



HAL
open science

The M de Jussieu's 'mirror of the Incas': an ecuadorian archaeological artefact in the mineralogical collection of René-Just Haüy (1743-1822)

François Gendron

► **To cite this version:**

François Gendron. The M de Jussieu's 'mirror of the Incas': an ecuadorian archaeological artefact in the mineralogical collection of René-Just Haüy (1743-1822). *Annals of Science*, 2022, 79 (2), pp.259-273. 10.1080/00033790.2022.2028900 . hal-03941928

HAL Id: hal-03941928

<https://hal.science/hal-03941928>

Submitted on 3 Feb 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



The M. de Jussieu's "Mirror of the Incas": An Ecuadorian archaeological artifact in the mineralogical collection of René-Just Haüy (1743-1822)

Journal:	<i>Annals of Science</i>
Manuscript ID	TASC-2021-0055
Manuscript Type:	Original Article
Keywords:	Cañaris, Ecuador, Joseph de Jussieu, Inca Mirror, René-Just Haüy

SCHOLARONE™
Manuscripts

Abstract

This article reports on a historical investigation carried out on the conical object MIN000-3519 preserved in the mineralogy collections of the *Muséum National d'Histoire Naturelle* at Paris (France). Cut in a single pyrite (FeS_2) crystal, the mineralogist René-Just Haüy (1743-1822) included this object in his working collection with the references “Sulphured iron, mirror of the Incas, of Peru, M. de Jussieu”. All of the research lines followed lead the author to Joseph de Jussieu (1704-1779) and his shipments of botanical specimens and various other samples from South America. As a member of the Godin-La Condamine-Bouguer geodesic expedition on the equator (1735-1743), he returned to France only after 36 years (1771), ill, exhausted and dispossessed of the scientific product of his Andean collections. This pyrite mirror is important because, in addition to appearing to be the only archaeological object that can be linked to Joseph's peregrinations in America, it resembles other specimens found at sites of the Cañaris culture (500-1500 AD) in Ecuador. Preserved within the de Jussieu family, this object would presumably have been given to Haüy by Joseph's heirs, his nephews Antoine-Laurent (1748-1836) or Laurent-Pierre (1792-1866), with whom he had close ties.

Keywords

Cañaris, Charles-Marie de La Condamine, Ecuador, Joseph de Jussieu, Inca Mirror, Muséum National d'Histoire Naturelle, René-Just Haüy.

Contents

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25
- 26
- 27
- 28
- 29
- 30
- 31
- 32
- 33
- 34
- 35
- 36
- 37
- 38
- 39
- 40
- 41
- 42
- 43
- 44
- 45
- 46
- 47
- 48
- 49
- 50
- 51
- 52
- 53
- 54
- 55
- 56
- 57
- 58
- 59
- 60
1. Introduction
2. A “sulphured iron” mirror from the Incas of Peru in the René-Just Haüy’s collection
 - a. Description
 - b. The pyrite mirror, a pre-Hispanic artefact?
3. The geodesic mission Godin-La Condamine-Bouguer in the Ecuadorian regions
 - a. *Issac Newton vs. Jacques Cassini, the shape of the Earth*
 - b. *Measurements and descriptions of pre-Hispanic ruins*
 - c. *Collects and shipments of archaeological and natural history objects*
 - d. *Joseph de Jussieu's shipments to his brothers*
4. René-Just Haüy and the de Jussieu family
 - a. *Haüy, the “father” of Mineralogy*
 - b. *Haüy's commitment to his naturalist assistant*
5. Conclusion

1 – Introduction

Chemical analyses of the beautiful obsidian mirror no. 176.101, preserved in the mineralogy collections of the *Muséum national d'Histoire Naturelle* (MNHN) at Paris (France), confirmed that this vitreous rock came from the Ecuadorian deposit of Mullumica¹. During the same period, my historical investigations revealed that this object, whose origin was lost, was part of a shipment sent in 1737 from Quito (Ecuador) by the academicians Louis Godin (1704-1760) and Charles-Marie de La Condamine (1701-1774). For 130 years, the catoptric effect of this mirror, presented as being of Inca origin, fascinated the public of the Natural History Cabinet of the *Jardin du Roy* (JdR), an institution that became the *Muséum d'Histoire Naturelle* (MHN) in 1793, and later the MNHN. This remarkable singularity earned this exotic object numerous mentions^{2, 3, 4, 5, 6, 7, 8, 9}. However, after 1864, this fascinating obsidian lens disappeared from the literature¹⁰..., only to reappear in 1976, discovered during the re-collection of the mineralogy collections by Professor Henri-Jean Schubnel and the technical

¹ Thomas Calligaro, Pierre-Jacques Chiappero, François Gendron and Gérard Poupeau, New clues on the origin of the “Inca Mirror” at the Museum National d’Histoire Naturelle in Paris, *Latin American Antiquity-Report* 30, no. 2 (2019), p. 422-428 (p. 425).

² Antoine, Joseph Dezallier d'Argenville, *L'Histoire naturelle éclaircie dans deux de ses parties principales, la lithologie et la conchyologie dont l'une traite des pierres et l'autre des coquillages* (Paris : De Bure l'Aîné, 1742), p. 199.

³ Anne Claude Philippe de Caylus, ‘Examen d’un passage de Pline dans lequel il est question de la pierre obsidienne’, in *Mémoires de littératures, tirés des registres de l’Académie des Inscriptions et Belles-Lettres* 30 (1764), p. 457-502 (p. 485).

⁴ Valmont de Bomare, *Dictionnaire Raisoné, Universel d’Histoire Naturelle ; contenant l’Histoire des Animaux, des Végétaux et des Minéraux*, Tome IV MEA-PIV (Paris : Lacombe, 1768), p. 590.

⁵ Nicolas Jolyclerc, ‘Cours de Minéralogie rapporté au tableau méthodique des minéraux, donné par Daubenton, de l’Institut national de France ou démonstrations élémentaires et naturelle de Minéralogie’ (Paris : Vve. Panckouke, 1802), p. 343.

⁶ Louis de Launay, *Minéralogie des Anciens*, T. I (Bruxelles : Weissenbruch, 1803), p. 363-364.

⁷ Jean-Antoine Chaptal, Eugène Patrin et Antoine Libes, *Nouveau Dictionnaire d’Histoire naturelle appliqué aux arts*, Tome XXIII (Paris : Crapelet, 1804), p. 178.

⁸ Cyprien Prosper Brard, *Minéralogie appliquée aux arts*, Vol. 3 (Paris : F.G. Levrault, 1821), p. 365-366.

⁹ Joseph, Philippe, François Deleuze, *Histoire et Description du Muséum Royal d’Histoire Naturelle*, T. II (Paris : Royer, 1823), p. 368.

