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CATALOGUE OF THE COLLECTIONS OF THE GEOMINERO MUSEUM MINERAL COLLECTION OF THE AUTONOMOUS REGIONS AND CITIES: MADRID REGION



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Regions and Cities:

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INTRODUCTION

The Geominero Museum (Figure. 1) is located on the first floor of the Spanish Geological and Mining Institute (IGME), which was built as the headquarters of the organisation between 1921 and 1941. The building was declared a Property of Cultural Interest in 1998 due to its architectural value.

The museum contains several geological collections: of fossils, minerals, rocks and other geological items. Some rock collections are of great historical value as they contain specimens gathered by famous geologists and mining engineers during the 19th and early 20th centuries, when the IGME was known by the name of “the Spanish Geological Map Commission” (Lozano & Rábano, 2001, 2004; González Laguna et al., 2007). The mineral and fossil collections also include historical items documenting the original works of the Commission (Lozano et al., 2005).

As a national geological service, the IGME has participated in numerous projects, resulting in the collection of geological specimens from all around the Spanish territory. The collection of Spanish minerals entitled the “Mineral Collection of the Autonomous Regions and Cities” is a testament to these origins, although many of the specimens in it are derived from other activities such as collection campaigns organised by the museum itself, donations from private individuals, exchanges and acquisitions.

The aim of the present work is to present the “Catalogue of Minerals of the Madrid Region”, as one of the main milestones in the project entitled “Refurbishment and enhancement of the mineral collection of the Autonomous Regions in the Geominero Museum: Madrid and Castilla-La Mancha”, which was sponsored by the IGME for three years and finalised at the end of 2011. This project marked the start of the refurbishment of the museum’s collection of Spanish minerals.



Figure 1. Main room in the Geominero Museum.

THE COLLECTION OF SPANISH MINERALS

The mineral collection of the Autonomous Regions and Cities is displayed in 27 cabinets on the second tier of balconies in the museum (Fig. 2). Most of the Spanish mineral collection is conserved in the lower drawers of each cabinet.

The main aim of this exhibition is to display a selection of minerals that are representative of the most important Spanish sites. The collection therefore has a wealth of specimens from exhausted mining operations or extinct sites and also includes a large number of mineral findings from recent decades.

In 1927 the core of the collection was moved definitively to the large room it currently occupies in the museum, which had been inaugurated one year earlier by King Alfonso XIII. There is scarcely any record of the events undergone by this collection between the inauguration and the 1970s. One of the few known facts is that the Spanish rocks and minerals were transferred from the first to the second tier of balconies in the museum, where they remain today. In the 1980s, after the Statute of the Autonomous Regions came into force, the specimens were displayed by the regional agencies, and the process of digitising the collections and producing new labels was begun. The shelves were subsequently remodelled to improve the view of the specimens, a white background was added to give greater luminosity to the cabinets, the old labels were replaced, and panels were added with graphic and written information on the specimens and the sites.

Despite all this work, the collection still had many deficiencies, namely the absence of some characteristic mineral species, and errors and omissions in the information and classification. Thus in September 2008 the cabinets for the Castilla-La Mancha and Madrid regions were chosen as the first candidates for a review of this collection. Specimens from these regions cover a space proportional to their geographic area: those from Castilla-La Mancha are displayed in cases 120, 121 and 122, whereas those from the Madrid Region are shown in case 112.

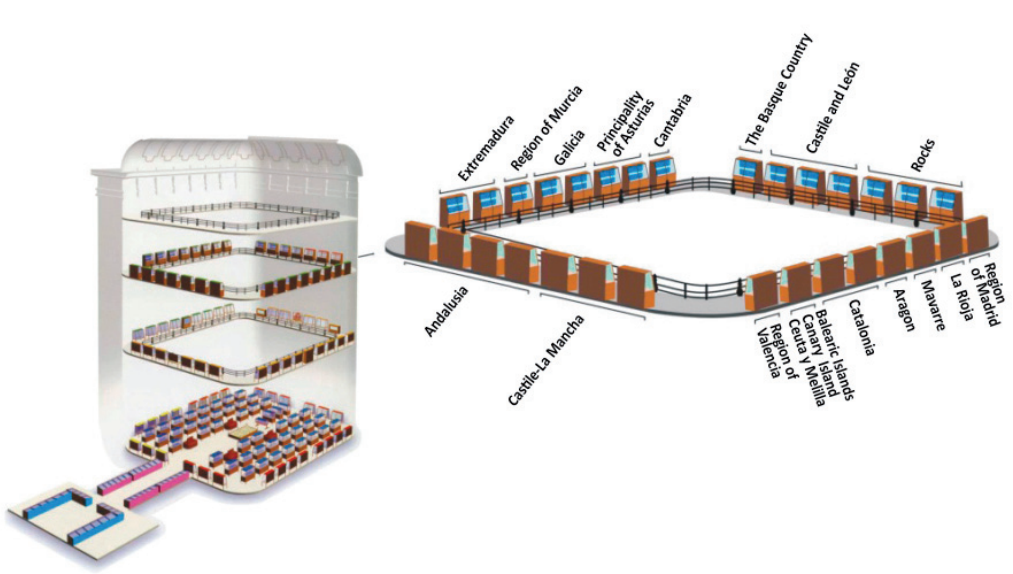


Figure 2. Location of the Mineral Collection of the Autonomous Regions and Cities.

PREVIOUS STATE OF THE COLLECTIONS: CASTILLA-LA MANCHA AND MADRID

To determine the state of the collection prior to the implementation of the project, a review was conducted of the specimens from the regions of Castilla-La Mancha and Madrid, including both the items on display and those held in storage, in addition to the available documentation. The current state of conservation of the minerals was also documented.

To verify whether the specimens in the collections were representative of the sites in these regions and to identify any deficiencies, the main guides to Spanish mineral sites were reviewed (Calderón, 1910; Del Valle González & González Cesteros, 1990), along with other works containing information about specimens of interest in collections and museums. For the province of Albacete, in Castilla-La Mancha, approximately one third of the minerals of interest described in the bibliography were found to be inventoried, and around 20% of the sites, although it was particularly significant that specimens were only conserved from three sites.

The representation of minerals of interest from the province of Ciudad Real in the museum was somewhat less than 40%, and almost half the sites of interest indicated in the bibliography. Only a quarter of the minerals of interest in the province of Cuenca were represented, and around 10% of the sites. The most significant finding was that the museum had minerals from only four sites, and yet Cuenca, along with Guadalajara, is the province with the highest number of sites and the best specimens of aragonite from the Keuper (Jiménez Martínez et al., 2005).

The museum's representation of items from the province of Guadalajara was approximately one third of the minerals and sites mentioned in the bibliography, and with a similar situation to Cuenca with regard to the sites from the Keuper. Additionally, during the review it was verified that 53 different mineral species were described for the highly emblematic site of the Hiendelaencina mines (Cuesta et al., 1995), representing more than twice the number of minerals inventoried in the museum at that time for the whole of the province of Guadalajara.

The province of Toledo was represented in the collection by 40% of the minerals and almost half the site.

Somewhat under one third of the minerals of interest and around half the sites in the Madrid Region were represented, although it should be noted that the basis for comparison was much more rigorous than for Castilla-La Mancha due to the existence of a monographic work on the minerals and sites in this region (González del Tánago Chanrai & González del Tánago del Río, 2002).

In regard to the information on the specimens, it was noted that there were numerous blank spaces in the fact sheets in the database. There was also uncertainty about the true nature of some specimens due to the absence of any type of clarifying analysis. The minerals were arranged in the cabinets without any clear criteria and the information on the labels was insufficient. There were also no criteria for unifying the nomenclature of the specimens. In the area of conservation, there was no knowledge of the presence of any unstable specimens, and although the environmental conditions had been monitored, no actions had yet been taken.

METHODOLOGY

Some of the methodological aspects for the refurbishment of the mineral collection of the Autonomous Regions and Cities have been published previously (González Laguna et al., 2010; Jiménez Martínez et al., 2010a; Lozano et al., 2011). The following is a summary of the methodology used:

Bibliographic study and review of external collections

The bibliographic collection consisted of assembling all the available information on the minerals and sites within the geographic scope of the work. The requirement was to compile detailed information on the mineral deposits and sites that had contributed specimens of interest, and thus identify any deficiencies that required correcting. A bibliographic study is often insufficient to determine these mineralogical resources, and it is therefore necessary to review other collections that can provide information of interest for the project. The study of external collections (public and private) contributes a real vision of the strengths and weaknesses of the IGME collection.

Specimen acquisition plan

The plan was based on four areas of action:

- 1) *in situ* collection at the sites.
- 2) exchanges with other museums and private individuals, both with the organisation itself and by participating in roundtables and in work carried out by the museum's technicians with collectors and traders.
- 3) donations, arising as a result of the direct relations between the museum's technicians and the collectors.
- 4) in last place and as an exception, the purchase of specimens, either through the usual providers or at leading mineral fairs.

Museographic elements and reorganisation

All the museographic actions have been conditioned by the priority of displaying a large number of different mineral species together with the most representative sites.

The acrylic glass blocks (where each piece is placed) were modified and a label holder in the same material was attached with Mowital B60 HH in a 20% dilution with ethanol, thus ensuring high compatibility with the acrylic over the long term and also making it totally reversible. The labels were replaced with others providing more content and including new elements such as the chemical formula of the mineral, and the name of the mine or place of origin. All the specimens in the collection were rearranged and ordered by province. Within these provinces, the fundamental criteria for the placement was the genetic type, and the specimens were grouped by sites so visitors can see at a glance the mineral groupings and parageneses in the communities considered. The bags containing the mineral specimens in the collections were replaced with low density polythene ziplock bags. The labels were also replaced.

Analysis, mineral classification and nomenclature

Due to the historic nature of the collection, some specimens were labelled with a questionable or obsolete name, as they were gathered in the field by experts in the mid-19th century, when the minerals were stored with some notations after a simple examination of the hand specimen. Additionally, today's techniques for mineral classification were unavailable. As a result of the current works of cataloguing and collecting specimens in the field, certain "problem" minerals were found that were not described in the parageneses of the sites visited, and whose verification in many cases represented one of the most important scientific contributions of this project.

The techniques used were X-ray diffraction, X-ray fluorescence (IGME laboratories in Tres Cantos, Madrid) and electron microprobe and scanning electron microscopy (National Electron Microscopy Centre at the Complutense University in Madrid).

