# Gold Grains and Black Spherules

**Josef Spacek**

When all of this happened fifteen years ago I found it exciting and mysterious. Now I'm writing it down it seems rather prozaic. But it still might be interesting, even inspiring to you.



*Figure 1. The red sand (left) and the fine black powder (right) from the bottom of the pan*

## Tough beginning

In the region I live in people have often said that if a hill is named Gold Mountain or a creek Gold

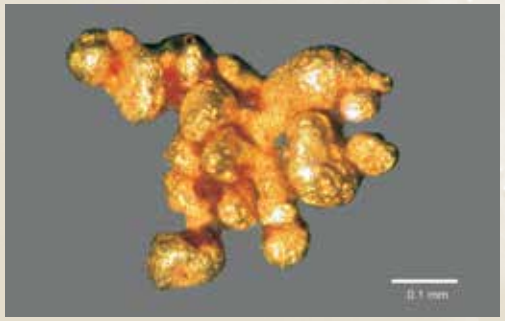



*Figure 2. The first gold grain (Bohemia)*

River then it is likely gold was found or mined there centuries ago, and may still remain there to this day. I decided to put this theory to the test. I began in the classic style of an old prospector, searching with a pan but at the end of the first day I hadn't dug out any gold. It was only when I went back with a powerful magnifying glass that I found a gold grain, invisible to the naked eye and not bigger than several tenths of a milimetre in a fine black powder at the bottom of my pan. I can assure you that finding a piece of gold, no matter how small, fills you with a fantastic feeling of satisfaction – you feel like a champion.

## First greater successes

Once I had improved my somewhat primitive working method I found that I had more success. I always collected the fine black powder that settled at the bottom of the pan into a jar. When I arrived home I placed the contents of the jar into a Petri dish containing some water and searched for gold grains with a low-power microscope. It was a quicker, more comfortable and more successful way

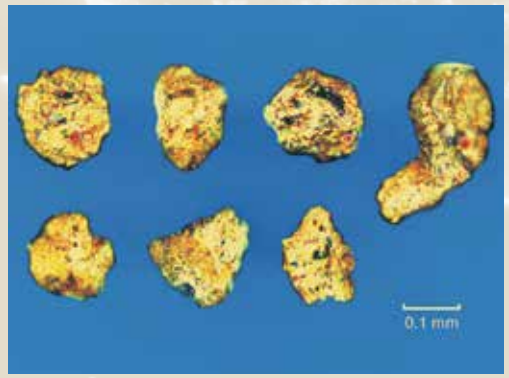



*Figure 3. The collected gold grains viewed by light microscopy*

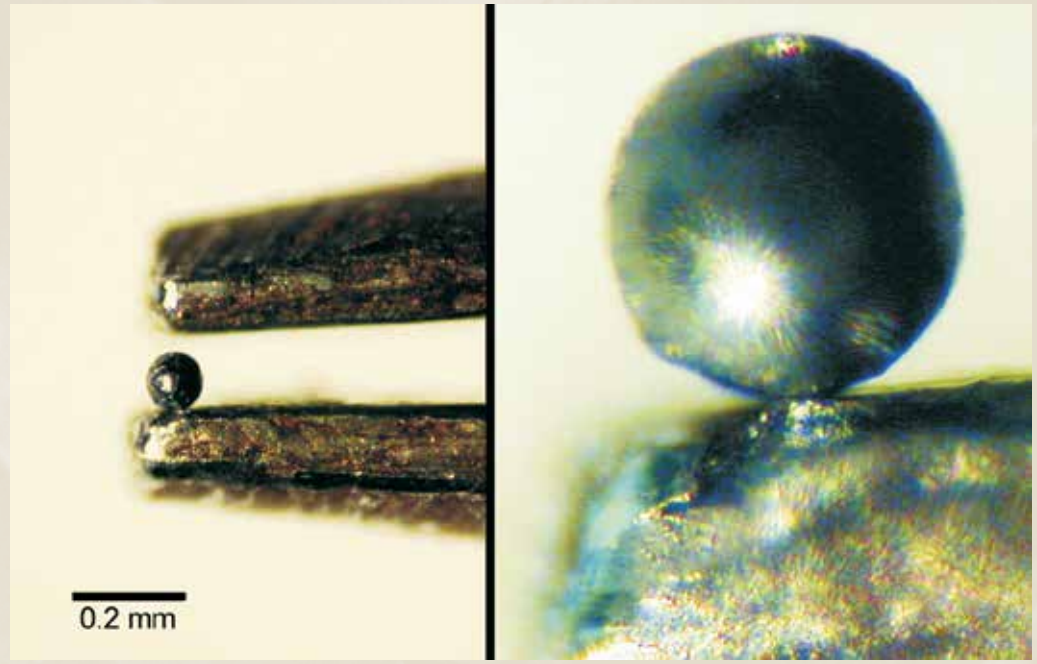



*Figure 4. The black magnetic spherule attached on the tweezers*

of searching for the gold grains. I found that after several hours I was able to place a pretty long line of the gold grains onto some Scotch tape.