¹⁰ Diego De Landa, *Relation des Choses de Yucatan*, translate by abbé Brasseur de Bourbourg, (Paris : Auguste Durand, 1864 [sixteenth century]).

1
2
3 team of the MNHN mineralogy gallery^{11, 12}. This reappearance, which took place with the
4
5 provenance of the object still unknown, gave rise to a hypothesis that was as far-fetched as it
6
7 was superfluous¹³.
8
9

10
11
12 In addition to confirming its geological and historical origins, my research on the Inca mirror
13
14 no. 176.101 also revealed that other material testimonies, sent or brought back by the
15
16 members of the famous geodesic expedition Godin-La Condamine-Bouguer (1735-1743),
17
18 were indeed in France, but this had been generally unknown. It was in this context that an
19
20 unusual artefact, preserved in the mineralogy collections of the MNHN (Cristiano Ferraris and
21
22 Jean-Marc Fourcault pers. comm.) was brought to my attention.
23
24
25
26
27
28
29

30 31 **2. A “sulphured iron” mirror from the Incas of Peru in the collection of René-Just Haüy**

32 33 34 35 *a. Description*

36
37 The object reported to me by my colleagues is listed in the catalogue of the working collection
38
39 of the mineralogist René-Just Haüy (1743-1822), with the references: “Polished sulphured iron,
40
41 (Mirror of the Incas). From Peru - M. de Jussieu”. The symbol M. is assumed to simply mean
42
43 *Mister* in French rather than an abbreviated first name. This artefact is not unpublished, its
44
45 presence in the Haüy’s collection having been first reported by the ethnologist Paul Rivet (1876-
46
47 1958) in 1912¹⁴. The general shape of this “mirror of the Incas” is inscribed in a cone cut by
48
49
50
51
52

53
54 ¹¹ Henri-Jean Schubnel, ‘Pierres précieuses, Gemmes & Objets d’art de la Galerie de Minéralogie du Muséum’, in
55 *Revue de Gemmologie*, numéro Hors-série (Paris : AFG/Fondation de France, 1977), p. 5.

56 ¹² Henri-Jean Schubnel, Pierre-Jacques Chiappero, Éric Gonthier, *Trésor du Muséum, Cristaux précieux, Gemmes*
57 *et Objets d’Art* (Paris : MNHN/Elf Aquitaine/AFG, 1998), p. 31.

58 ¹³ Mireille Simoni-Abbat, ‘Le miroir de l’Inca’, in *La Pierre et l’Homme* (Paris : MNHN), p. 53.

59 ¹⁴ René Verneau et Paul Rivet, *Ethnographie ancienne de l’Equateur. (Mission du Service géographique de*
60 *l’armée pour la mesure d’un arc équatorial en Amérique du Sud)*, Tome VI, fascicule I (Paris : Gauthier-Villars,
1912), p. 208.

1
2
3 the technique of stone grinding in a single crystal of pyrite¹⁵. The oval base of the cone, which
4 corresponds to the reflecting face of the mirror, is finely polished or even glossed to produce
5 the desired catoptric effect (**Figures 1a and b; and figure 2 near here**). Renumbered MIN000-
6
7
8
9
10 3519 in the mineralogy collections of the MNHN, this pyrite cone was previously numbered
11
12 5492 in Haüy's catalogue and 5774 in the English catalogue¹⁶. It is perforated near its upper
13
14 edge and a translucent white quartz¹⁷ vein has been cut through by the grinding on its lower
15
16 edge. As with all of his samples, Haüy used a Judean bitumen base to adhere this mirror to a
17
18 black-painted fruitwood base. Finally, on the front side of this base, the mineralogist glued a
19
20 label made of yellowed paper on which is written the above-mentioned references, which are
21
22 given on page 693 of the catalogue of his working collection.
23
24
25
26
27
28

29 *b. The pyrite mirror, a pre-Hispanic artefact?*

30 Monolithic or mosaic-like mirrors, cut in various metallic minerals (pyrite, magnetite,
31
32 ilmenite or hematite), are well known in the cultures of Mesoamerica (Olmec, Teotihuacan,
33
34 Maya and Nahua) and of the Southwestern United States (Hohokam). On the other hand, as
35
36 Verneau and Rivet¹⁸ point out, this kind of artefact is rare in the Andean area. The inventory
37
38 drawn up by Verneau and Rivet listed about ten specimens known at that time, of which only
39
40
41
42
43

44 ¹⁵ The term "sulphured iron" was invented by Haüy while Dioscorides in 50 BC already spoke of pyrite. The
45 term pyrite refers to fire, firestone in Latin, because this mineral emits sparks when struck. Pyrite is an iron
46 disulphur (FeS₂) which crystallizes in the cubic system, its hardness is from 6 to 6.5 on the Mohs scale and the
47 species is recognized as valid by the International Mineralogical Association.

48 ¹⁶ In 1823, although the Museum's Professors offered 40 to 50,000 Fr., Haüy's heirs sold his collection for £4,000
49 (100,000 Fr.) to the Duke Richard I of Buckingham & Chandos (1776-1839). This mineralogical collection,
50 historically exceptional as a support of the mineral description system, left France for England. It was kept at
51 Stowe Manor in the Buckinghamshire. In 1848, the ruin of Richard II (1797-1861), second Duke of Buckingham
52 & Chandos, led to the sale of all his properties and possessions. Armand Dufrenoy (1792-1857), then director of
53 the *École des Mines de Paris* (1836-1857) and of the chair of Mineralogy at the MNHN (1847-1857), took
54 advantage of the opportunity to travel to England and acquire the entire Haüy collection (6,000 specimens in the
55 catalogue) for the sum of 320 guineas (12,000 Fr). Repatriated to France, this founding collection of the
56 mineralogical discipline, which includes many mineralogical types, is today entirely preserved at the MNHN in
57 Paris. Concerning the history of the ruin of the Dukes of Buckingham & Chandos, see Henry, R. Forster, *The*
58 *Stowe Catalogue priced and annotated* (London: David Bogue, 1848), p. 268.

59 ¹⁷ Mineralogical determination carried out by the Raman technique of spectral analysis at the Analytical Platform
of the *Musée de l'Homme* at Paris.

60 ¹⁸ *Ibid.* note 14, p. 208.