To unify the nomenclature used in the collection, a series of guidelines was designed to allow the species name and mineral variety to be precisely assigned to each specimen.

Review, update and improvement of the database

The database required a thorough review, as there were a series of deficiencies regarding the location of the sites. The analysis of the existing information revealed that numerous specimens were incorrectly identified and many of the fields intended for the description of the specimen were blank. Some labels contained erroneous or imprecise location data.

Conservation and restoration

Since November 2006 the Geominero Museum has had a system for measuring the main environmental parameters, consisting of monitors for the uninterrupted radio recording of data on a computer system to enable their statistical analysis. Once the environmental parameters were known, a more expansive conservation plan was implemented. This involved assessing and monitoring the state of conservation of the specimens, and performing restoration work; namely surface cleaning with different reagents according to the physical and chemical properties of the mineral to be treated, and adhesions and consolidations with reversible acrylic or vinyl resins.

The main risk factors that must be considered for this collection, in order of importance, are: relative air humidity, temperature, and lighting, both ultraviolet radiation and illuminance.

The main problem observed concerned the incident light falling on the specimens, as the light fittings in place at the time did not reproduce all the colours with sufficient quality. The tubes therefore needed to be replaced with others with (Philips TLD 58/82,827) a more adequate spectral curve to ensure perfect colour reproduction (Philips TLD 90 DE LUXE PRO 58,950). The fluorescent lights

in the cabinets were also covered with transparent polycarbonate casings capable of filtering most UV radiation.

The restoration involved surface cleaning, mainly with sodium hexametaphosphate, oxalic acid, sodium bisulphate and orthophosphoric acid, occasionally supplemented with immersion in aqueous solution with common detergents and/or calgon, in an ultrasonic tank. Paraloid B,72, Mowital 60 HH and Fluormet A diluted in acetone were used for actions involving adhesion and/or consolidation.

RESULTS

The main works on Spanish mineralogy were consulted for the bibliographic review, ranging from classic 20th century guides (Calderón, 1910; Del Valle González & González Cesteros, 1990), through to the recent although still incomplete work by Miguel Calvo on minerals and mines in Spain (Calvo, 2003a, 2003b, 2006). Information was also obtained from different articles in specialised journals on Castilla-La Mancha Region (Cuesta et al., 1995; Calvo et al., 2002; Palero, 2002; González Bagueño et al., 2003; García, 2004; García et al., 2004; Sáinz de Baranda et al., 2004; Jiménez Martínez et al., 2004; Sáinz de Baranda et al., 2004; Sáinz de Baranda et al. & Viñals, 2007) and the Madrid (Vindel, 1980; García et al., 2004; González del Tánago, 1981; Locutura & Tornos, 1985, 1987; Cabañero et al., 1998; González del Tánago Chanrai & González del Tánago del Río, 2002; Lozano, 2003; Jiménez Martínez et al., 2004; González del Tánago et al., 2006, 2008).

Both public and private mineralogical connections were reviewed. Four museums in the first category were examined: a) Geominero Museum (IGME), systematics collection, with almost 2,000 specimens; b) National Natural Science Museum (CSIC), with 14,000 specimens in its collection; c) Don Felipe de Borbón y Grecia Historic Mining Museum (ETSIM-UPM), with over 1,000 specimens on display and 6,500 in its collection; and d) Mineralogy Museum of the Faculty of Sciences at the UAM, with 500 specimens on display. Other public collections in secondary schools in the Madrid Region were also reviewed. This consultation

was done through the participation of the Geominero Museum in the programme of R+D activities in the Madrid Region called “Science and education in Madrid secondary schools through its cultural heritage (1837-1936)”.

Most of the private collections were consulted on the Internet (website of the Association of Mineralogy and Paleontology Museums, “FMF” forums and “Tu Planeta”).

The review of external collections identified some of the collection’s strengths, such as the extensive representation of granite specimens from La Cabrera (Madrid) and the silver mines in Hiendelaencina (Guadalajara). However, the comparison with other collections has highlighted some very significant deficiencies. Some examples are the absence of pyromorphite from the Horcajo mines and zeolites from the volcanic area of Campos de Calatrava (Ciudad Real), magnetite from San Pablo de los Montes (Toledo) and menilite opal from Agramón (Albacete). Similarly, the external reviews reveal the poor quality of some specimens such as the azurite and malachite from Pardos (Guadalajara) and the aragonites from the Keuper (Cuenca and Guadalajara). The acquisition plan has increased the number of specimens and sites represented, and most of the previous deficiencies have now been corrected.

From the start of the project, the Geominero Museum has participated in the leading forums and blogs on mineral collecting (Foro de Mineralogía Formativa (FMF), MINERESP, Mineralogía Topográfica Ibérica (MTI), and Tu Planeta). This has led to contact with numerous collectors who tend to be responsible for a large number of mineralogical findings, enabling the recruitment of donors, and the exchange and purchase of minerals.

The collection, which previously contained 808 specimens, has now been enhanced by the incorporation of most of the representative minerals that were previously lacking (Figure 3), and currently comprises 4,354 specimens, representing an increase of over 400%. The number of sites has grown by over 500%, from 116 to a little over 710. Table 1 shows a comparative summary of the previous state of the collections in this study and at the end, after their refurbishment. It is worth noting the increase in the specimens inventoried in the pro-

vince of Cuenca, which has seen a rise of over 2,200%, from only 16 to 375. The greatest increase in the number of sites represented can be seen in the provinces of Cuenca with 1,050%, and Guadalajara with 794%.

Province	Specimens inventoried (Previous state-current state)	Species inventoried (Previous state-current state)	Sites represented (Previous state-current state)
Albacete	14-118	7-24	3-27
Ciudad Real	169-511	24-64	16-74
Cuenca	16-375	6-16	4-45
Guadalajara	133-872	25-65	18-161
Toledo	56-550	16-74	21-82
Madrid	420-1928	62-135	54-320
Totals	808-4354	97-201	116-709

Table 1. Comparison between the number of specimens and the species inventoried and the number of sites represented, in the previous and current states.

A total of 3,546 new specimens have been incorporated: 2,600 donations from 193 donors, 765 collected in the field, 73 from exchanges, and 108 from acquisitions. Some of these minerals come from regions other than those within the scope of the review, which has added to the supply for subsequent projects and substantially contributed to refurbishing the cabinets for other regions (Balearic and Canary Islands and the Autonomous Cities of Ceuta and Melilla).

Below is a list of the most important incorporations of specimens:

Specimens have been obtained for the province of Albacete in Castilla-La Mancha from well-known sites such as those of the Keuper in Casas de Ves, Fuentealbilla and Hellín. Other interesting additions are the sulphurs of Riópar, the copper minerals of Alcaraz and the opals from Elche de la Sierra and Agramón. Specimens from several locations have been included, as there is an abundance of iron oxides and hydroxides in this province (goethite, hematite, limonite). The scarcity of carbonate has been resolved with several specimens of dolomite and aragonite.

Specimens have been added from important sites in the province of Ciudad Real, including the cinnabar site in Almadenejos and pyromorphite from the historic mines of El Horcajo, as well as a large number of specimens from the Pb-Ag mines in Almodóvar del Campo, Villanueva de Calatrava, Cabezarrubias del Puerto and sulphurs from the Alcudia valley. Finally, there are important incorporations from the volcanic complex in Campos de Calatrava, which were not previously represented in the collection. This is significant, since almost 270 volcanoes have been recognised in the area, representing one of the most distinctive geological characteristics of the province. For this reason, some amphiboles, carbonates, olivine and several types of zeolites were added to the collection.

The collection has been enriched with a complete representation of the minerals of the Keuper in the province of Cuenca, essentially aragonites and halites from some of the most important sites in the world (Enguídanos, La Pesquera and Minglanilla). Also represented, among others, are the site of Garaballa, known for its grey coppers; the iron sites at Cueva del Hierro; and the gypsum from dozens of outcrops such as the well-known gypsum rose from the site at La Almarcha.

In the province of Guadalajara, a large number of specimens have been added from the Keuper, including some historic aragonite sites such as those of Morro Gorrino in Molina de Aragón and Estriégana. Also included are copper minerals from the well-known mine of Estrella de Pardos, the site where probably the best malachite in Spain has been collected. Some of the species incorporated from this province include pyrite, galena, freibergite, fluorite, tyuyamunite, gypsum (alabaster), siderite, staurolite, sillimanite, schorl and almandine. Finally, there are specimens from recent findings, such as goethites crystallised in calcareous nodules from Tordelrábano and dolomites, ankerites and other minerals from the iron mines in Pardos and Setiles.

For the province of Toledo, several samples of garnets (almandine) were added from the historic site at Fuente de los Jacintos (Jiménez Martínez et al., 2012a), some sulphurs and carbonates from the Minas del Guajaraz, minerals from the graphite site at Guadamur, oxides from the tin mines in the southwest of the

province, specimens from the parageneses of Pb-Ba and Cu in the area of Madridijos (López Jerez & Jiménez Martínez, 2013), corundums and spinels from Villanueva de Bogas, radioactive minerals from the area of Nombela and metamorphic and pegmatite species from the area of Toledo-Argés-La Puebla de Montalbán (dravite, almandine, amphiboles, biotite, muscovite, sillimanite and corundum).

For the Madrid Region, it was found that some species such as azurite, chalcantite, chrysocolla, pyrrhotite, scorodite, cerussite, chloritoid, wollastonite, serpentine, pyromorphite, pyrite and vesuvianite, among others, were either not in the cabinets, or in most cases were not in the collection. Sometimes the paragenesis that was missing indicated the absence of highly important sites, as is the case of the copper mines in Colmenarejo and Colmenar Viejo, the BPGC type paragenesis in Colmenar del Arroyo, the F-Pb-Ba paragenesis in Navalagamella and the triangle formed by several towns and villages (Cadalso de los Vidrios, Cenicientos and Rozas de Puerto Real), the skarnoides and skarns from the Sierra de Guadarrama and their foothills (Colmenar Viejo, Horcajo de la Sierra, Somosierra) and others in the west with magnetite and serpentine. Other sites that were poorly represented were the gypsum sites of Villalbilla and Chinchón, the beryliferous pegmatites of Soto del Real and Guadalix, the evaporites of San Martín de la Vega, and the findings of recent decades, such as the minerals in the miarolitic cavities in the plutons in Cadalso de los Vidrios (bavenite, kamphaugite and milarite) and the discovery in La Cabrera, where dozens of species have been collected whose quality justifies their importance internationally, particularly in the case of stokesite.

