

Pierce Jackson

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Old Meteorites

Since 1976, more than 22,000 meteoric specimens have been recovered from the Transantarctic Mountains by the Antarctic Search for Meteorites (ANSMET)¹. Those are only the ones that have been recovered and confirmed to be meteors from one location on Earth – so it can be assumed that many more unrecovered meteorites scatter the globe. These meteorites are important for studying aspects of the solar system, like how it formed and the composition of other planetary and asteroid bodies. Thus, it is important that these specimens not be contaminated by Earth's environment to ensure that accurate scientific data can be collected from them. The Earth is not a clean room, though. Meteorites can become easily contaminated by their environment, depending on where it lands. For example, if one was to land in or near a city, it would likely react with pollution in the air or weather from acid rain. This would compromise the specimen because it could become significantly altered from its “natural” form. For example, if it lands in a moist climate, it will absorb some of that moisture, especially if it contains chlorides². This absorption of moisture could mislead scientists into believing that the parent body of the meteorite hosted liquid water, when it likely did not. The sooner a sample can be collected, the better because it will be less likely to be significantly influenced by the environment. The longer a sample is exposed to its environment, the more likely it is to be

¹ <https://caslabs.case.edu/ansmet/faqs/>

² <http://www.meteoritemarket.com/preserv.htm>

significantly altered. In addition to discovering a pristine meteorite, it must be carefully managed to ensure minimal contamination. Simply placing a sample into a container would not be sufficient: “Meteorites in display cases will be constantly exposed to the changing relative humidity of the room [which it is located]³.” Though keeping a meteorite pristine requires careful effort, it is not impossible. Keeping the sample in conditions similar to outer space (dry and cold) as well as applying a safe protective coating can preserve its natural state. Some samples can be cleaned and “reverted” to their natural state by removing rust or soil that may contaminate it. For example, one could modify a toothbrush and gently scrape off dirt. Another example is abrasive blasting (or sand blasting), however this may entirely remove the top surface of the specimen – so this method must be done carefully³. In all, it is vital to keep meteorite samples as pristine as possible for the most accurate scientific data to be extracted.

³ https://www.meteorite-times.com/Back_Links/2008/december/Jims_Fragments.htm