown samples
- The technique can identify elements and their isotopes with high precision.

Technology: secondary ion mass spectroscopy



The Mg Isotope Ratios of the "MUESTRA-A" Ubatuba sample are natural

(Muestra – A from Dr. Fontes)

Isotope	Natural	Shard 1	Shard 2
Mg(24)	78.9	80%	80%
Mg(25)	10	9%	9%
Mg(26)	11.1	11%	11%

Ratios appear to be *the same* as Terrestrial.

The material also contains silicon and sodium

The Mg Isotope Ratios of the "Muestra-B" Ubatuba sample are (apparently) non-natural

(Muestra – B is from Sr. Hercente)

~100 nanometers into shard…

Isotope	Natural	Shard 3a	Shard 3b
Mg(24)	78.9	66%	67%
Mg(25)	10	15%	16%
Mg(26)	11.1	20%	17%

Ratios are *significantly different* from "Terrestrial" standard.

The material also contains silicon and sodium.

Caveats

- **Both samples appear to be heavily contaminated with Silicon**
  - **Molten Mg mixing with silicon in sand?**
  - **This would be consistent with witnesses' statements**

- **Significant levels of Sodium**
  - **Seawater salt?**
  - **This observation is also consistent with fishermen's testimony**

  - **Next step: Redo ALL Ubatuba analyses from surviving samples**

Ubatuba References

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The “Sierra-1” case: Titanium

Composition

- Titanium: 99.35% of weight
- Al: 4020 ppm
- Si: 755 ppm
- Fe: 561 ppm
- Mg: 321 ppm
- V: 202 ppm
- Cr: 197 ppm
- Mn: 136 ppm
- Ni: 137 ppm
- Ca (73 ppm) and K (16 ppm)

Isotopes

	standard:	Sample:
• Ti46	8.25%	8.70 and 7.66
• Ti47	7.44%	**5.33 and 3.83**
• Ti48	73.72%	73.91 and 76.56
• Ti49	5.41%	**6.30 and 6.70**
• Ti50	5.18%	5.76 and 5.26

The “Sierra-2” case: Iron

Composition

- Iron: 98.55% of weight
- Mn: 8543 ppm
- Cr: 3500 ppm
- Cu: 1032 ppm
- Ni: 613 ppm
- Si: 592 ppm
- Co: 94 ppm
- Zn: 76 ppm
- Al: 63 ppm
- Ca (10 ppm) and V (7 ppm)

Isotopes (TBD)

Summary of Findings / Next steps

1. Certain metal materials are seen to contain trace levels of elements (and isotopes of said elements) which no man-made or terrestrial metals would be expected to contain. Are these contaminants or purposefully introduced (engineered)?

2. The technical analysis needs to be expanded through the use of several instruments to arrive at more precise composition tables. No analysis from a single instrument or method is fully reliable.

3. We plan an aggressive program of search for additional samples in order to reach a general picture of the entire problem.

4. Abnormal isotope ratio DOES NOT MEAN: ET origin!

General References

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TO BE CONTINUED