

THE ITALIAN SULFUR MINES: AN EXHIBITION IN BOLOGNA

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Show cases of exhibition:
“The Italian Sulfur Mines”
by Renato and Adriana Pagano.

Photo: Roberto Appiani.

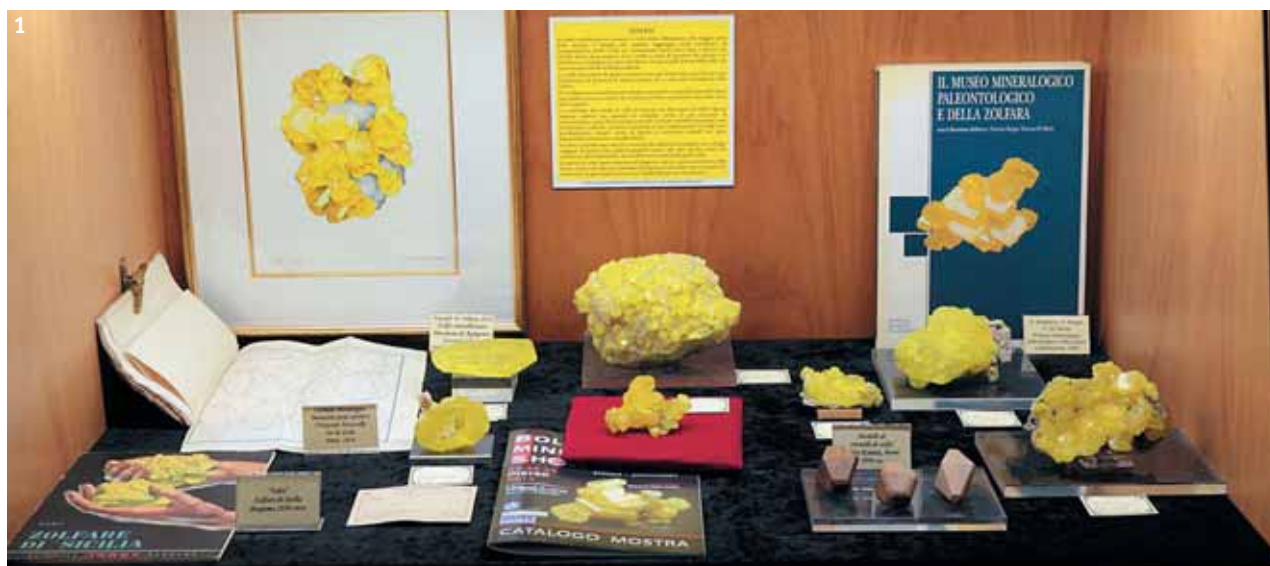
The sulfur mines and their minerals played an important part in the industrial history of Italy. Also, these mines produced a wealth of beautiful specimens that grace many museum and private collections all over the world.

All this – history, geology, mineralogy, and literature – was elegantly presented in a 10-case special exhibition at the Bologna Show in March 2012. The famous collectors from Italy – Renato and Adriana Pagano – used specimens, books, and other items from their collection to illustrate the fascinating history of the Sicilian sulfur mines.

The sulfur mining industry in Italy goes back many centuries. After being used mainly for pharmaceutical purposes in Roman and Greek times, it became a strategic commodity later when it was used to produce gunpowder. Sulfur became even more important during the industrial revolution when it found many practical uses, especially in the production of sulfuric acid, a chemical used in various industrial processes such as the manufacture of soda (sodium carbonate) used in the glass, soap and other industries.

In the 19th century Italy was the main source of sulfur. Various mines existed in the Messinian evaporitic formation that extends throughout various parts of Italy, but 90% of the sulfur came from Sicily where hundreds of mines, employing up to 25,000 people, were active in the south-western part of the island. The exploitation of the deposits was mostly manual, under dangerous working conditions. Child labour was used extensively. Sulfur was recovered from the ore by burning part of the sulfur, thus generating enough heat to melt the rest which was then gathered in wooden molds. This process was carried out for many decades in circular structures called *calcaroni*. Later, the newly invented Gill kilns allowed more efficient and less polluting recovery, until floatation processes were installed after the 1950s.

Figure 1. A case dedicated to **sulfur**, featuring the specimen used in the show posters and catalog, sulfur crystal models and an original artwork by Dr. Wendell E. Wilson.





The sulfur industry started declining after the Solvay process replaced the Leblanc process at the end of the 19th century, and then the Frasch process allowed molten sulfur to be extracted directly from the Louisiana and Texas deposits (USA). The mines became fewer and were later subsidized by the government for social reasons. At the end of the 1970's most of them were shut down.

Among the most impressive minerals found in the Sicilian mines native **sulfur** should be mentioned first: it was found in spectacular crystals, sometimes up to 15–20 cm, mostly yellow but at times reddish or greenish.

Aragonite was also quite common in large, stout pseudo-hexagonal twinned crystals. The best specimens came from the Cianciana mines near Agrigento, and sometimes these were associated with sulfur crystals.

Prismatic **celestine** crystals and stalactites etc. were also common. Strontium was widespread in the Sicilian deposits, but no other strontium mineral was found there.

The deposits are in a gypsum formation and often in limestone banks, thus it is not surprising that fine, clear and large **gypsum** specimens were also found, while **calcite** often covers aragonite crystals and is found with sulfur mostly in small scalenohedral crystals.

The rare mineral **hauerite** was recovered in fair quantities at one of the mines, the Destricella mine, near Raddusa, in the form of nice black octahedral and cubo-octahedral crystals measuring 1–2 cm, rarely up to 3–4 cm, sometimes showing faces of other forms.

Silica minerals (**quartz**, **opal**) and **barite** occurred sparingly in small crystals. It is likely that they were not so rare, but they went mostly unobserved.



Figure 2. **Sulfur**, 7.5 x 7.5 cm crystal. Agrigento, Sicily.

Figure 3. **Gypsum** crystals with **sulfur**. 6 x 7 cm. Cianciana mines, Agrigento, Sicily.

Figure 4. **Celestine**, doubly terminated 7.5 cm crystal with **sulfur** inclusions. Floristella mine, Enna.

Figure 5. Another case, showing some important **sulfur** specimens and a plate from the book *The World's Mineral Masterpieces* by Eberhard Equit (2002) illustrating two Pagano specimens.