EPSC Abstracts
Vol. 13, EPSC-DPS2019-585-1, 2019
EPSC-DPS Joint Meeting 2019

EPSC
EPSC-DPS Joint Meeting 2019
15–20 September 2019 | Geneva, Switzerland

See to Believe. Meteorite Collections at the Forefront of Science Communication in Society

V. Moggi Cecchi[1], G. Pratesi[2], A. Franza[2]

(1) Museo di Storia Naturale – Sistema Museale di Ataneo, Università di Firenze, Firenze, Italy vanni.moggicecchi@unifi.it;
(2) Dipartimento di Scienze della Terra dell'Università di Firenze, Firenze, Italy

Abstract

Science communication is today a well-established area of research. For instance, there are several educational books about Astrophysics and Astronomy. Not so many educational books are instead dedicated to Planetary Sciences, not to mention Meteoritics. About this topic, Meteoritics, which studies meteorites and other extraterrestrial materials, should be more accessible to the general public interested in Astronomy. To promote the knowledge of meteorites among the general public, this presentation focuses on the study of historical meteorite collections as useful communication tools. This paper presents the meteorite collection that belonged to the Italian naturalist and geologist Teodoro Monticelli (1759-1845). Several meteorites within Monticelli's collection have fascinating stories about their discoveries, and some of them are of historical significance. Moreover, the specimens of this unique collection that were recently rediscovered at the Royal Mineralogical Museum of the University of Naples could lead to the identification of new meteorites. Finally, implications for both science communication and science education are outlined.

1. Introduction

The term «science communication» refers to both communication from scientists to the general public and to the indirect forms of communication in science education. In this paper, we focus on historical meteorite collections and their role in Planetary Science communication. In particular, we present to scientific community the private meteorite collection of the Italian naturalist and geologist Teodoro Monticelli (1759-1845). Monticelli was a well-known scientist in his time. Today he is mainly remembered as both the author of books and essays on the volcanic activity of Mount Vesuvius and as the owner of a mineralogical cabinet of more than 16,000 specimens. In 1851 and 1857 the Royal Mineralogical Museum of Naples purchased part of this collection (3,000 minerals) that is still on display. Nonetheless, Monticelli's scientific activity as a meteorite collector is wholly forgotten.

Figure 1: Portrait of Teodoro Monticelli depicted by Vincenzo Giovanni Bova (1750-1816) from the Archiepiscopal Public Library at Brindisi.

2. Materials and Methods

In the early eighteenth century, Monticelli edited his *Catalog of Exotic Minerals,* an inventory of 6,000 specimens belonging to his cabinet. Amongst them, he recorded the entries of six different meteorites: one sample of the so-called "Pallas Iron", fallen in Krasnoyarsk (Siberia) in 1749; six samples recovered in the French district of Antraignes in 1821; eighteen in the Campanian area of Sannio in 1810 and one discovered in Marsala (Sicily, Italy) in 1834. These meteorites are actually known as Krasnoyarsk (pallasite, MG), Juvinas (Eucrite), Sannio (H condrite), and Marsala. Monticelli classified all these specimens as «meteoric iron» and carried out a

petrographic investigation. He then compared the data obtained with those performed on the Vesuvian lava to determine the relative abundances of feldspar minerals in igneous rocks. Monticelli verified that these meteorites had a minerochemical composition different from that of volcanic rocks and thus excluded them from his *Prodrome to Vesuvian Mineralogy* (1825), an essay where he described both the crystallographic and chemical features of the main mineral species composing the various rocks of Mount Vesuvius.

3. Tables

Table 1: Teodoro Monticelli's Meteorite Collection

Name	Place	Year
Pallas	Siberia	1749
Aerolite	France	1821
Aerolite	Sannio	1810
Aerolite	Marsala	1834

4. Results and Discussion

In 2018, new research into Monticelli's Collection at the Royal Mineralogical Museum of Naples brought to light the Sannio meteorite. The specimens recovered are still preserved in their original glass jar together with the original label, which describes the samples as "aerolite," the old term for stony meteorites, and reports the inventory number (16433 - E 4972), the place (Sannio), and the year of the meteorite's recovery (1810). In order to confirm the extraterrestrial nature of Sannio meteorite, a chip of the specimen has been sent to the Natural History Museum of the University of Florence for a detailed textural and minerochemical analysis. Scientific data proved the sample as a meteorite. Therefore, it can be considered as a new Italian meteorite, the 42nd, since its name is not included in the Meteorite Bulletin database, a searchable electronic resource that contains information about all known meteorites. A report on this recovery has been sent to the Nomenclature Committee of the Meteoritical Society for the official approval of Sannio as a new meteorite. Moreover, the presence of one specimen of the Marsala meteorite in the *Catalog of Exotic Minerals* proves, for the first time, the meteor shower occurred in 1834. Before Monticelli's meteorite collection was brought back to the light, this meteoric event was only reported in newspapers and scientific memories. The provincial superintendent of Trapani recovered one specimen, as we read in the *Journal of Sciences, Literature and Arts for Sicily* (1835), but when local scientists analyzed it, they recognized the sample as a synthetic limestone. To date, the Meteorite Bulletin database records the Marsala meteorite as a doubtful meteorite. Archival research is still ongoing to recover the specimen of the Marsala meteorite that Monticelli purchased in the early eighteen century. If it is found, it can be considered as another new Italian meteorite.

5. Summary and Conclusions

Monticelli's meteorite collection is an invaluable resource for both science community and general public. It can be used for current and future high-quality research projects. Moreover, the discovery of two new potential Italian meteorites within the collection opened up a new interdisciplinary field in cosmochemistry and astrophysics, presenting a novel approach to study the history of meteorites with all its complexity. Increasing the focus on the role of meteorite collections and scientific archives as valuable sources of information can contribute to the advancement of the history of both Earth and Planetary Sciences. In conclusion, the analysis of the historical reports that first introduced both scientists and the general public to meteoritics can lead to the discovery of meteorites and impact sites previously unknown, improving our understanding of the cosmos forward.

Acknowledgements

We thank K. Di Rocco, Dir. of the Archiepiscopal Public Library at Brindisi, for Monticelli's portrait. This abstract is supported with the MIUR FFABR 2017 funds and the University of Firenze 2018 funds.

References

[1] Grady, M. et al.: Atlas of Meteorites. Cambridge University Press, 2014.

[2] McCall, G.J.H. Bowed, A.J. Howarth, R.J. (eds): The History of Meteoritics And Key Meteorite Collections: Fireballs, Falls & Finds. Geological Society of London, London, 2006.

[3] Medin, LD., Bang, M. 2014: The cultural side of science communication. Proceedings of the National Academy of Sciences of the United State of America, 111: 13621–13626.