The total number of specimens analysed and correctly classified was 147, among which it is worth mentioning the sulphosalts from the silver mines in La Acebeda and Horcajuelo de la Sierra (Madrid) and the copper, lead and vanadium minerals from historic mines in the province of Toledo.

New information was added, including toponyms of interest selected in the methodology, a description of the restoration procedures, the UTM coordinates, the name of the mine/ quarry and the town/community/district/village and the



0 1 2 cm



0 2 4 cm



0 1 2 cm



0 1 2 cm



0 5 10 cm



0 1 2 cm

Figure 3: Examples of existing deficiencies in the collection that have now been corrected. A: Opal (menilite). Hellín, Albacete, B: Pyromorphite (Minas del Horcajo). Almodóvar del Campo, Ciudad Real. C: Gypsum (rose). La Almarcha, Cuenca. D: Dolomite (Mina Carlota). Setiles, Guadalajara. E: Molybdenite (Mina de Las Cabañuelas). Hoyo de Manzanares, Madrid. F: Magnetite. San Pablo de los Montes, Toledo.

associated bibliographic references. One copy of the works featuring specimens from the museum was conserved and deposited in the library. Finally, all the specimens on display were photographed so the images could be incorporated into the database in the future.

The environmental factors monitored reveal average annual values with very low relative humidity (20-30%), rarely attaining 50%, and high average temperatures (between 20 and 25 °C), occasionally exceeding 30 °C.

A detailed study of the specimens in the collection for Castilla-La Mancha showed that the most vulnerable species were the red silvers of Hiendelaencina (Guadalajara), the cinnabars of Almadén (Ciudad Real) and the sulphates from the Tagus basin (Toledo). It was verified that none of these species was affected in the average conditions observed in the cabinets.

Of the 115 specimens on display in the collection from Madrid, one dozen required special environmental care. Two hydrated species (chalcantite and epsomite) that were unstable in the environmental conditions in the cabinet were isolated to special microclimatic conditions to match their field of stability inside small urns with a water deposit calculated specifically for each species. The rest of the more sensitive specimens are pending more complex treatments.

DISSEMINATION OF THE RESULTS

One important goal of the refurbishment is for the mineralogical collections of the regions of Castilla-La Mancha and Madrid in the Geominero Museum to serve as an international reference for the sites and minerals present in these regions. For this reason, written material has been produced to target different types of audiences.

The partial results of the project have been presented in two international congresses (González Laguna et al., 2010; Jiménez Martínez et al., 2010a). Leaflets have been published on the minerals from the two autonomous regions inten-

ded for teachers and the general public (Jiménez Martínez et al., 2011b, 2012b). Several mineral findings have been published as part of the project: stokesite from Valdemanco, Madrid (González del Tánago et al., 2012), garnet from Fuente de los Jacintos (Jiménez Martínez et al., 2012a) and magnetite from San Pablo de los Montes (López Jerez & Jiménez Martínez, 2011), these last two in the province of Toledo. Some works have also been published regarding the dissemination of the geological heritage of Castilla-La Mancha (Jiménez Martínez & Lozano, 2009; Jiménez Martínez, 2010; López Jerez & Jiménez Martínez, 2013) and the Madrid Region (Jiménez Martínez & Prado, 2008; Jiménez Martínez et al., 2010b, 2011a; Lozano & Jiménez Martínez, 2010). The criteria for the nomenclature applied to label the collection can be consulted in Lozano et al., (2011).

Finally, the unabridged catalogue of the specimens in the collection of the Madrid Region is attached to this work (Annexed. 1). Also included is a photographic collection of the minerals from this autonomous region that are currently exhibited in the cabinets (annexed).

There are plans to post the information on the sites and mineral species from these regions on the most widely consulted international mineralogy blogs, such as “Mindat” and “WebMineral”.

ACKNOWLEDGEMENTS

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REFERENCES

- Caballero, J.M., Monge, A., La Iglesia, A. & Tornos, F. 1998. Ferri-clinoholmquistite, $\text{Li}_2(\text{Fe}^{2+}, \text{Mg})_3 \text{Fe}_3+2\text{Si}_8\text{O}_{22}(\text{OH})_2$, a new B Li clinoamphibole from the Pedriza Massif, Sierra de Guadarrama, Spanish Central System. *American Mineralogist*, 83 (1,2), 167-171.
- Calderón, S. 1910. *Los minerales de España*. Pub. Junta para Ampliación de Estudios e Investigaciones Científicas, Madrid, 2 vol., 416 and 561 p.
- Calvo, M. 2003a. *Minerales y Minas de España*. Vol. I, Elementos. Museo de Ciencias Naturales de Álava, 217 p.
- Calvo, M. 2003b. *Minerales y Minas de España*. Vol. II, Sulfuros. Museo de Ciencias Naturales de Álava, 705 p.
- Calvo, M. 2006. *Minerales y Minas de España*. Vol. III, Halogenuros. Museo de Ciencias Naturales de Álava, 267 p.
- Calvo, M., Viñals, J. & García, G. 2002. Tordelrábano. Un yacimiento de goethita cristalizada. *Bocamina*, 10, 28-43.
- Cuesta, E., Yuste, C. & García, G. 1995. Hiendelaencina. El Filón Rico. *Bocamina*, 1, 4-28.
- Del Valle González, A. & González Cesteros, V. 1990. *Guía de Minerales de España*. Tomo 4, Silicatos y Apéndices. Departamento de Cristalografía y Mineralogía de la Universidad de Valladolid, 365 p.
- García, G. 2004. Aragonitos de Pantoja (Toledo). *Bocamina*, 13, 10-27.
- García, G., González, C. & Bueno, A. 2004. Cadalso de los Vidrios (Madrid). *Bocamina*, 14, 12-46.
- González Bargueño, C., Orea, I. & Jordá, L. 2003. Buenasbodas. El Oro de los Montes de Toledo. *Bocamina*, 11, 32-57.
- González del Tánago, J. 1981. Estudio de las pegmatitas del Macizo de San Pedro y de sus formaciones encajantes. Tesis de Licenciatura. U.C.M., Madrid, 175 p. (unpublished).
- González del Tánago Chanrai, J. & González del Tánago del Río, J. 2002. *Minerales y Minas de Madrid*. Conserjería de Medio Ambiente. Ed. Mundi, Prensa, Madrid 271 p.

- González del Tánago, J., La Iglesia, A. & Delgado, A. 2006. Kamphaugite (Y) from La Cabrera Massif, Spain, a low temperature hidrothermal Y,REE carbonate. *Mineralogical Magazine*, 70 (4), 397-404.
- González del Tánago, J., Lozano, R.P. & González del Tánago Chanrai, J. 2008. Plutón de La Cabrera. Pegmatitas graníticas y alteraciones hidrotermales. *Bocamina*, 21, 99 p.
- González del Tánago, J., Lozano, R.P., Larios, A. & La Iglesia, A. 2012. Stokesite crystals from La Cabrera, Madrid, Spain. *The Mineralogical Record*, 43, 499-508.
- González Laguna, R.; Lozano, R.P.; Menéndez, S. & Abad, A., 2007. La colección histórica de rocas de la provincia de Huesca conservada en el Museo Geominero (IGME, Madrid): catalogación e interpretación histórica. *Boletín Geológico y Minero*, 118 (1), 127-140.
- González Laguna, R., Jiménez Martínez, R., Paradas, A., Baeza, E., Lozano, R.P. & Bernat, M. 2010. Patrimonio geológico mueble. Actualización de la colección de minerales de la Comunidad de Madrid del Museo Geominero. En Brandão, J.M.; Callapez, P.M., Mateus, O. & Castro, P. (Eds). Museo Mineralógico y Geológico de la Universidad de Coimbra. *Colecções e museus de Geologia: missão e gestão*, 133-138.
- Jiménez Martínez, R. 2010. Aragonitos del Keuper: nuevos yacimientos. *Revista de Minerales*, IV (3), 50-59.
- Jiménez Martínez, R., Bellido, F., Martín Rubí, J.A., López Jerez, J. & Calvo, M. 2012a. Minerales con historia: el granate almandino de la Fuente de los Jacintos (Toledo). *Boletín Geológico y Minero*, 123 (2), 183-192.
- Jiménez Martínez, R., Calvo, M., Martínez Palomares, M.A. & Gorgues, R. 2005. Yacimientos de aragonito del Triásico español. *Bocamina*, 16, 30-93.
- Jiménez Martínez, R., González Laguna, R., Paradas, A., Baeza, E. & Lozano, R.P. 2010a. Patrimonio Geológico Mueble. Actualización de la colección de minerales españoles del Museo Geominero: Castilla, La Mancha y Comunidad de Madrid. En P. Florido e I. Rábano (Eds.). Una visión multidisciplinar del patrimonio geológico y minero. *Cuadernos del Museo Geominero*, 12, 407-416.
- Jiménez Martínez, R., Jordá, L., Jordá, R. & Prado, P. 2004. Madrid: la minería metálica desde 1417 hasta nuestros días. *Bocamina*, 14, 52-89.