1
2
3 two, collected in Cañar and Ingapirca (Ecuador), have a known provenance. Rivet's work in
4
5 Ecuador added two more mirror-polished specimens to this list¹⁹. One would come from the
6
7 pre-Hispanic ruins of Sigsig, a Cañari village near the city of Cuenca (Tumipampa in Cañari
8
9 language), and the other from the site of Ingapirca, the largest Inca site in Ecuador. I add to
10
11 their inventory two more mirrors, similar to the MIN000-3519 specimen. One is also
12
13 preserved in the mineralogy collections of the MNHN. Discovered wandering and without
14
15 origin in 1905, it was renumbered 105.504 by Professor Alfred Lacroix (**Figure 3 near here**).
16
17 The other (83 x 75 mm) is in the Pitt Rivers Museum (PRM) of Oxford University (UK).
18
19 Collected before 1929, it was first preserved at the Wellcome Institute before being
20
21 transferred to the PRM in 1985 where it is registered under no. 1985.49.134. Described as
22
23 originating from “ancient Peru”, it has two suspension holes in its upper part²⁰.
24
25
26
27
28
29

30
31 The rare archaeological elements linked to these few pyrite mirrors do not help us to decide
32
33 on a safe and precise chrono-cultural attribution of the MIN000-3519 mirror. I note that two
34
35 morphologically similar artefacts come from the Ecuadorian site of Ingapirca²¹ and that two
36
37 others also come from Cañaris sites (Sigsig and Cañar), but Rivet does not specify their
38
39 context of discovery. To support the hypothesis of the Ecuadorian origin and the Cañaris
40
41 cultural attribution of the MNHN mirror, I add to this inventory the descriptive and
42
43
44
45
46
47
48
49

50
51 ¹⁹ René Verneau et Paul Rivet, *Ethnographie ancienne de l'Equateur. (Mission du Service géographique de*
52 *l'armée pour la mesure d'un arc équatorial en Amérique du Sud)*, Tome VI, fascicule II (Paris : Gauthier-Villars,
53 1922), Plate X, Fig.1, 2, 4.

54
55 ²⁰ Amanda Engineer, Illustrations from the Wellcome Library, Wellcome and “The Great Past”, *Medical History*,
56 44 (2000), p. 395.

57
58 ²¹ At the end of the 15th century, before falling to the power of the Incas, the city of Ingapirca (Inca wall in Quechua)
59 was named Hatun Cañar (the Great Cañar) and was, from 500 AD, an important ceremonial centre of the Cañaris
60 culture. In its northern expansion, the Inca Empire came up against a coalition led by the Cañaris, who were
eventually persuaded to surrender. However, a new revolt led to the massacre of the tribe's elders, killed because
they were the custodians of ancestral knowledge, and the deportation of the rest of the tribe to the Cuzco. In order
to demonstrate their taking possession of the Cañar country, the Incas modified the urbanism, architecture and the
name of Hatun Cañar so that it corresponded to the Inca style and like this it is integrated to the *Tahuantinsuyu*.

1
2
3 archaeological elements reported by Antonio de Ulloa²²: “When you open a *Guasque* [pre-
4
5 Hispanic burial mound], you find [...] two kinds of stone mirrors, some of Inca stone and
6
7 others of *Gallinace* stone”. He adds that this Inca stone is:

8
9
10
11
12 “soft and not transparent, it has the colour of lead. Usually these mirrors [made of Inca
13
14 stone] are round, one of the surfaces is flat, and as smooth as that of a crystal mirror;
15
16 the other is oval, or a little spherical, less smooth and less polished. Although they
17
18 come in different sizes, they are commonly three to four inches²³ in diameter: I saw
19
20 one that was about a foot and a half in diameter: the main surface was concave, and
21
22 made the objects much larger, as polished as the most skillful workman among us
23
24 could make them. This stone has the defect of having veins and straws that spoil its
25
26 surface, and make the stone so brittle that at the slightest blow it splits. Many people
27
28 are convinced, or at least suspect, that it is a composition and not a stone, and indeed
29
30 there is some appearance to this, but there is no solid proof of it. On the contrary, there
31
32 are flows where minerals of this kind of stone are found, and some of them are still
33
34 being extracted, although they are no longer being worked for the use the Indians used
35
36 to make them. However, this did not prevent them from being melted down like
37
38 metals, to perfect them both in quality and figure”²⁴.
39
40
41
42
43
44
45
46
47
48
49
50
51
52

53 ²² In order to monitor the activities of the French scientists of the Godin-La Condamine-Bouguer expedition in
54 the Viceroyalty of Peru, the King of Spain appointed two lieutenants from his Navy, Don Jorge Juan y Santacilia
55 (1703-1773) and Don Antonio de Ulloa de la Torre-Giral (1716-1795).

56 ²³ A Spanish *pulgada* from the old regime was 23.2 mm wide and these mirrors would have measured between
57 69.6 and 92.8 mm in diameter. On the other hand, the diameter of 1.5 feet or 418 mm (a foot being worth 278.6
58 mm) seems to me to be exaggerated.

59 ²⁴ Antonio de Ulloa, *Voyage historique de l'Amérique méridionale fait par ordre du roi d'Espagne par don George*
60 *Juan et par don Antonio de Ulloa*, 2 vol. (Amsterdam & Leipzig : Arkstee et Merkus, 1752), L.VI, Chap. XI, p.
383-385 and 392.

1
2
3 To this literary description, de Ulloa added an engraved plate of archaeological structures and
4 artefacts, or supposedly such, upon which appears an Inca mirror seen from both sides²⁵
5
6

7 **(Figure 4 near here).**
8
9

10
11
12 Apart from the nature, the supposed use, the cultural attribution and the provenance, the point
13 in Haüy's references that immediately caught my attention, and which seems to have escaped
14 that of professor Rivet's, is the mention "M. de Jussieu". This patronym links the artefact
15 MIN000-3519 with the famous dynasty of Lyonnais botanists. These were, influential
16 members of the JdR and the MHN, who reigned over botany from the 18th to the 19th century.
17
18 Furthermore, if this patronym resonates with the South American expedition led by Godin, La
19 Condamine and Pierre Bouguer (1698-1758), it is due to the presence of Joseph de Jussieu
20
21 (1704-1779) among its members.
22
23
24
25
26
27
28
29
30
31
32
33
34

35 **3 – The geodesic mission Godin-La Condamine-Bouguer in the Ecuadorian regions**

36
37
38
39

40 From 1700 onwards, Philip V de Bourbon (1683-1746), grandson of the French King Louis
41 XIV (1638-1715), reigned over Spain (Castile and Aragon) to which the West Indies were
42 added in 1716. Political and diplomatic ties between the kingdoms of France and Spain
43 loosened, opening the doors of the American Spanish colonies to French scientific
44
45 expeditions.
46
47
48
49
50
51
52
53

54 *a. Issac Newton vs. Jacques Cassini: theories on the shape of the Earth*
55
56
57
58
59

60 ²⁵ Ibid. note 24, Plate XVI, Fig. F and G.

