# SANTA LUZIA DE GOYAZ METEORITE

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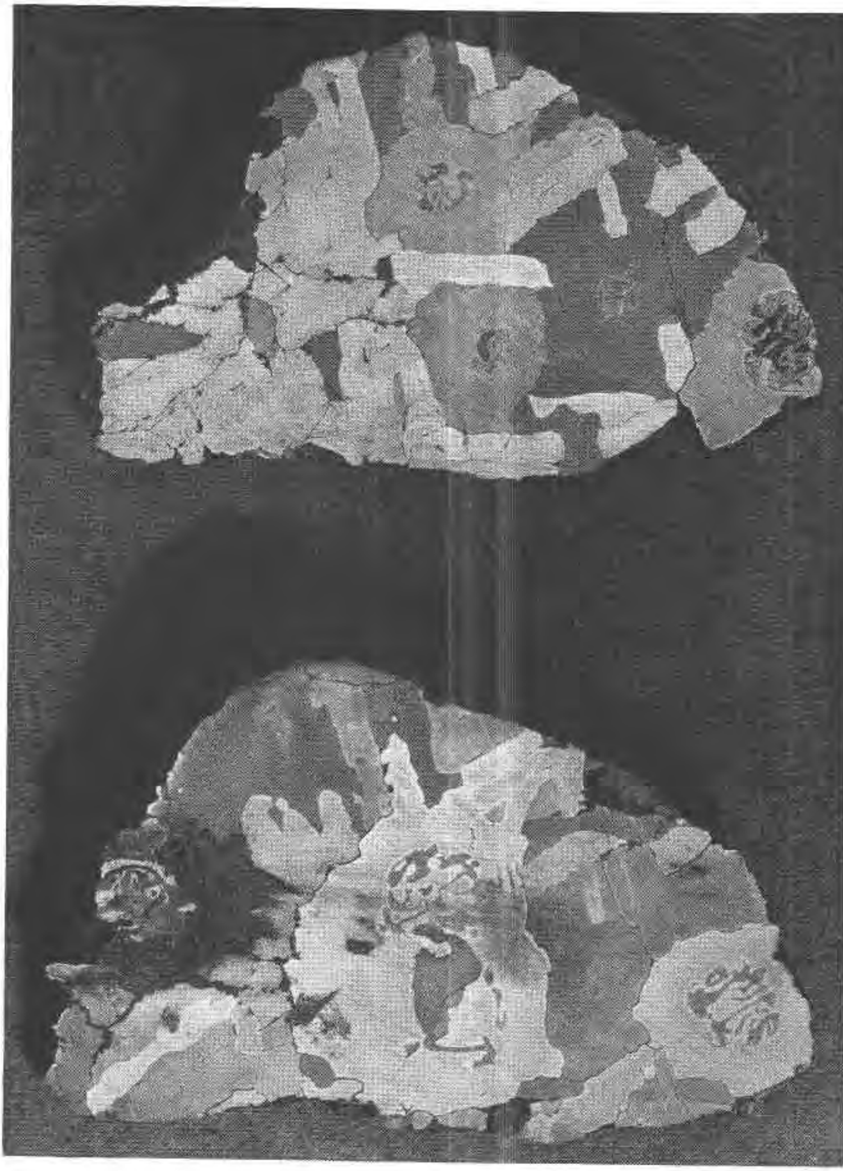
The Santa Luzia de Goyaz meteorite has been partially described by Oliveira (1931) who gives a chemical analysis and history for the iron and says that the structure is octahedral. Mention of it has also been made by Araujo (1931), Vidal (1931), and Betim (1935). The writer has made a study of this meteorite and finds a much different chemical composition from that published by Oliveira and in addition believes that the structure is of considerable interest.

## History

From the files of the United States National Museum and from abstracts (*Mineralogical Abstracts*, vols. **5** and **6**) of the above papers, the writer has compiled the following brief outline of the history of the Santa Luzia de Goyaz meteorite. It was found in 1927 (Oliveira gives the date as 1921) in the Negro Monte ravine, on the Paiva estate about 20 kilometres from the city of Santa Luzia, Goyaz, Brazil. Six fragments, whose total mass is 1923 kilograms, are known. The largest of these (1890 kilograms) is in the National Museum in Rio de Janeiro, Brazil. The United States National Museum has 22 kilograms in its collection.

## Description

An etched surface of a slice from one of the individuals shows a remarkable structure (Figs. 1 and 2). There are roughly rectangular areas of kamacite up to 3.5 cm. by 1 cm. which are free of visible impurities. Intermingled with these rectangles are more or less circular areas of kamacite which are up to 5 cm. in diameter with irregular cores of schreibersite and troilite. The kamacite, surrounding these cores is, in general, almost 1 cm. thick. The specimens shown in Figs. 1 and 2 are cut from the same individual and are approximately 1.5 cm. apart. Some idea of the coarseness of the structure is obtained by observing the development of the small area of troilite in the lower centre of Fig. 1 into the large area of troilite in the lower centre of Fig. 2. There is a little taenite between grains of kamacite and there are traces of plessite at some of the boundaries of schreibersite.



Figs. 1 and 2. Santa Luzia de Goyaz, coarsest octahedrite: Etched slices showing the large development of kamacite crystals, troilite and schreibersite. Mag. 4/5.

## Chemical Analysis

Two small pieces were cut from the mass and the surfaces ground away to provide only fresh material for chemical analysis. One piece (about 18 grams) was from the average kamacite and taenite mass and contained a little plessite. The analysis of this specimen is given in Table 1, column 1. The other specimen (about 16 grams) was cut from a kamacite

Table 1. The Santa Luzia de Goyaz Meteorite: Chemical Analyses

| | 1[1] | 2[1] a | 2[1] b | 3[2] |
|---|---|---|---|---|
| Fe | 92.81% | 93.88% | 93.45% | 95.33% |
| Ni | 6.48 | 6.14 | 6.11 | 2.64 |
| Co | 0.348 | 0.096 | 0.096 | 0.42 |
| Cu | 0.043 | 0.079 | 0.079 | 0.22 |
| P | 0.325 | 0.240 | 0.239 | 0.39 |
| S | 0.004 | trace | trace | — |
| C | 0.014 | 0.006 | 0.006 } | 0.96 |
| Pt, etc. | 0.023 | 0.023 | 0.023 } | |
| Cr | nil | nil | nil | — |
| Total | 100.05% | 100.46% | 100.00% | 99.96% |

[1] Analyst: V. B. Meen.
[2] Analyst: A. Girotto.

1. Average sample of kamacite and taenite mass.
2. *a*. Kamacite area free of taenite but contaminated by a little schreibersite.
   *b*. Analysis 2*a* reduced to the sum of 100
3. Analysis of average mass given by Oliveira (1931).

area and, so far as could be ascertained, did not contain any taenite or plessite. It did, however, contain a little schreibersite. The chemical analysis of this kamacite is given in column 2*a* and reduced to the sum of 100 in column 2*b*. In both analyses, iron was determined volumetrically and nickel was determined on separate portions in which the iron was held in solution by tartaric acid. The analysis by A. Girotto, published by Oliveira (1931), is given in column 3 and is assumed to be of the average kamacite-taenite mass. The chief differences between the present analyses and the older one are the values for iron and nickel. Oliveira's value for nickel is extremely low.

The chemical composition of kamacite has long been a matter of interest. It is only when coarsely crystallized irons are discovered, in which the kamacite can be separated from the other constituents, that more information on this score may be obtained. The extremely coarse structure of the Santa Luzia de Goyaz meteorite afforded another such opportunity.

## References

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