- Jiménez Martínez, R. & Lozano, R.P. 2009. Los minerales del Keuper de Guadalajara. *Guía de la excursión de la IX Semana de la Ciencia*, Madrid, 15 p.
- Jiménez Martínez, R., Lozano, R.P. & González Laguna, R. 2010b. Recorridos mineralógicos por la sierra de Madrid. El Embalse de El Atazar (I). *Acopios*, 1, 83-94.
- Jiménez Martínez, R., Lozano, R.P., González Laguna, R. & Prado, P. 2011a. Recorridos mineralógicos por la sierra de Madrid. El Embalse de El Atazar (II). *Acopios*, 2, 1-12.
- Jiménez Martínez, R., Lozano, R.P., Paradas, A., González Laguna, R. & Baeza, E. 2011b. *Colección de minerales de las Comunidades y Ciudades Autónomas: 1. Comunidad de Madrid*. Publicaciones del Museo Geominero, 23 p.
- Jiménez Martínez, R., Lozano, R.P., Paradas, A., González Laguna, R. & Baeza, E. 2012b. *Colección de minerales de las Comunidades y Ciudades Autónomas: 2. Castilla, La Mancha*. Publicaciones del Museo Geominero, 23 p.
- Jiménez Martínez, R. & Prado, P. 2008. Yacimientos de rutilo en la “Sierra Norte de Madrid”. *Revista de Minerales*, III (6), 48-50.
- Locutura, J. & Tornos, F. 1985. Consideraciones sobre la metalogenia del sector medio del Sistema Central Español. *Rev. Real Academia de Ciencias Exactas, Físicas y Naturales*, 79 (4), 589-615.
- Locutura, J. & Tornos, F. 1987. Aspectos genéticos de las mineralizaciones de F(-Ba,Pb) del área de Colmenar de Arroyo. Sistema Central. *Boletín Geológico y Minero*, 98, 680-694.
- López Jerez, J. & Jiménez Martínez, R. 2011. El yacimiento de magnetita de San Pablo de los Montes, Toledo. *Revista de Minerales*, IV (6), 10-18.
- López Jerez, J. & Jiménez Martínez, R. 2013. Yacimientos de plomo y barita en “Perdiguera” y “Las Cabezuelas”, Madrudejos, Consuegra y Camuñas (Toledo). *Hastial*, 3, 45-99.
- Lozano R.P. 2003. *Petrología de los rellenos cálcicos hidrotermales de las cavidades miarolíticas del plutón de La Cabrera* (Madrid). Tesis Doctoral. U.C.M., Madrid, 373 p.
- Lozano, R.P. & Jiménez Martínez, R. 2010. Recorrido por el granito de La Cabrera (Sierra de Guadarrama, Madrid). *Guía de la excursión de la XXX Reunión de la Sociedad Española de Mineralogía*, 20 p.

- Lozano, R.P., Jiménez Martínez, R., González Laguna, R., Paradas, Á. & Baeza, E. 2011. Revisión de la terminología utilizada en la exposición pública de minerales españoles del Museo Geominero (IGME, Madrid). *Boletín Geológico y Minero*, 122 (1), 49-70.
- Lozano R.P. & Rábano I. 2001. Las colecciones históricas de rocas de Barcelona del Museo Geominero (IGME, Madrid): catalogación e interpretación histórica. *Boletín Geológico y Minero*, 112 (2), 133-146.
- Lozano R.P. & Rábano I. 2004. Revisión y catalogación de las colecciones históricas de rocas de Zaragoza del Museo Geominero (IGME, Madrid). *Boletín Geológico y Minero*, 115 (1), 85-102.
- Lozano, R.P., Rodrigo, A., Menéndez, S. & De la Fuente, M. 2005. Catálogo de la colección histórica de fósiles de la provincia de Barcelona conservada en el Museo Geominero (IGME). *Boletín Geológico y Minero*, 116 (3), 257-272.
- Palero, F.J. 2002. La mina de Almadén. Las otras riquezas inagotables. *Bocamina*, 10, 4,43.
- Sáinz de Baranda, B., Palero, F. & García, G. 2004. El Horcajo. Las piromorfitas más famosas del mundo. *Bocamina*, 13, 32-68.
- Sáinz de Baranda, B. & Viñals, J. 2007. La mina "Estrella". Pardos (Guadalajara). *Bocamina*, 19, 12-33.
- Vindel, E. 1980. *Estudio mineralógico y metalogénico de las mineralizaciones de la Sierra de Guadarrama (Sistema Central Español)*. Tesis Doctoral, U.C.M., Madrid, 249 p.

ANNEXED I

Catalogue of the collection of the Madrid Region

Shown below is the complete catalogue of the minerals in the collection in the possession of the Madrid Region.

The data shown in the catalogue have been grouped by municipal districts and arranged in alphabetical order. These include two different sites with the corresponding mineral species present and the inventory number for each specimen. Specimens from old collections for which there is no data on the site and whose morphological characters do not allow their inclusion in any known site are labelled "*specimens with no site location data*", in clear reference to their uncertain provenance within a municipal district.

The total number of specimens inventoried is 1,928, distributed in 85 municipalities.

The total number of sites represented is 320, and the number of species represented is 135.

Alcalá de Henares

Specimens with no site location data

Celestine: M-754

Alpedrete

Canteras de Alpedrete

Albite: 9946

Calcite: 15005

Chlorite: 14970

Chrysocolla: 14972

Fluorite: 14973

Malachite: 14971

Muscovite: 15004

Opal: 14969

Canteras de Alpedrete (Cercas de Ávila)

Molybdenite: 14984

Canteras de la Dehesa

Andalucite: 15917, 15918, 15920

Quartz (Smoky): 12152

Canteras del Cañal

Molybdenite: 9855, 9898

El Cañal

Albite-Anorthite Series (Labradorite):
10032 to 10034

Aranjuez

El Regajal. Túnel del AVE

Glauberite: 17321 to 17324

Gypsum: 17319, 17320

Halite: 10933 to 10936, 14338

Braojos

El Egido. Estación de FCC de Braojos, La Serna

Quartz: 13422, (Rose: 13428, 13429)

Microcline: 13425, 13426

Muscovite: 13427

Sillimanite: 13421

Tourmaline: 13423, 13424

Buitrago del Lozoya

Embalse de Puentes Viejas

Garnet: 12147

Rutile: 10831, 12145, 12146

Río Lozoya

Almandine: 13457, 13458

Garnet: 10809

Specimens with no site location data

Quartz: 68, 1267

Schorl: 1125, 5369, 6276, 14786

Tetraedrita: 6724

Bustarviejo

El Collado

Albite: 12011, 12012

Orthoclase: 11582, 12010

Quartz: 12008, 12009

El Pinar

Quartz (Milky): 9799, 14760

Fuente del Collado

Quartz (Milky): 9245, 17269

La Alberiza

Albite: 12150, 12151

Biotite: 9836

Orthoclase: 9969

Quartz: 10057, 12015, 12016, (Smoky: 12013, 12014, 12017, 14843)

Mina Mónica. Cuesta de la Plata

Arsenopyrite: 10780, 15912

Chalcopyrite: 15913

Quartz: 12131, 12132, (Smoky: 12130)

Specimens with no site location data

Orthoclase: 1009, 1010, 1019, 1385

Cadalso de los Vidrios

Canteras de El Venero

Albite: 9986, 13195 to 13199, (Cleavelandite: 13200 to 13203)

Arsenopyrite: 11556, 11557

Bavenite: 9201, 13180, 13181

Biotite: 13192, 13193

Britholite (Ce): 17676

Calcite: 9985, 13204, 13205

Cassiterite: 15318

Chabazite: 11559 to 11561

Chalcopyrite: 13212

Chlorite: 13215 to 13219, 15319, 15919

Epidote: 11552, 11553

Fluorite: 13223, 13370

Gadolinite: 11550, 11551

Helvine: 11554, 11555, 13175, 13176, 13177

Kamphaugite (Y): 12018

Laumontite: 13224 to 13226

Microcline: 13182 to 13186

Milarite: 9295, 13194

Molybdenite: 13209, 13210, 15961

Muscovite: 13206 to 13208

Opal: 13220 to 13222

Phlogopite: 11576 to 11579

Pyrite: 13211

Quartz: 13187 to 13191, (Smoky: 9983, 9984)

Scheelite: 9356, 15316, 15317

Spessartine: 10883, 13178, 13179

Stilbite (Ca): 11558, 13213, 13214

Canteras del Lanchar de la Osa

Albite: 13526

Biotite: 13525

Chlorite: 13522

Molybdenite: 13524

Orthoclase: 13484

Pyrite: 15985

Quartz (Smoky): 13523

Minas del arroyo del Molinillo

Baryte: 9851, 10884, 10921

Galena: 9864, 9869, 10924, 10925

Siderite: 10923

Sphalerite: 9863

Canencia

Collado Bajero

Orthoclase: 9749

Cenicientos

Cerro Cabeza de la Cruz

Calcite: 10968

Orthoclase: 10963, 10964

Los Almendros

Baryte: 13460, 13461

Galena: 13459

Quartz: 10028, 12174 (Milky: 10027)

Mina del arroyo del Mancho

Sphalerite: 9952

Peñas de Cenicientos

Orthoclase: 10828 to 10830

Cercedilla

Mina las Cortes

Arsenopyrite: 13234, 13235

Chlorite: 13236

Quartz: 13233

Wolframite: 12166

Cervera de Buitrago

Casasola. Embalse de El Atazar

Ilmenite: 11566, 11567

Sillimanite (Fibrous): 10019

Dehesa del Soto. Embalse de El Atazar

Microcline: 11396, 15907 to 15911

Quartz (Smoky): 15007 to 15010,
15905, 15906

Embalse de El Atazar

Albite: 13268

Hornblende: 11540

Microcline: 10538

Orthoclase: 10511 to 10513, 10885 to
10894, 11532, 11533, 12019 to 12024

Quartz: 11534 to 11536

Sillimanite: 11539

Las Tinadas del Perdigón

Ilmenite: 11537, 11538

Staurolite: 11527 to 11531

Peña de la Hoz. Embalse de El Atazar

Chloritoid: 11568 to 11570

Staurolite: 11571 to 11575

Chinchón

Canteras del arroyo de Valdezarza

Gypsum: 9917, 10516, 10746, 10747

Minas del Consuelo

Epsomite: 10510

Glauberite: 4164, 9897, 10044 to
10049, 10839, 12506

Gypsum: 10042, 13231

Ciempozuelos

Salinas de Espartinas. Barranco de Valdelachica

Epsomite: 13238
Glauberite: 1961, 1970, 7109
Gypsum: 13239 to 13243
Quartz (Flint): 13237

Collado Mediano

El Jaralón

Quartz: 11593

Mina del arroyo de los Limos del Soto

Chalcopyrite: 12168

Mina de las Cercas de Rehoyo

Ferberite: 16083

Mina Fortuna

Fluorite: 9838, 9841
Galena: 9839

Specimens with no site location data

Wolframite: 2748

Collado Villalba

Cantos Altos

Orthoclase: 17382, 17823

Casa Aguilar

Orthoclase: 13480 to 13483, 13548

Las Suertes

Orthoclase: 11588

Los Horcajos

Illite: 9900
Quartz: 9899, (Milky: 9966, 9979)

Colmenar de Oreja

Mina Fátima

Glauberite: 11047, 14849

Colmenar del Arroyo

Mina Chaparra

Fluorite: 9912, 9958, 10496
Galena: 9875, 9879
Quartz: 9853

Mina la Carrala

Covellite: 12204
Fluorite: 6393, 10837
Galena: 12205, 12206
Sphalerite: 12202, 12203