1
2
3 At the beginning of the 18th century, a fundamental question divided astronomers. Through
4
5 theoretical considerations, Isaac Newton (1642-1727) established that due to universal
6
7 attraction, the Earth has the shape of an ellipsoid of revolution which causes its flattening at
8
9 the poles. His hypothesis contrasts with that of the Cartesian Jacques Cassini (1677-1756)
10
11 who asserts that the Earth is domed at the poles. The astronomer Pierre Louis Moreau de
12
13 Maupertuis (1698-1759) took Newton's position, but the controversy persisted, leading to the
14
15 conclusion that only direct measurements of three degrees of arc (about 250 km long) from a
16
17 meridian near the equator and one degree of arc near the pole could settle the debate. Between
18
19 1736 and 1737, Maupertuis led the Franco-Swedish expedition to Lapland²⁶, while another
20
21 group of scientists²⁷ set off in 1735 to the centre of the Viceroyalty of Peru, near the line of
22
23 the equator. For eight years, they travelled through unexplored regions between Quito in the
24
25 North and Cuenca in the South (today the Republic of Ecuador), triangulating and measuring
26
27 scrupulously altitudes and distances; but their scientific activities extended far beyond these
28
29 long surveying sessions.
30
31
32
33
34
35
36
37
38

39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
a. Measurements and descriptions of pre-Hispanic ruins

²⁶ The expedition to Lapland (1736-1737) consisted, for its French members, of the mathematician Alexis Claude Clairaut (1713-1765) and the astronomers Charles Etienne Louis Camus (1699-1768), Pierre Charles Le Monnier (1715-1799) and Réginald Outhier (1694-1774). The Swedes appointed the astronomer Anders Celsius (1701-1744) and the Finnish interpreter Anders Hellant (1717-1789) for the Franco-Sámi translations.

²⁷ In addition to the academicians Louis Godin, Charles-Marie de La Condamine and Pierre Bouguer, the expedition was made up, as we have seen, by the botanist Joseph de Jussieu, Jean Séniergues (? -1739) who acted as surgeon and Jean Louis de Morainville (1705-1764), engineer in charge of natural history drawings. Also, there were three topographers, Jean-Joseph Verguin (1701-1777), a naval engineer, Jacques Couplet-Viguié (? - 1736) who died of yellow fever in Panama, and Jean Godin des Odonnais (1713-1792), cousin of Louis Godin, also there was a watchmaker, Mr Hugot or Hugo (? -?), responsible for the maintenance of measuring instruments. And, as I have already said, to oversee the activities of these valiant surveyors, the King of Spain appointed two lieutenants from his Navy, Don Jorge Juan y Santacilia and Don Antonio de Ulloa. Pedro Vicente Maldonado y Flores (1701-1748), a young Creole with a passion for astronomy and geography, joined the expedition and took part in triangulation operations. About members of the geodesic expedition, see Louis Godin, *Note autographe : Liste des membres de l'expédition au Pérou et instructions pour le chirurgien et le cuisinier*, Archives de l'Institut de France, Académie des Sciences, fonds Charles Marie de La Condamine 14 (1735). And, Roger Mercier, *Les Français en Amérique du Sud au XVIII^e siècle : la mission de l'Académie des Sciences (1735-1745)*, *Revue française d'histoire d'outre-mer* 56, no. 205 (1969), p. 327-374 (p. 334).

1
2
3 Since they were sent to measure the rotundity of the Earth and to study the Botany of the
4
5 visited areas, some descriptions of pre-Hispanic architectural remains appeared in the
6
7 reports²⁸ of Bouguer, La Condamine and the *Journal de voyage* of Antonio de Ulloa. Thus,
8
9 for example Bouguer raved about the incredible nature of the walls of the Temple of the Sun
10
11 at Cuzco:
12
13

14
15
16
17 “These walls are made of stones that are 15 to 16 feet in diameter, and which, although
18
19 rough and irregular, all fit together so exactly that they leave no gaps between them”²⁹.
20
21

22
23
24 La Condamine states, in the face of this telegraphic astonishment, that “none of us have been
25
26 to Cuzco”³⁰. The reality is that the three astronomers had an appalling relationship³¹, so we
27
28 should not be surprised by this literary stumbling block. The same La Condamine, moreover,
29
30 hardly dwells on describing the ruins of the pre-Hispanic cities in his *Journal de voyage*
31
32 (1751), preferring to deliver a memoir entirely devoted to this subject in the *Mémoires de*
33
34 *l'Académie Royale des Sciences et Belles-Lettres de Berlin*³². As for de Ulloa's³³ description
35
36 of the pre-Hispanic ruins in the district of Cayambe³⁴ (Ecuador), it is very valuable today
37
38
39
40
41

42
43 ²⁸ Louis Godin's travel relationship was never finished. The academician Grandjean de Fouchy (1707-1788), in his
44
45 eulogy of the late astronomer, reports having had a first manuscript in his hands, but it was never published and
46
47 even seems to have disappeared. Jean-Paul Grandjean de Fouchy, ‘Éloge de Monsieur Godin’, in *Histoire et*
48
49 *Mémoires de l'Académie des sciences* (1760), p. 181-194 (p. 189).

50
51 ²⁹ Pierre Bouguer, *Relation abrégée du voyage fait au Pérou par MM. de l'Académie royale des Sciences, pour*
52
53 *mesurer les degrés du méridien aux environs de l'équateur, & en conclure la figure de la terre, HAS, Mém.* (1744),
54
55 p. 249-298 (p. 277).

56
57 ³⁰ Charles-Marie de La Condamine, ‘Mémoire sur quelques anciens monumen(t)s du Pérou, du tem(p)s des Incas’,
58
59 in *Mémoires de l'Académie royale des Sciences et Belles-Lettres de Berlin*, 2 (1748), p. 435-456 (p. 438).

60
61 ³¹ An memoir by Bouguer, written at the “signal of Yassuay on 14 July 1739” and intended for the Royal Academy
62
63 of Sciences, accuses Godin of compromising the measurement of the meridian arc by refusing to collaborate with
64
65 his colleagues. In a signed apostille joined to it, La Condamine declared that he “adhered to everything Bouguer
66
67 wrote”. 8 p. in-fol.

68
69 ³² Ibid. note 30, p. 435-456.

70
71 ³³ Ibid. note 24, p. 382-384.