## Exciting surprise

Suddenly something peculiar happened to the object. A shiny black ball leaped to the top of the tweezers. After a few hours I had collected a line of black spherules in addition to the gold grains. Some of these spherules were matt black or brownish and sometimes hollow and scoriaceous. However most of them were smooth and shiny, metal-like and magnetic (see Figure 6). Their size generally ranged between 50 and 200 micrometres and their surface revealed a crystalline-like texture when under the electron microscope (see Figure 7). To me, the exciting mystery about this was how these spherules appeared in the sand at the bottom of the creek.

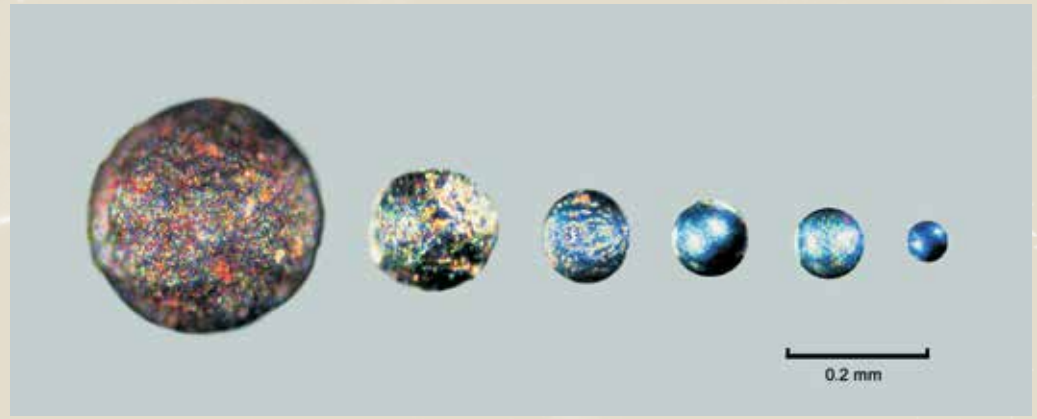



*Figure 5. The spherules (those non magnetic have been placed on the left)*

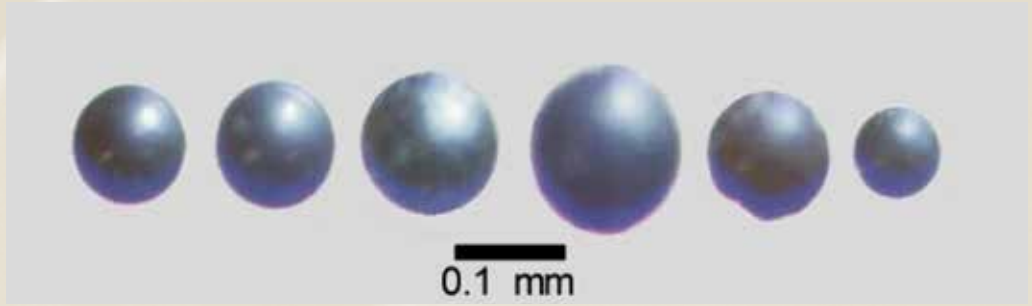



*Figure 6. The magnetic spherules (Bohemia)*

## Where are they from?

I speculated about where these balls could have appeared from. Is it possible that they were waste that had been generated after welding and grinding? Yes, and in fact I'd seen similar particles in technical waste. But who would weld here, deep in the forest?

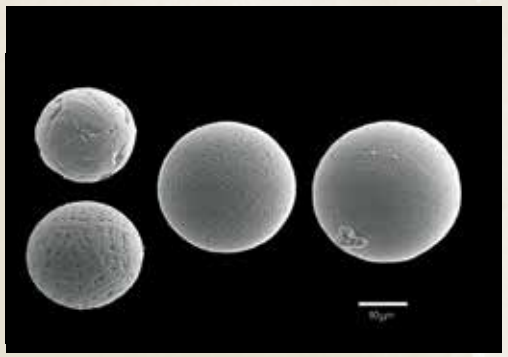


*Figure 7. The magnetic spherules imaged using the electron microscope (in collaboration with Dr.T. Kohout, The Geological Institute of the Czech Academy of Sciences)*