Mina Rosita

Cerussite: 15953
Fluorite: 9955
Galena: 9956, 15952

Mina San Eusebio. La Corvera

Baryte: 12196
Cerussite: 10503
Fluorite: 10482, 10768, 10820, 10821,

13430, 13431, 14839
Galena: 9963, 12197

Minas de Nuestro Padre Jesús

Baryte: 12088
Calcite: 9954, 10812
Cerussite: 9926
Chalcopyrite: 9953
Galena: 7802, 10835, 12085
Pyrite: 9892, 10497
Sphalerite: 10771, 12086

Pozo Corvera

Baryte: 15923, 15928
Calcolpyrite: 15924
Fluorite: 12178, 12179
Galena: 12180, 15926
Sphalerite: 15925, 15927

Colmenar Viejo

Alto Eugenio

Diopside: 12162
Grossular: 9884, 9885, 9932
Wollastonite: 10498

Cancho El Escorial. Cerro de San Pedro

Sillimanite: 14014

Cerro de San Pedro

Quartz: 13437 to 13439

Las Dehasas

Quartz: 14985

Dehesa de Navalvillar

Beryl: 14021

Las Llanillas

Tourmaline: 13291

Minas del Arroyo Cantalojas. Dehesa de Navalvillar

Arsenopyrite: 12099
Fluorite: 9913, 9918, 9951, 12095 to 12099
Malachite: 12098
Pyrite: 12100 to 12102

Mina del Arroyo del Pocito de los Lobos

Chalcopyrite: 10743, 10744
Malachite: 12163

Mina Asturias. Arroyo del Jaramillo

Cassiterite: 12140, 12141
Wolframite: 12142

Mina Navarrosillos

Chalcopyrite: 9933
Chrysocolla: 10823

Mina San Marcelino. Cerro de Peñalvento

Chrysocolla: 10822, 12138, 12139
Pseudomalachite: 12137

Navallar

Arsenopyrite: 15665
Scorodite: 15666

Specimens with no site location data

Baryte: 6812, 15596

Quartz: 46, 65, 14768

Colmenarejo

Barranco de Valbedillo

Apatite: 13286

Chlorite: 13285

Muscovite: 13283, 13284

Schorl: 9972

Cuesta Blanca

Quartz (Milky): 9870

El Chaparral. Embalse de Valmayor

Quartz: 17253, 17254

La Presa

Quartz: 13541, (Crystal: 2091, 9205, 9206, 9258 to 9262, 9788),(Milky: 9255 to 9977)

Mina La Liebre. Pedazo del Toro

Azurite: 12169

Chalcanthite: 12170

Chrysocolla: 12171

Mina María

Azurite: 9935, 12078

Chalcopryrite: 12081

Chrysocolla: 12079, 12080

Malachite: 9905, 12076, 12077

Metatorbernite: 12082, 12083

Torbernite: 12084

Mina Pilar

Agardite (Y): 12089

Arsenopyrite: 10777

Azurite: 10495, 10773, 10840

Chalcanthite: 9922, 10488, 10499

Chalcopryrite: 4030, 10770, 13538

Covellite: 9959, 9960, 13539

Malachite: 10502, 10701, 10702, 10767,

11587, 12091, 13267

Mixite: 10913

Olivenite: 10912

Pharmacosiderite: 10504, 10781,

13540, 14845

Siderite: 12090

Specimens with no site location data

Quartz: 6904

El Berrueco

Cantera de Los Taberneros

Albite: 9883

Axinite: 9848, 9849

Beryl (Aquamarine): 11549

Biotite: 11541, 11542

Calcite: 9694, 9760, 9763, 9806,

9809, 9812, 9860, 9862, 9876, 9921,

9936, 9939, 9949

Chalcopryrite: 13542

Chamosite: 11543 to 11547

Chlorite: 16056, 16057

Datolite: 14215 to 14218

Epidote: 9722, 10505, 11548, 13543,

15086, 15087

Fluorapophyllite: 1495, 1499, 9698,
9699, 9866 to 9868, 9881, 14767
Fluorite: 9725
Galena: 15922
Garnet: 9873
Laumontite: 1494, 1496, 1498
Molybdenite: 13544
Muscovite: 12176
Opal: 11958 to 11980
Orthoclase: 9757, 9833, 9957
Prehnite: 4142, 7710, 9697, 9718, 9739,
9756, 9807, 9808, 9810, 9811, 9813,
9882, 9915, 9925, 14785
Quartz: 9738, 9748, (Crystal: 9727,
9745, 9753, 10043, 14758), (Milky:
97669), (Smoky: 9726)
Schorl: 9887
Titanite: 15921

*Cerrillo del Conde. Embalse de
El Atazar*

Orthoclase: 14221

Cola Sur del embalse de El Atazar

Almandine: 17309, 17377
Andalucite: 17308
Hornblende: 17310, 17311
Ilmenite: 17378
Kyanite: 17257, 17296 to 17299, 17704
Quartz (Flint): 17305
Rutile: 17303, 17304
Schorl: 17307
Sillimanite: 17300 to 17302
Staurolite: 17306

*El Cotorro. Cola Sur del embalse de
El Atazar*

Epidote: 17265, 17376
Quartz: 17375

El Espinarejo. Tres Cantos

Quartz (Crystal): 14840 to 14842

El Picachuelo. Embalse de El Atazar

Orthoclase: 10023, 13432 to 13436,
13975 to 13980, 15001
Sillimanite: 13455, (Fibrous: 10020)

Embalse de El Atazar

Quartz: 11440

Los Pozuelos

Orthoclase: 9759
Quartz (Smoky): 96253

Pradera del Amor

Oxid of Mn: 10056
Quartz: 10915, 10917

Tres Cantos

Quartz (Crystal): 9736

Valdecarro. Embalse de El Atazar

Garnet: 13969, 13970

El Boalo

Cerceda

Molybdenite: 6644

El Chaparral de la Mina. Cerceda

Chalcopyrite: 13261, 13262
Chlorite: 13264
Covellite: 13265
Malachite: 13263
Sphalerite: 13453, 13454

Minas del río Samburiel. Cerceda

Chalcopyrite: 13258
Chlorite: 13259, 13260

El Escorial

Specimens with no site location data

Dolomite: 1935

El Molar

Specimens with no site location data

Muscovite: 868
Pyrolusite: 2804

El Vellón

*El Espartal. Falda SE del Cerro
Mirabueno*

Calcite: 2867, 3140, 3161, 3162, 3167,
3168, 14751, 14759, 14789
Oxid of Mn: 3129, 3138, 14761, 14762

Valdelanava

Ilmenite: 9786, 9965

Fresnedillas de la Oliva

Minas de la Renta

Cerussite: 12189
Fluorite: 12188, 15947 to 15950
Galena: 12190, 15939
Quartz: 15940

Mina Rodolfo o Josefina

Baryte: 16065
Galena: 16066, 16067

Specimens with no site location data

Fluorite: 2431
Quartz: 84

Fuenlabrada

Cerro de la Coronilla. Cobo Calleja

Dolomite: 9982
Opal: 10841

Galapagar

Coto Nuevo

Quartz: 17331, 17332

Las Cuerdas

Orthoclase: 9938, 9940 to 9942,
10874, 10875

Las Suertes del Telégrafo

Quartz: 17318

Los Ranchos

Quartz (Crystal): 17742, 17743

Los Rosales. Parquelagos

Quartz: 10073, 10872, 10873

Mina La Osera. Cerro de la Osera

Azurite: 12209, 12210

Chalcopyrite: 12211

Chrysocolla: 13276, 13277

Fluorite: 13274, 13275

Malachite: 12207, 12208

Mottramite: 13278, 13279, 13280

Garganta de los Montes

Arroyo de Navalasierra

Schorl: 9988

Mina Celia. Arroyo de Sardalinde

Wolframite: 9987, 15954, 15955

Mina Chilena. El Cuadrón

Bismite: 9889, 12123, 12124

Bismuthinite: 7694, 7695

Chalcopyrite: 12128, 12129

Galena: 12125

Malachite: 12126, 12127

Sphalerite: 3379, 9992, 9993, 14764, 14765, 14766

Mina Fernandito

Chalcopyrite: 10074, 14980

Malachite: 14981

Gargantilla del Lozoya y Pinilla de Buitrago

Mina María Luisa

Sphalerite: 3369

Mina San José

Azurite: 12200

Baryte: 12198

Galena: 10814

Malachite: 12199

Schorl: 12201

Sphalerite: 10493, 10813

Specimens with no site location data

Sphalerite: 3372

Getafe

Canteras del cerro Marañosa

Quartz (Flint): 12212, 12213

Cerro de los Ángeles

Opal: 12032

Quartz: (Chalcedony: 1301), (Sardonyx: 1296)

La Marañosa

Opal: 11603

Quinta de los Ángeles

Quartz (Flint): 7003

Specimens with no site location data

Quartz (Chalcedony): 6754

Guadalix de la Sierra

Arroyo del Horcajo

Beryl: 13973, 13974

Muscovite: 13530, 13971, 13972

Cantera de El Verdugal

Arsenopyrite: 9999

Beryl: 9909 to 9911, 10766, 15898,
15903

Clinochlore: 9891, 9907, 9964

Muscovite: 9901, 9902, 9920, 10772

Torbernite: 15904

Triplite: 9893, 9894

Dehesa del Verdugal

Muscovite: 13474

Tourmaline: 13473

El Verdugal

Wolframite: 10801

Mina San Isidro. La Erilla

Arsenopyrite: 13488, 13489, 13490

Schorl: 13491

Mina Sardinera

Wolframite: 13921

Mina Verdadera

Arsenopyrite: 15003

Chalcopyrite: 12143, 12144

Scorodite: 15002

Minas de Peña Cervera

Arsenopyrite: 13518

Scorodite: 13519

Wolframite: 13520, 13521

Mina de Valdemoro

Cassiterite: 14976

Schorl: 14975, 14977

Guadarrama

Cabeza Lijar

Beryl: 14002

El Cercado

Quartz (Milky): 10879

El Soto

Quartz (Milky): 10810

Embalse de la Jarosa

Microcline: 14219, 14220

Mina Primera. Cabeza Lijar. Collado de la Mina o de la Cierva

Autunite: 9108

Beryl: 16081

Chalcopyrite: 6903

Chrysocolla: 13510

Garnet: 13513

Hübnerite: 13515 to 13517

Malachite: 13514

Molybdenite: 10776

Muscovite: 13511, 13512

Tablada

Orthoclase: 11591, 11592

Specimens with no site location data

Autunite: 4818

Quartz: 1266

Horcajo de la Sierra

Corral de los Lobos (boudinage)