72
73 ³⁴ Cayambe is a canton in the province of Pichincha located in the northern Sierra of Ecuador. The site described
74
75 by Antonio de Ulloa is Puntiatichil, of which little remains today. Puntiatichil was made up of truncated cone-
76
77 shaped pyramidal buildings, *tolas*, *camellones* and agricultural terraces. There were dwellings, ceremonial
78
79 buildings and agricultural production dating from the Integration Period (800-1500 AD) and attributed to the
80
81 Caranquis culture. Puntiatichil was also a historical and cultural space of the Cayambis people.

1
2
3 because these monumental remains were almost completely razed to recover the building
4 materials.
5

6
7 This destruction of the pre-Hispanic cities observed by astronomers inspired this lapidary
8 remark by La Condamine:
9

10
11
12
13
14 “One will not be surprised that one has so little regard for an ancient monument, in a
15 country where Letters and Arts have made little progress, if one considers that the same
16 thing happens every day in Europe, in the places where antiquities are most respected”³⁵.
17
18
19
20
21
22

23
24 *b. Collections and shipments of archaeological and natural history objects*

25
26 The interest of French academicians and Spanish naval officers in pre-Hispanic architectural
27 remains is limited to their description and a few plans. Also, to honour the scientific spirit of
28 their time and to bear witness to the refinement and know-how of ancient Indian cultures, they
29 collected some material productions, both pre-Hispanic and ethnographical³⁶. Unfortunately,
30 the majority of the crates containing these artefacts were lost during the trip. The reliability of
31 maritime trade between South America and Europe in the 18th century was at stake, especially
32 between 1740 and 1748 due to the American repercussions of the War of the Austrian
33 Succession, were at stake. Only the shipments from Portobelo (Panama) in 1735 and from
34 Quito in 1737 reached their Parisian addressee, Charles Cisternay du Fay (1698-1739),
35 intendant of the JdR^{37, 38}. In 1745, La Condamine added what he brought to the Cabinet of the
36 JdR:
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54

55
56 ³⁵ Ibid. note 30, p. 441.

57 ³⁶ Ibid. note 24, Plate XVI.

58 ³⁷ Charles-Marie de La Condamine, *Journal du voyage fait par ordre du roi, à l'Équateur, servant d'introduction*
59 *historique à la mesure des trois premiers degrés du méridien*, (Paris : Imprimerie royale, 1751), p. 104, note.

60 ³⁸ Louis Godin, ‘Lettre IX de M. Godin’, in *Lettres inédites d'Henri IV et de plusieurs personnages célèbres*,
(Paris : Tardieu et Sérieys, 1802), p. 214-217.

1
2
3 “a collection of two pieces of natural history, & of various works of art, which I had
4 collected both in Quito and while travelling down the Amazon River; & during my
5 various stays in Para, Cayenne, Surinam & Holland”³⁹.
6
7
8
9

10
11
12 I also noted that in the consignment lost in Cartagena (Colombia) in October 1740, there were
13 “Several marcasites carved from the stone called ‘mirror of the Inca’ (...)”⁴⁰.
14
15
16

17
18
19 *c. Joseph de Jussieu's shipments to his brothers*
20

21 Godin and La Condamine were not the only ones to send or bring back material evidences of
22 the ancient South American civilisations. I discovered through an indirect information from,
23 Anne Claude Philippe de Caylus⁴¹, that the botanist Joseph de Jussieu:
24
25
26
27

28
29
30 “sent from Lima, a few years ago, to his brothers, one of whom was still alive⁴², a
31 crate where, among several curiosities, he found pieces of *gallinaceous* stone, some
32 worked, others raw”⁴³.
33
34
35
36
37

38
39
40 Although Joseph was primarily a botanist, he also showed a great interest in the Natural
41 Sciences in general and particularly in the Earth Sciences. From the very beginning of the
42
43
44
45

46
47 ³⁹ Charles-Marie de La Condamine, *Relation abrégée d'un voyage fait dans l'intérieur de l'Amérique méridionale*
48 (Paris : Vve. Pissot, 1745), p. 207.

49 ⁴⁰ Ibid. note 37, p. 104.

50 ⁴¹ Anne-Claude-Philippe de Tubières de Grimoard de Lévis de Caylus, Marquis d'Esternay, Baron de Branzac
51 (1692-1765) is an antique dealer and man of letters. Abandoning his military career to devote his life to the study
52 of the arts, he travelled throughout Europe to study antiquities. He was one of the first aesthetes to consider
53 Archaeology as a science, laying the foundations for the comparative method. First received at the *Académie de*
54 *Peinture et de Sculpture* in 1731, de Caylus joined the *Académie des Inscriptions et Belles Lettres* in 1742. From
55 1729 onwards, he began collecting antiques, and by the time of his death, this collection would be one of the most
56 important in France. Rich of 2890 pieces, it is today preserved in the *Cabinet des Médailles* of the *Bibliothèque*
57 *nationale de France*.

58 ⁴² This chronological detail helps us to situate the arrival of the crate in France after April 22nd 1758, date of
59 Antoine de Jussieu's death, and before 1760, date of the reading of the dissertation about obsidian in front of the
60 Academy by the Count de Caylus.

⁴³ Ibid. note 3, p. 487.

1
2
3 expedition, in Panama, he was attracted by metal deposits and their exploitation methods.
4
5 Hence, he left the expedition for a while to visit gold mines near Portobelo⁴⁴. In 1739, while
6
7 the triangulation campaigns continued in the province of El Oro (southern Ecuador), he
8
9 escaped to visit the abandoned gold mines of Zaruma. In 1749, when he accompanied Godin
10
11 on his way back through Buenos Aires (Argentina), every mining locality they passed through
12
13 was an opportunity for visits and observations. From Lima on the Pacific coast, the two
14
15 scientists went up the Andes mountain range to the hamlet of Poma-Cachau (Pacococha)
16
17 where the silver mines of Hungracava are in operation⁴⁵. Following the Western Cordillera to
18
19 the South, they stopped at Guancavellica (Huancavelica, Peru) to visit the galleries of the
20
21 quicksilver mine⁴⁶. Joseph took the opportunity to study the different minerals present in the
22
23 deposit: arsenopyrite, barite, cinnabar, galena, marcasite, quicksilver, orpiment and realgar⁴⁷
24
25 and designed the furnace used to calcinate the ore. Their passage through Pumacancha
26
27 (Pumacancha, District of Jauja, Province of Junín) allowed Joseph to study the magnetic stone
28
29 (magnetite) that constitutes the local mountains. Before separating, the two travellers also
30
31 travelled through the region of the Lake Titicaca where Joseph visited silver mines⁴⁸.
32
33 Joseph did not return to Lima until 1755, although since 1743 he had been struck by a
34
35 degenerative disease that gradually emptied him of his memory, his strength and then of his
36
37 speech. His return to Lima was marked by an avalanche of bad news coming from France, the
38
39 death of his mother and brothers Jean (1698-1750) and especially Antoine (1696-1758). These
40
41 announcements would plunge him into an abyss of sadness that further accelerated his
42
43
44
45
46
47
48
49
50
51

52
53 ⁴⁴ Charles Andry, 'Joseph de Jussieu', in *La Biographie médicale, c'est-à-dire, les vies des médecins célèbres avec*
54 *des notices de leurs ouvrages, Encyclopédie méthodique, Médecine*, tome 7 (Paris : Société de Médecins, 1798),
55 p. 765-776 (p. 766).