It seemed like an unlikely explanation to me. Could they have been emissions from a thermal power station? I'd previously found plenty of microscopic globules in ashes from a sedimentation lake near one power station but these hadn't been metallic, instead they looked like they were from glass. So this didn't lead me anywhere. Then another idea struck me. The sand in the creek had been red, the same as all the rocks in the region – why not look further at them? I collected a sample of the red stone and found it was crumbling, more than 200 million years old – a sandstone called Arkose. Water erodes Arkose easily, causing it to fragment into a red sand. I crushed this stone between two sheets of paper using a hammer and passed the magnet through the red sand. If this sand contained the same balls as that in the creek, then they should jump at the magnet. I found that they were clearly visible on its surface and even more so on the

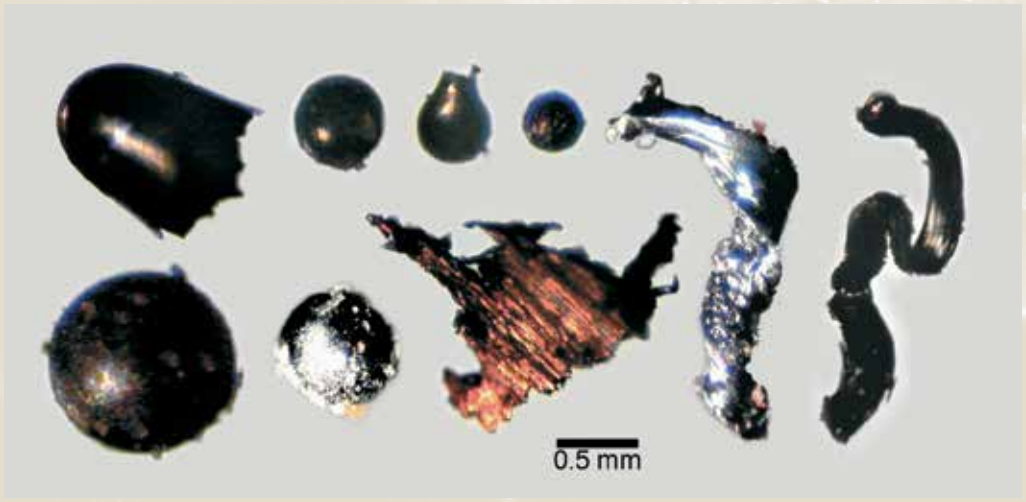



*Figure 8. The waste from welding and grinding also contains metallic balls*

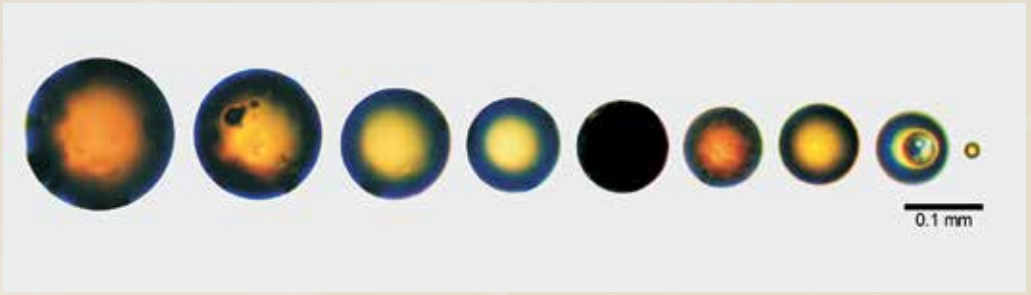



*Figure 9. The glassy spherules found in the ash from the thermal power station*



*Figure 10. The arkose rock*

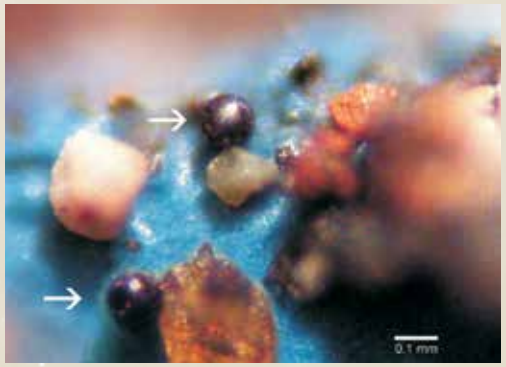



*Figure 11. The magnetic balls attached to a magnet (arrows)*

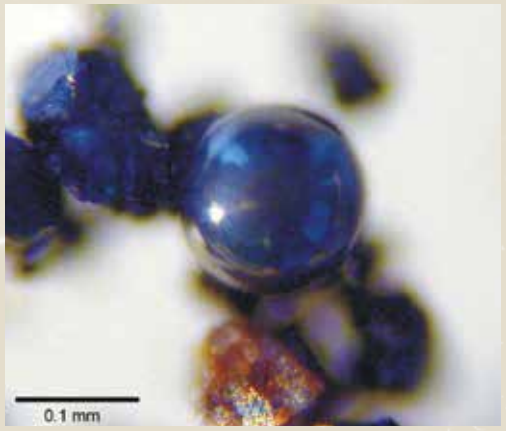



*Figure 12. The magnetic spherule glued to sticky scotch tape*

Scotch tape I fixed them to. So there you have it, the mysterious magnetic and even glassy spheres are captured in the rocks (see Figures 13 and 14).