Anatase: 10898 to 10900

Brookite: 10895 to 10897

Clinocllore: 10901, 10902

Corral de los Lobos (skarnoide)

Grossular: 10783, 10869

Pyrrhotite: 9895, 9896, 10867, 10868

Titanite: 11589

Vesuvianite: 9914, 10784, 10785, 12175, 14846

La Puebla

Rutile: 10068, 10069

Las Majadillas

Quartz: 10064, (Crystal: 16149)

Rutile: 10507, 14226

Sillimanite (Fibrous): 10066, 10067

Tourmaline: 10065

Mina de la Cabeza de Rullueco

Biotite: 16045, 16046

Dravite: 13462, 13463

Microcline: 16049, 16050

Pyrite: 13464, 13465, 16047

Quartz (Crystal): 16048

Schorl: 16041, 16042, 16043, 16044

Specimens with no site location data

Rutile: 7139

Schorl: 1331, 5337

Sillimanite: 6137

Horcajuelo de la Sierra

Arroyo de la Garita o de las Cabrillas

Anatase: 14244, 15652

Biotite: 14039

Chlorite: 14246

Ilmenite: 14248

Pyrite: 15653

Quartz: 12164, 15651, (Crystal: 14242, 14243)

Rutile: 10500, 14247, 15899, 15900

Sillimanite (Fibrous): 10489, 14213, 14214, 14249

Tourmaline: 14245

Camino de la Maesa

Quartz: 16060, (Rose: 16059), (Smoky: 16061)

Sillimanite: 16058

Camino Viejo del Horcajo

Rutile: 1594, 1595

Cerro de Recuenco

Kyanite: 6181

El Lanchar

Rutile: 9781

El Pinganillo

Kyanite: 16147

La Pasada

Quartz: 13993, (Smoky: 13994 to 13996)

Los Linares

Quartz: 9996

Rutile: 16150

Los Sacedones

Sillimanite: 16145

Majada Teresa

Sillimanite (Fibrous): 9916

Mata de la Cabezada

Quartz (Milky): 23

Mina de los Artilleros. Canto Blanco

Arsenopyrite: 13479

Quartz: 13475, 13476

Scorodite: 13477

Sillimanite: 13478

Mina San Francisco. El Frontal.

Cerro de las Minas

Freibergite: 10916

Graphite: 6596, 9789, 9930, 9931, 10745

Pyrargyrite: 10914

Quartz (Crystal): 9948, 9981

Specimens with no site location data

Almandine: 1346

Andalucite: 577

Quartz: 7,40,58

Rutile: 1582,1587,1590

Schorl: 1117

Hoyo de Manzanares

Arroyo de los Loberillos

Baryte: 15930, 15931

Barranco de Valdelaza

Cassiterite: 12154, 12155

Ferberite: 12153

Quartz: 10084, 10092 to 10095

Mina de Casablanca

Chrysocolla: 13532, 15301

Libethenite: 15006

Quartz: 13531, 13533

Mina de Las Cabañuelas

Albite: 17532 to 17534

Arsenopyrite: 17513 to 17515

Bornite: 17528

Cassiterite: 15901

Clinochlore: 17527

Covellite: 17529

Ferberite: 17508 to 17512

Fluorite: 17520 to 17524

Molybdenite: 9962, 10492, 17525, 17526

Muscovite: 17530, 17531
Quartz: 9830, 12161
Scheelite: 9904, 17516 to 17519, 17804,
17805
Wolframite: 9961, 10824, 12159, 12160

*Minas del Barranco de la Casquera.
El Pendolero*

Cassiterite: 9794, 10508, 12133, 12135,
12136, 13497, 16146
Ferberite: 10825, 12134, 13499 to 13503
Quartz: 13495, 13496
Tin (artificial): 13498

Minas del Cancho de las Cruces

Arsenopyrite: 10862, 10877, 13297
Chalcopyrite: 10864, 13307
Chlorite: 13308
Chrysocolla: 13309, 13310
Copper: 13303
Covellite: 10861, 10863, 13306
Fluorite: 10860, 10876, 13298
Galena: 13312, 13313
Malachite: 13299, 13300
Oxid of Fe: 13311
Pyrite: 13301, 13302
Quartz: 13295, (Flint: 13294), (Milky:
10878)
Scheelite: 13269, 13270
Scorodite: 11580, 11581, 13296
Sphalerite: 13304, 13305
Wolframite: 10856 to 10859

Valdelaza

Cassiterite: 15936
Chlorite: 15937
Molybdenite: 15933, 15938
Oxid of Mn: 15932
Quartz: 15934, 15935

Specimens with no site location data

Cassiterite: 7005, 7006
Scheelite: 1202
Triplite: 45
Wolframite: 2714

La Acebeda

Cerro del Gargantón

Garnet: 14040
Quartz: 14005

El Raizal. Camino del Puerto

Biotite: 17668, 17669
Hornblende: 17671
Quartz: 17670
Sillimanite (Fibrous): 17672

El Zarzoso

Microcline: 17675
Schorl: 17674
Sillimanite (Fibrous): 17673

Mina de El Carcabón

Biotite: 13504
Pyrite: 13505
Quartz: 13506

Mina del arroyo del Puerto de La Acebeda

Arsenopyrite: 10769, 15982
Matildite: 9858
Pyrite: 17663 to 17666
Quartz: 15984
Schorl: 15983
Sphalerite: 17667

Mina la Felicidad

Arsenopyrite: 13509
Pyrite: 13508
Quartz: 13507

Mina la Platera

Arsenopyrite: 13529
Pyrite: 13527
Quartz: 13528
Tourmaline: 10807

Pocillo Antonia

Muscovite: 13493, 13494
Tourmaline: 13492

Puerto de La Acebeda

Arsenopyrite: 9950
Caolinita: 13287

La Cabrera

Cabeza Mala

Quartz: 12030

Collado de la Tejera

Albite: 10077

Orthoclase: 10078
Prehnite: 10075
Quartz: 10076

La Cueva de Cristal. La Dehesa

Quartz: 12034, 12035, 12036, (Crystal: 17314), (Smoky: 17312 to 17316)

Prado Collado

Quartz: 11437

Specimens with no site location data

Almandine: 870
Orthoclase: 1386
Quartz (Milky): 66

La Hiruela

Puerto de La Hiruela

Chloritoid: 67, 903, 14790
Magneiochloritoid: 11977, 11978

Specimens with no site location data

Quartz (Crystal): 1291

La Serna del Monte

Las Cercas

Vesuvianite: 9923

Las Rozas de Madrid

Fuente del Cura

Quartz: 17317

Los Peñascales

Quartz: 13292, 13293

Loeches

Specimens with no site location data

Gypsum: 2097, 15594

Los Molinos

Cerro Matalafuente

Quartz (Milky): 9906

Prado de los Veneros

Quartz: 12165

Lozoya

El Sabinar de Lozoya

Microcline: 15082, 15083

Puerto de Navafría

Goethite: 16082

Lozoyuela, Navas, Sieteiglesias

Canteras de La Dehesilla. Sieteiglesias

Albite: 9857

Chabazite (Ca): 11564

Epidote: 9705

Fluorapophyllite: 9710, 11562, 11563,
13535 to 13537

Garnet: 9714, 9765, 9840, 9859

Laumontite: 3041

Microcline: 11397

Molybdenite: 9700, 9872

Orthoclase: 9643, 9712, 9750, 9762

Quartz: 9632, 9634, 9638, 9640,
9645, 9647, 9650, 9651, 9654, 9661,
9668, 9672, 9674 to 9677, 9679 to
9681, 9751, 10506, 13534, (Crystal:
4989), (Smoky: 3180, 11438)

Schorl: 9847

Stilbite (Ca): 9695, 9846, 10050,
10051, 11565

Estación de tren de Lozoyuela

Quartz (Crystal): 2065, 10055

Las Zahurdas

Orthoclase: 9693, 11441

Lavadero Isabelita

Cassiterite: 16148

Mina Caridad. La Cañada

Azurite: 11585

Chalcopyrite: 11583

Malachite: 11584

Proximidades canteras de La Dehesilla

Microcline: 10052

Madarcos

San Cristóbal

Rutile: 10957 to 10959, 13922, 13923,
15975 to 15979

Sillimanite (Fibrous): 10947 to 10949
Tourmaline: 11590

Madrid

Arganzuela (obras del túnel de la M-30)

Gypsum (Fibrous): 14853

Arenero Parador del Sol

Quartz (San Isidro's diamond): 12172, 12173

Canillas

Quartz (Bloodstone): 304

Cerro Almodóvar. Vallecas

Gypsum (Alabaster): 11605
Opal: 378, 381, 5032, (Milky: 383, 384, 1315)
Quartz: (Chalcedony: 233, 249, 252, 257, 5333, 10865, 10866, 11606), (Flint: 11607)
Sepiolite: 983, 985, 991, 1686, 10514, 10515

El Espinillo. Villaverde

Gypsum: 7852, (Fibrous: 7849)

El Panderuelo. Vallecas

Gypsum (Fibrous): 10950, 10951, 10952
Quartz (Flint): 10953

Langostillo. Vallecas

Gypsum: 10855

Quartz (Flint): 10853, 10854

Los Pilonos. Vallecas

Gypsum (Lapis Specularis): 10956

Quartz (Flint): 10955

Monte Viejo. Vallecas

Gypsum: 10960

Quartz (Flint): 10954

Pradera de San Isidro

Quartz (Smoky): 51,75

Río Manzanares. El Pardo

Quartz (Flint): 10961

Vallecas

Gypsum: 2098, 2113, 9061, 15079
Opal: 286, 6361
Quartz: (Agate: 298), (Chalcedony: 1311), (Flint: 288, 341)