56 ⁴⁵ Ibid. note 44, p. 768.

57 ⁴⁶ This description corresponds to the Santa Barbara mine located in the Peruvian District of Mercure.

58 ⁴⁷ <https://zh.mindat.org>, consulted November 11, 2020.

59 ⁴⁸ Most probably this is the San Antonio de Esquilache silver mine, which is located in the Peruvian Department
60 of Puno, on the southern shore of the Lake Titicaca. Discovered in 1620, it was in active operation during the
passage of Godin and de Jussieu.

1
2
3 physical and moral decline⁴⁹. In 1770, his friends in Peru, Canon Juan de Borda Nave, rector
4 of the humanities in Lima, and Martin Delgart, a French surgeon in the same city, decided to
5 send him back to France. Accompanied on his return journey by the devoted merchant
6 Bourdaz, who had promised to his brother Bernard to bring him back to France, Joseph
7 arrived in Paris on July 10, 1771⁵⁰. There he found only his brother Bernard (1699-1777)
8 since his fifth brother, Christophe (1695-1758), has also died. He also discovered Christophe's
9 descendants, in particular his nephew Antoine-Laurent (1748-1836), of whom he had known
10 by letter. However, it was a great embarrassment for the de Jussieu family when they
11 discovered that Joseph had returned to France empty-handed. His luggage, which was
12 supposed to contain the fruits of years of scientific collections, was empty...

13
14
15
16
17
18
19
20
21
22
23
24
25
26 In a letter written in 1775, Juan de Borda Nave explained to Antoine-Laurent that:

27
28
29
30
31 “The people who had succeeded to Joseph in his house had not seen the considerable
32 wealth of his collections nor measured the unique value of his writings. Seeds, stones,
33 fossils, minerals, objects had to end their careers in the waste that the waves of the
34 [rio] Rimac carried to the sea. His plates, sketches, plans, memoirs and letters, which
35 represented the equivalent of several large volumes, had gone up in smoke when they
36 were used to light the fire or had disappeared along with the vegetables they had taken
37 the place of packaging”.

38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

⁴⁹ On the status of the "I" in the correspondance of Joseph de Jussieu, see: Nathalie Vuillemin, 'Un 'Je' peut en cacher un autre: statut et construction de l'intimité dans la correspondance de Joseph de Jussieu', in P. Antoine et V. Parla (dir.), *Voyage et Intimité* 6 (Paris : Classiques Garnier, Carrefour des lettres modernes, 2018), p. 59-72. And Nathalie Vuillemin, 'Les silences du voyageur : Joseph de Jussieu au Pérou (1736-1711)', in *Dévoiler l'ailleurs. Correspondances, carnets et journaux intimes de voyage*, L. Tissot, P. Vincent, J. Ramseier (éds.), (Neuchâtel : Alphil, 2020), p. 21-34.

⁵⁰ Ibid. note 44, p. 774.

1
2
3 The iconoclast would be neither more nor less than the daughter of the late Mr Delgart, who
4
5 died during the time of Joseph's to return to France⁵¹.
6
7
8
9

10 The tragic end of Joseph's collections explains why the identification of the MIN000-3519
11 mirror as one of the few of these artefacts that arrived from South America, is so important.
12
13 This object is perhaps the last testimony of Joseph's anthropological collections across the
14
15 Ecuadorian Andes, as those represented by the Count of Caylus⁵², if they still exist, have not
16
17 yet been located...
18
19
20
21
22
23
24
25

26 **4. René-Just Haüy and the de Jussieu family**

27
28
29

30 The mention "M. de Jussieu" linked to the mirror of the Incas MIN000-3519 prompted me to
31 investigate what links the abbot Haüy had with the Parisian branch of the de Jussieu family.
32
33
34
35
36

37 *a. Haüy, the "father" of the Mineralogy*

38
39

40 When he was appointed Professor of the *Jardin du Roy* in 1783, Haüy entered into a world of
41 naturalists of which Antoine-Laurent had been a member since 1770. On February 8th of the
42 same year, the mineralogist was introduced to the seat of academician that Antoine-Laurent
43 had occupied since 1773. Antoine-Laurent was promoted from assistant botanist to associate
44 botanist. Haüy's election was effective on the 12th of the same month and ratified by Louis
45
46 XVI (1754-1793) on the 15th. On 23 April 1785, the king created the new academic class of
47
48 Natural History and Mineralogy especially for him⁵³. Haüy and de Jussieu retained their title
49
50
51
52
53
54
55
56

57 ⁵¹ Ibid. note 44, p. 774.

58 ⁵² Ibid. note 3, p. 457, Fig. c-g.

59 ⁵³ Alfred Lacroix, La vie et l'œuvre de l'abbé René-Just Haüy, *Bulletin de la société française de Minéralogie, La*
60 *célébration du deuxième centenaire de la naissance de l'abbé Haüy* 67 no. 1-6 (1944), p. 15-226 (p. 25-26).

1
2
3 until 8 August 1793, date of the suppression of the Royal Academies by the *Convention*. On
4
5 16 November 1801, following the death of Dieudonné Gratet de Dolomieu (1750-1801),
6
7 holder of the Chair of Mineralogy at the MHN, Haüy was immediately and unanimously
8
9 elected as his successor. After 1793 and the establishment of the republican system, the new
10
11 organisation of the MHN assigned a naturalist assistant to each professor. On his arrival,
12
13 Haüy found M. Valenciennes, who had previously served Louis Jean Marie Daubenton (1716-
14
15 1800) and Dolomieu, in this position. Matteo Tondi succeeded Valenciennes, then in 1813
16
17 Laurent-Pierre de Jussieu (1792-1866), son of Bernard-Pierre de Jussieu (1751-1836), a
18
19 Lyonnais banker and younger brother of Antoine-Laurent, took over the job. His uncle must
20
21 have hoped to have him take his place with Haüy, but Laurent-Pierre only remained in this
22
23 position from 1813 to 1818. He only published a few mineralogical notes in the *Annales du*
24
25 *Muséum* and the *Journal des Mines*, one of which is devoted to white sulphured iron, but he
26
27 does not mention the mirror of the Incas⁵⁴. Laurent-Pierre would devote the rest of his career
28
29 to politics and he was elected deputy of the Seine Department from 1837 to 1842.
30
31
32
33
34
35
36
37

38 *b. Haüy's commitment to his naturalist assistant*

39
40 Jussieu's family archives have provided an important document which establishes Professor
41
42 Haüy's deep esteem for his young naturalist assistant. There is a certificate dated from March
43
44 25, 1812, and addressed to the Director-General of the Paris Conscription⁵⁵. At this time,
45
46 French Emperor Napoleon I (1769-1821) was recruiting massively to launch the Russian
47
48 Campaign the following June (June-December 1812). For Laurent-Pierre to escape to this
49
50 conscription, Haüy got involved with all the Professors-Administrators of the MHN so that he
51
52
53
54
55
56
57
58

59 ⁵⁴ Laurent-Pierre de Jussieu, 'Sur le fer sulfuré blanc', *Journal des Mines* 30, no. 178 (1811), p. 241-253.