## What could it be?

So the spheres were clearly not waste from welding, or emissions from a power station. Could they be the result of volcanic dust? There were plenty of active volcanos at the time this sandstone would have been formed but this would likely be glass-like rather than metallic. I decided to turn to the internet for help and put 'Sphere' into my search engine as a keyword. The results were useless, returning results such as 'Geometrical objects,' 'Celestial Spheres' and 'Mysterious Spheres on Mars.' Frustrated, I tried, 'Magnetic Spherules' and found it yielded results,s including phrases such as 'Deep-sea magnetic spherules,' 'Extraterrestrial Spherules' and 'Cosmic Spherules'. After reviewing several scientific studies I was able to ascertain that the spherules have previously been found in deep lakes and oceans (Crizier 1960, Marvin & Einaudi 1967, Del Monte et al 1976), in rocks (Cilek 1982), in Antartic ice (Engrand & Maurette 1998, Taylor 2002), in the stratosphere – in short, they had been found everywhere! Their composition excluded volcanic and industrial origins (Del Monte et al, 1976). To me this testified to a cosmic origin – my spherules were micrometeorites! They appeared to be debris particles that were created in the formation of planets, comets and asteroids billions of years ago and melted during their passage through the atmosphere of our Earth. Once again I felt like




*Figure 13. The metallic black spherule captured in the arkose*



*Figure 16 The metallic spherule collected from the bottom of a garden pool (France)*

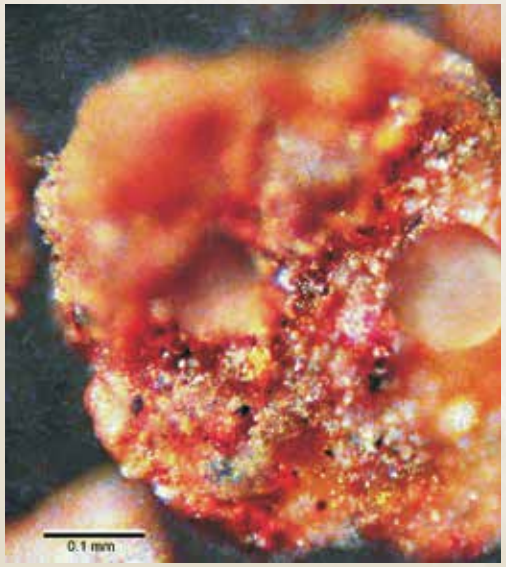



*Figure 14. The glassy spherule captured in the arkose*

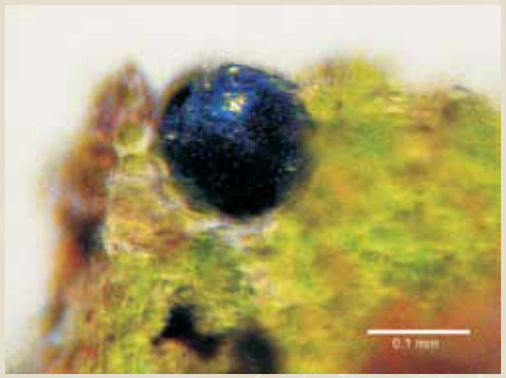



*Figure 15. The metallic spherule imprisoned in moss from a roof*

a champion, not only had I found Gold but I had discovered extraterrestrial objects too.

## Roofs and swimming pools

If the micrometiorites are falling from the sky onto our planet all the time (and it's likely that there are more than one hundred tonnes falling a day) then they should be easily found in any large area. Fields are probably not the best place to look for them, but why not search on a roof or in a swimming pool? I've found many spherules on the bottom of roof gutters, as well as some imprisoned in moss. With the aid of a magnet I've also been able to fish them from the bottom of our garden pool.

## Hunting for micrometeorites

I searched online for the word 'Micrometeorites' and it became clear to me that I was no champion at all – there is a big crowd of enthusiasts and micrometeorite hunters all over the world. You can try it as well, it can be a very exciting activity. As I've found there is no need to crush rocks, melt Antartic ice or to dive to oceanic depths when roof gutters and garden pools are so close to us!

## References


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