Vicálvaro

Calcite: 9220

Quartz (Flint): 295

Sepiolite: 2707R

Specimens with no site location data

Gypsum: 2080

Quartz: 42

Manzanares El Real

Arroyo de la Yedra

Clino-Ferro-Ferri-Holmquistite: 16003

to 16007

Ferri-Pedrizite: 15999 to 16002,

16009, 16010

Ferro-Ferripedrizite: 15988 to 15992

Quartz: 15986, 15987

Cierros del Ganguino

Fluorite: 13254, 13255

Orthoclase: 13281, 13282

Quartz: 13250

Fuente Grande

Clino-Ferri-Holmquistite: 15993 to
15998

Clino-Ferro-Ferri, Holmquistite:

16008

Ferro-Actinolite: 15964, 15965

Ferro-Ferripedrizite: 16011

Orthoclase: 15315

Hueco de Coberteros. La Pedriza del Manzanares

Beryl: 14101

La Raja

Calcolpyrite: 17613

Fluorite: 17611

Quartz: 17612

Las Viñas

Oxid of Mn: 9980

Refugio Giner de los Ríos

Ferro-Actinolite: 16052 to 16055

Pared de Santillana. La Pedriza del Manzanares

Quartz (Smoky): 14100

Senda de la Abutarda

Sillimanite: 14134, 14135

Mejorada del Campo

Specimens with no site location data

Quartz (Flint): 7845

Miraflores de la Sierra

Mina Carcamala

Muscovite: 13487

Tourmaline. 13486

Mina El Cubero

Muscovite: 13485

Mina de las Zahúrdas

Arsenopyrite: 14974

Peña Gorda. Talud vía del AVE

Beryl: 15969, 15972

Fluorite: 10808, 10881, 15966, 15974

Opal: 15970

Orthoclase: 15973

Prehnite: 15968

Quartz: 15967

Schorl: 15971

Vaqueriza Alta

Quartz (Smoky): 2070

Specimens with no site location data

Almandine: 6123

Arsenopyrite: 41

Montejo de la Sierra

Arroyo del Entablado

Staurolite: 12033

Las Caseras

Almandine: 14865,14866,14867

Anatase: 15035

Andalucite: 14859

Ilmenite: 15036

Kyanite: 15037, 15038

Muscovite: 14863, 14864

Rutile: 14860, 14861, 14862

Schorl: 14857, 47858

Sillimanite: 15033, 15034

Mina del camino del Lomo de la Tejera (1)

Arsenopyrite: 15085

Mina del camino del Lomo de la Tejera (2)

Berthierite: 15094,15095

Mina del camino del Lomo de la Tejera (3)

Berthierite: 15091 to 15093, 16864 to 16867

Cervantite: 16868

Graphite: 15297, 15298

Quartz: 15300

Pyrite: 16863

Stibiconite: 15088 to 15090, 15299

Dehesa Boyal

Schorl: 9837, 9871

El Cogorral

Andalucite: 12214

El Gustar

Sillimanite: 10765

Las Majadas

Staurolite: 6350, 9046, 10085 to 10088, 10090, 10091, 10490, 10491, 10932, 14769 to 14773

Loma de Enmedio

Staurolite: 10070, 10071

Lomo de la Tejera

Anatase: 17413 to 17416

Ilmenite: 14992

Microcline: 14995

Muscovite: 14993

Quartz: (Smoky: 14986 to 14991), 17417

Schorl: 14994

Los Pezuelos

Kyanite: 507, 1363

Mina La Perla. Las Pozas

Diaphorite: 4855

Pyrargyrite: 4830, 4838, 5842, 9601, 9613

Puerto del Cardoso

Andalucite: 6268, 10082, 10083

Quartz (Smoky): 10079

Sillimanite: 10080, 10081

Specimens with no site location data

Actinolite: 94

Almandine: 1345

Biotite: 1395

Clinocllore: 912

Muscovite: 6362

Quartz (Crystal): 1293, 6306

Rutile: 5834

Sillimanite (Fibrous): 587, 14763

Staurolite: 2986, 14777 to 14779,

14780 to 14784, 14791

Tremolite: 6311

Moralzarzal

Cerro de las Minas

Quartz: 10040

La Suerte. Minas de Moralzarzal

Arsenopyrite: 10029 to 10031

Mina Fe. El Portillo de la Mina

Quartz: 12167

Navacerrada

Rasos de la Majadilla

Quartz: 9974, (Milky: 10833)

Navalafuente

El Carrascal

Orthoclase: 10053, 10054

Navalagamella

Las Tejoneras. Filón Montañesa Este

Azurite: 12193

Baryte: 12194

Galena: 12191, 12192

Malachite: 12195

Mina La Montañesa. El Horcajo

Baryte: 12181, 13443, 13444

Cerussite: 10782, 13445, 13446

Fluorite: 12182

Galena: 12183, 12184, 13449 to 13451

Malachite: 10811, 13452

Plumbogummite: 10509, 10742

Pyromorphite: 9880, 10816 to 10819, 10703, 13448

Wulfenite: 10741, 13447

Navas del Rey

Cerro del Moro

Orthoclase (Adularia): 6734, 9832

Río Alberche

Quartz: 9861

Vallefrías

Dolomite: 10803, 10804

Magnesite: 10815, 10844

Patones

Dehesa de la Oliva

Calcite (Speleothema): 2064,2728

Las Huelgas. Patones de Abajo

Sillimanite: 2089, 9240 to 9242, 14788

Pelayos de la Presa

La Enfermería

Hastingsite: 10918,10919

Piñuécar, Gandullas

Cabeza de Piñuécar. Piñuécar

Vesuvianite: 9924

Embalse de Puentes Viejas

Apatite: 10072

Bytownite: 10908

Fluorapatite: 10909

Kyanite: 14872

Muscovite: 10487

Quartz (Rose): 11604

Rutile: 9780, 9782, 9783, 14873, 14874

Schorl: 10483, 10484, 15302 to 15314, 15981

Sillimanite (Fibrous): 9919, 9989, 14877

Tourmaline: 9990, 14875, 14876

Ladera Bernal. Gandullas

Ilmenite: 9991

Prádena del Rincón

Arroyo del Valle. Las Cebadillas

Staurolite: 544, 14753 to 14757

Las Cercas

Muscovite: 9890, 12031

Mina Artistas

Pyrrargyrite: 4860

Specimens with no site location data

Kyanite: 6108

Rutile: 1593

Schorl: 1336

Puebla de la Sierra

La Tornera

Quartz (Milky): 13991

Puentes Viejas

Camino de la Hiruela. Serrada de la Fuente

Andalucite: 10041, 10062, 10920, 14013

Ilmenite: 15962, 15963

Kyanite: 91, 10058 to 10061, 10834, 14012, 15077

Rutile: 9929, 10501

Tourmaline: 10063

Cerrillo de Montegil. Embalse de El Atazar. Manjirón

Microcline: 14869

Orthoclase: 14036

Quartz: 14034, (Amethyst: 14870, 4871)

Sillimanite: 14035, 14868

Cerro Pelado. Paredes de Buitrago

Almandine: 13289

Cordel del Carrascal

Rutile: 15902

Dehesa de Santillana. Manjirón

Orthoclase: 13966, 13967, 13968

Embalse de El Atazar. Manjirón

Orthoclase: 14222 to 14225

Embalse de Puentes Viejas, Aliviadero

Muscovite: 10832, 12177

Orilla oeste del embalse de El Atazar. Manjirón (I)

Albite: 14136

Chlorite: 14138

Orthoclase: 14142 to 14145

Prehnite: 14139, 14140, 14141

Quartz: 14137

Orilla oeste del embalse de El Atazar. Manjirón (II)

Quartz: (Amethyst: 3170, 3171, 9729, 9731, 9743, 9775, 9776, 9934, 10096), (Milky: 774)

Rascafría

Arroyo del Artiñuelo

Grossular: 14024

Tourmaline: 14025

Vesuvianite: 14022, 14023

Bailanderos

Clinocllore: 15956, 15957, 15958

Barranco del Cardoso

Chondrodite: 437

Carro del Diablo

Actinolite: 10880

Mina Aníbal. Oteruelo del Valle

Arsenopyrite: 13989

Calcite: 13984

Cassiterite: 13985, 13986

Scheelite: 13990

Scorodite: 13987, 13988

Peñalara

Vesuvianite: 14026, 14027

Redueña

Camino de Redueña a La Cabrera

Microcline: 15668

Sillimanite (Fibrous): 15667

Mina El Pajarito

Arsenopyrite: 16085

Chalcopryrite: 16144

Galena: 16086
Pyrite: 16087
Sphalerite: 16084

Mina de El Portillo

Arsenopyrite: 14978
Scorodite: 14979

Rivas-Vaciamadrid

Cerro de la Tarta. Campillo de San Isidro

Calcite: 11594 to 11598
Quartz (Flint): 11599, 11600

Laguna del Campillo

Quartz (Flint): 17266 to 17268

Vegas del Porcal

Quartz (Flint): 9927, 10802

Robledillo de la Jara

Dehesa del Soto. Embalse de El Atazar

Orthoclase: 2349, 2352, 2644, 2645,
10937 to 10941
Quartz: 2361, 2363

El Carrascalejo. Embalse de El Atazar

Quartz: (Amethyst: 14124, 14125,
14126), (Crystal: 14127)

Embalse de El Atazar

Orthoclase: 10962

Las Bellotas. Embalse de El Atazar

Albite: 14129
Epidote: 14130
Orthoclase: 14128, 14132
Quartz: 14131, 14133

Orilla este del embalse de El Atazar

Fluorapatite: 11442, 11443, 11444
Orthoclase: 11395

Robledo de Chavela

Mina Asturiana. Arroyo de Valdezate

Baryte: 12215
Chalcopyrite: 9787, 10838
Fluorite: 9975, 9976
Galena: 9831, 9967, 10806

Mina Asturiana (Pozo). Arroyo de Valdezate

Hemimorphite: 10550, 10804

Mina del Cerro Chinarroso

Fluorite: 15012

Robregordo

Colgarejos

Clinocllore: 17288, 17289
Schorl: 17290, 17291

Cordel de la Dehesa

Quartz: 17295
Schorl (Rose): 17292
Microcline: 17293, 17294

Mina del arroyo de las Atalayas

Arsenopyrite: 17285
Quartz: 17286, 17287

Mina Sinforosa

Oxid of Fe: 13466
Quartz: 13468
Tourmaline: 13467

Prados del Collado

Biotite: 13471
Microcline: 13469, 13470
Sillimanite: 13472

San Lorenzo de El Escorial

Arroyo del Valle. Puerto de la Cruz Verde

Chrysotile: 15059
Magnesite: 12092, 13232
Talc: 12093, 12094, 14011

Cuelgamuros

Beryl: 644, 738, 14774 to 14776

Prado del Rincón

Orthoclase: 10836

Prado del Valle

Garnet: 14085

Puerto de Malagón

Biotite: 10842
Diopside: 689
Potassic-Pargasite: 11975, 11976
Titanite: 10903 to 10907
Tremolite: M-1054