60 ⁵⁵ *Ibid.* note 53, p. 181-182.

1
2
3 would be exempted from military service. The rest of the story is known to us, the military
4 campaign turned into a disaster, costing the lives of at least 200,000 French soldiers⁵⁶.
5
6
7
8
9

10 We can see that the links between Haüy and the de Jussieu family were close. It is not so
11 important that the date and circumstances of the handing over of the mirror of the Incas to the
12 mineralogist are unknown to us. In essence, it remains an exotic object of South American
13 origin that only Uncle Joseph was able to send or bring back from his South American
14 peregrinations. This gift made to Haüy by Antoine-Laurent or Laurent-Pierre de Jussieu may
15 have been motivated by many reasons: friendship, to provide scientific substance to the
16 mineralogist, or even to thank him for the attention lavished to Laurent-Pierre...
17
18
19
20
21
22
23
24
25
26
27
28
29
30

31 **5. Conclusion**

32
33
34
35 The large obsidian mirror (176.101) from the MNHN mineralogy collections has previously
36 been identified as one of the objects sent to Paris from Quito by the academics of the Godin-
37 La Condamine geodesic expedition (1735-1743). It seems plausible to find other objects from
38 these shipments that were scattered after they arrived in France. It is in this context that the
39 MIN000-3519 pyrite cone, carved by artisanal grinding and polishing techniques, was
40 noticed. When René-Just Haüy included it in his working collection, between the end of the
41 18th and the beginning of the 19th century, he took great care to record it, among the sulphured
42 irons, as a “mirror of the Incas, [brought back from] Peru, [by] M. de Jussieu”. This brief but
43 important mention associates this artefact with South America, its pre-Hispanic cultures and
44 above all with the de Jussieu family. And it allowed me to launch a historical investigation
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

⁵⁶ Maurice Rivoire, *NAPOLEON*, (Paris : Dargaud, collection Les grands de Tous les Temps, 1965), p. 56.

1
2
3 that led me to the extravagant Joseph de Jussieu. He left France in 1735 as a botanist of the
4
5 Godin-La Condamine-Bouguer geodesic expedition to the equator, and extended his stay in
6
7 South America until 1771, an absence of 36 years. During this long period, he was
8
9 successively elected deputy botanist (January 9, 1743), then associate veteran (1758) of the
10
11 *Académie des Sciences*, but he never appeared there.
12
13
14
15
16

17 My historical investigation confirmed too that Joseph sent samples of all kinds to France.
18
19 During his long stay and despite the distance, they were quite numerous but mainly made up
20
21 of seeds and plants. I discovered, thanks to the writings of the Count de Caylus, that one of
22
23 these shipments made from Lima (Peru) between the end of 1757 and the beginning of 1758,
24
25 contained “several curiosities” and objects of obsidian. Some of the latter were published by
26
27 de Caylus in 1764, but what became of the others? It seems logical that they remained in the
28
29 possession of the de Jussieu family, being kept in Paris in their house on the *rue des*
30
31 *Bernardins*. At the end of the 18th century, the de Jussieu family, who ruled over Botany,
32
33 came into contact with the Abbot René-Just Haüy, the “father” of a new science, Mineralogy.
34
35 Perceiving the scientific potential to be discovered through it, Antoine-Laurent introduced his
36
37 nephew Laurent-Pierre into the first circle of this eminent mineralogist. Uncle Joseph's Incas
38
39 mirror, which was to hang in the family home, was then used as an argument for the cause
40
41 and came into Haüy's possession. But the hopes of the de Jussieu family were to disappointed,
42
43 the mineralogical initiations of Laurent-Pierre did not take hold, since the political
44
45 determination prevailed over science.
46
47
48
49
50
51
52
53

54 My conclusion to this research on the pyrite mirror MIN000-3519 is that it is, at the present
55
56 state of the research, the only known pre-Hispanic South American artefact sent by Joseph de
57
58 Jussieu to his brothers. This object is a product of the Cañaris culture, as this people,
59
60

1
2
3 destroyed and dispersed by the Incas at the end of the 15th century, was the only people in the
4
5 Andean area to work pyrite in a mirror-like manner. I therefore refute the hypothesis that the
6
7 MIN000-3519 mirror is a "border-artefact", that is to say, "a concentrator of complex relations
8
9 and a revealing agent both of its production society and that of its reception"⁵⁷. According to
10
11 this hypothesis, it would not be pre-Hispanic but an object made more recently in the manner
12
13 of the ancient Indians in a material evoking the past. Its function as a mirror, immediately
14
15 intelligible in Europe, is intended to illustrate, by gnosis, a supposed technical mastery of the
16
17 Inca craftsmen and the knowledge of the ancient peoples of the Americas in the field of
18
19 astronomy.
20
21
22
23
24
25
26
27
28
29
30
31

32 **Declaration of interest statement**

33 No potential conflict of interest was reported by the author.
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58

59 ⁵⁷ Sabine du Crest, ' Exogenèses et objets frontières', in *Exogenèses. Objets-frontières dans l'art européen XVI^e –*
60 *XX^e siècle*, études réunies par Sabine du Crest (Paris : Ed. de Boccard, 2018), p. 11.



Figure 1a. Pyrite mirror MIN000-3519 preserved in the René-Just Haüy's collection seen from its reflective side (\varnothing : 87.5 x 77 mm); (Photography: F. Gendron/MNHN).

373x363mm (180 x 180 DPI)

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

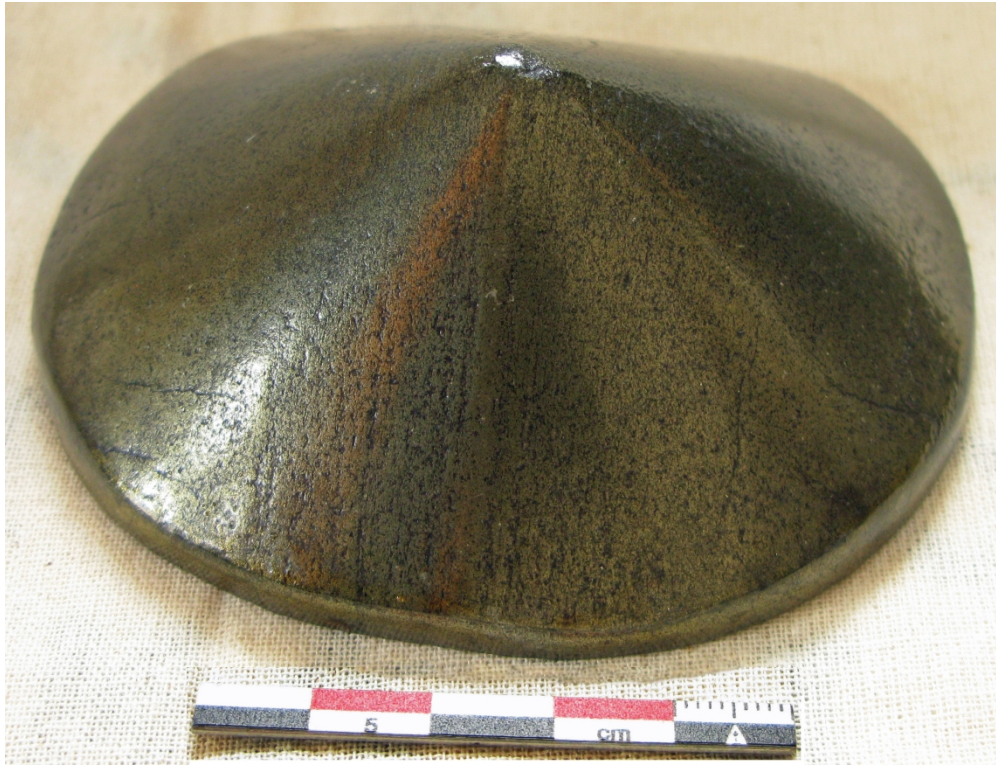


Figure 1b. Pyrite mirror MIN000-3519 preserved in the René-Just Haüy's collection seen from its conic side (height: 26.8 mm); (Photography: F. Gendron/MNHN).

366x279mm (180 x 180 DPI)

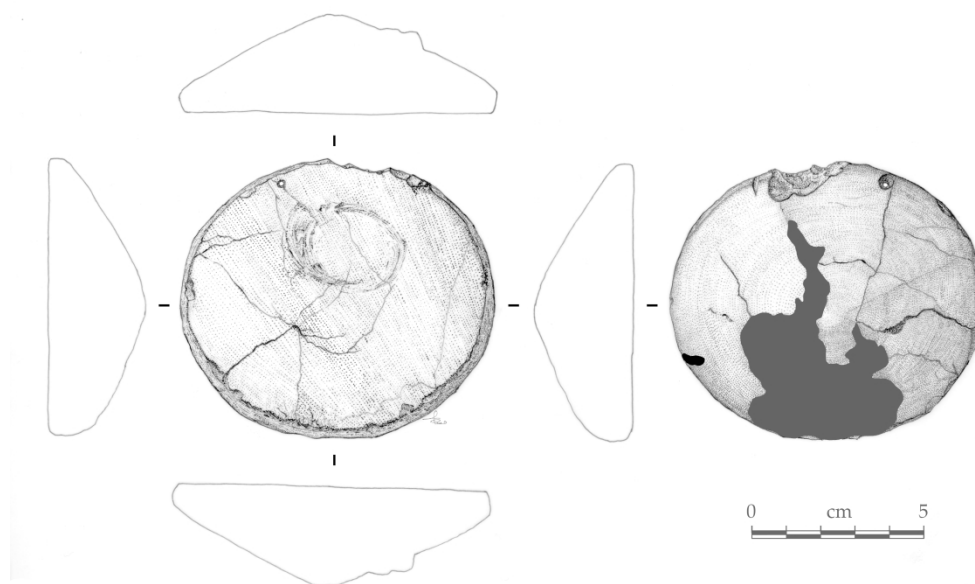


Figure 2. Faces and profiles of the "Mirror of the Incas" MIN000-3519 (Height: 26.8 mm; weight: 344.1 g). The black parts are Judean bitumen used by Haüy to glue this artefact to its wooden base. (Drawings: Éric Ahmed-Delacroix.).

283x179mm (600 x 600 DPI)



Figure 3. Pyrite mirror no. 105.504 preserved in the Mineralogy's collections of the MNHN seen from its reflective side (height: 39.8 mm; \emptyset base: 95.3 x 75 mm; weight: 514 gr); (Photography: F. Gendron/MNHN).

376x389mm (180 x 180 DPI)

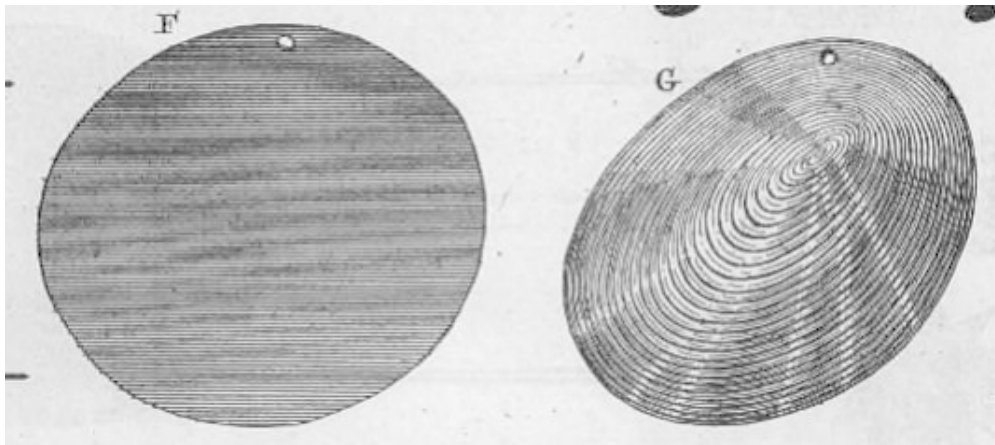


Figure 4. Figures F and G "Inca rirpo, or mirror of the Incas" and "Inca Rirpo, or convex mirror" from Plate XVI of Don de Ulloa's *Journal de voyage* (1752); engraving by Jan Punt (1711-1779).

141x62mm (96 x 96 DPI)