Specimens with no site location data

Augite: M-434
Diopside: 1011, 14787
Magnesio-Hornblende: M-324

San Martín de la Vega

Cerro Pascual Domingo

Opal: 9997, 9998

Gózquez de Abajo

Gypsum: 14848, 14850

San Martín de Valdeiglesias

Cerro de las Colmenas

Orthoclase: 13290

Mina Santa Gema

Fluorite: 10870, 10871

Salto de Picadas

Biotite: 5374, 15595

Santa María de la Alameda

Cerro de la Cancha. Robledondo

Magnetite: 12148, 12149, 12220, 14146 to 14148

El Cascadero. Puerto de la Cruz Verde

Chrysotile: 10847, 10849, 10850
Magnesite: 1938, 6539, 6563, 10852
Talc: 891

El Ituero. La Hoya

Microcline: 13981 to 13983

El Toril

Apatite: 13251
Calcite: 13252
Hornblende: 13253

El Venero

Almandine: 9908

La Solanilla. Arroyo de la Umbría

Magnesio-Hornblende: 13440 to 13442
Magnetite: 12104 to 12106, 13227 to 13229

La Hoya

Diopside: 682
Magnesio-Hornblende: 5390

Los Moncayos

Schorl: 9947, 13271 to 13273, 14844

Prados Iruela. La Hoya

Hornblende: 13920
Magnesio-Hornblende: 5390
Tourmaline: 13919

Túnel de la Paradilla

Orthoclase: 13925, 13926
Tourmaline: 13924

Specimens with no site location data

Almandine: 489
Magnetite: 3008

Somosierra

Cuesta del Molino

Grossular: 71, 6100, 9835, 10942 to 10946, 17655 to 17662
Spinel: 10910, 10911
Vesuvianite: 9886, 9888, 10779

Dehesa de Somosierra

Microcline: 10761 to 10764

Pico de las Tres Provincias

Tourmaline: 14003

Sierra de las Veras

Schorl: 1330

Specimens with no site location data

Perovskite: M-825
Quartz: 6178, (Citrine: 1272)
Schorl: 1114, 1129

Soto del Real

Las Calerizas

Amber: 9217
Calcite: 10521

Los Rancajales

Arsenopyrite: 10775
Beryl: 9943, 9944, 10922, 13246, 13247
Biotite: 13249
Clinocllore: 11400, 13248
Muscovite: 9945, 13245
Quartz (Rose): 13244
Tourmaline: 9937
Triplite: 10786

Torrejón de Velasco

Cerro de Batallones

Opal: 12156, 12157
Quartz (Flint): 12158

Torrelaguna

Caleriza del Mortero

Gypsum: 14102

Mina Santa Eulalia o Sirena

Arsenopyrite: 16051
Galena: 16064

Torrelodones

Las Marías. En el talud a la salida del túnel del tren

Chlorite: 10967
Molybdenite: 2658

Mina del arroyo del Fortín

Autunite: 12121
Chrysocolla: 12116 to 12119

Fluorite: 12122
Malachite: 12120
Metatorbernite: 12109 to 12111
Torbernite: 4562, 6727, 6891, 9968, 12107, 12108, 12112
Uranophane: 12113 to 12115

Prado de la Solana

Quartz: 13257

Prado de las Minas

Goethite: 9828, 9829

Specimens with no site location data

Albite: 6118
Biotite: 6121
Muscovite: 6880, 6935

Valdemanco

Cantera de La Saludadora

Agardite (Y): 9615
Arsenopyrite: 9230 to 9236, 10778
Calcite: 7251, 7252, 9842 to 9844, 9877, 9878, 10089, 10481, 15084
Clinozoisite: 10966
Garnet: 9711
Laumontite: 7253 to 7263, 7265
Microcline: 9758
Opal: 9834, 9850, 9865, 9973, 10035, 10485, 10486, 10882
Orthoclase: 7778, 9741
Prehnite: 6829
Quartz: 7247, 9746, 9845, 9856, 11435,

(Crystal: 2738, 9740, 10022), (Milky: 9623, 9624), (Smoky: 2730, 7242 to 7246, 7248, 7249, 7250, 9616, 9617, 9620 to 9622, 9626, 9628, 9692, 9737, 9744, 11439)
Scheelite: 7961, 9978, 10774, 14838
Stokesite: 3578, 9602, 9604, 9605, 9607 to 9609, 9611, 11434

Cantera de Los Alisos

Albite: 11995, 11997
Calcite: 9713
Cassiterite: 15649, 15650
Epidote: 11990
Fluorapophyllite: 12003
Fluorite: 15644 to 15646
Garnet: 9874
Goethite: 15648
Laumontite: 12000
Microcline: 15647
Muscovite: 9703
Orthoclase: 2734, 9717, 11996, 11998, 11999, 12001, 12004, 12005
Prehnite: 11992, 11994
Quartz: 11993, (Crystal: 9728), (Smoky: 9764, 11989, 12002)
Schorl: 11586
Stilbite (Ca), 11991

Cementerio Nuevo

Opal: 10036 to 10039
Quartz (Crystal): 12216

El Madroñal

Albite: 7266, 9696
Calcite: 9852
Chalcopyrite: 9716
Galena: 9708
Prehnite: 9629
Quartz (Smoky): 9742, 12006, 12007
Spessartine: 9701
Sphalerite: 9854

Jaramala

Quartz (Crystal): 11436

Valdemaqueda

Fuente Sosa

Dolomite: 10024 to 10026

Valdemorillo

Camino de la Mina del Capitán

Muscovite: 14999
Orthoclase: 15000
Schorl: 14996 to 14998

Camino de Navalroble

Quartz (Flint): 9970

Colada de la Mina de Falcó

Microcline: 15011

El Praderón

Baryte: 15929

La Dehesa. Zanja conducción gas ciudad

Arsenopyrite: 10826

Scorodite: 10827

Mina de Falcó

Quartz: 14982, 14983

Valdemoro

Cerro de la Piedra

Quartz (Chalcedony): 9994, 9995, 10805

Venturada

La Caleriza

Calcite: 48, 1601, 1602

Talud de la autopista A1

Almandine: 2066, 2737, 13266

Valdeortigas

Opal: 14851

Villa del Prado

Mina en Las Loberas

Azurite: 16069

Baryte: 16070

Bornite: 16068

Chalcopyrite: 16072

Malachite: 16071

Villalbilla

Cerro San Roque

Gypsum: 10517 to 10520, (Gypsum rose: 9790, 10494)

Villamanrique de Tajo

Mina de la Cárcava

Gypsum (Alabaster): 15980

Salinas de Carcaballana

Gypsum (Alabaster): 15960

Quartz (Flint): 15959

Zarzalejo

Las Machotas

Orthoclase: 1027, 1382 to 1384, 9903, 12025 to 12029, 13545 to 13547, 13998 to 14000, 14752

Los Morales

Quartz: 13288

Puerto de la Cruz Verde

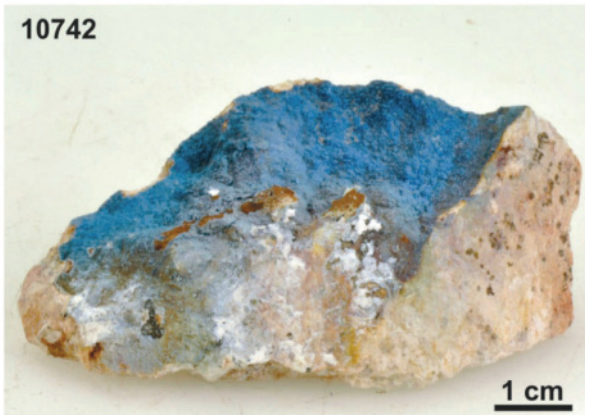
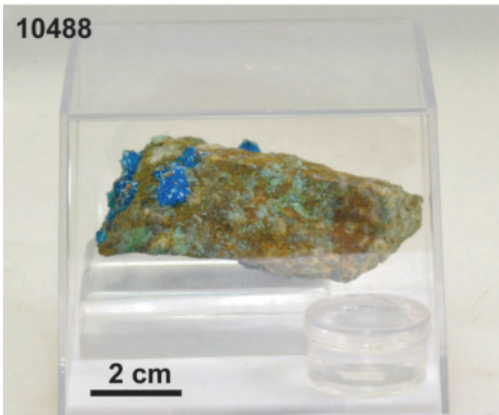
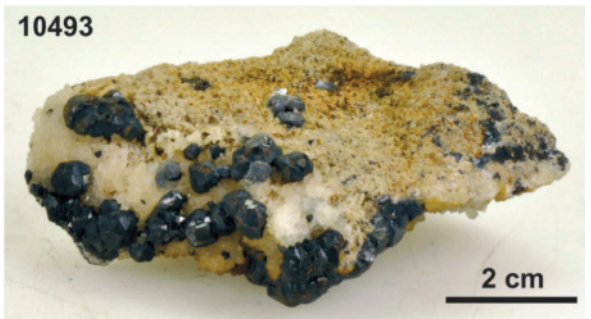
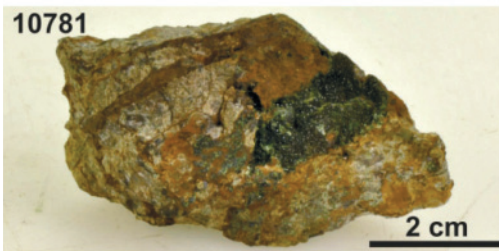
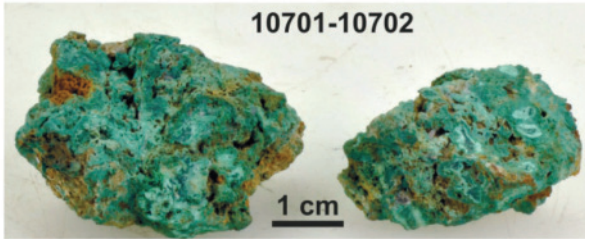
Chrysotile: 10848

Magnesite: 9928, 10851

Talc: 13230

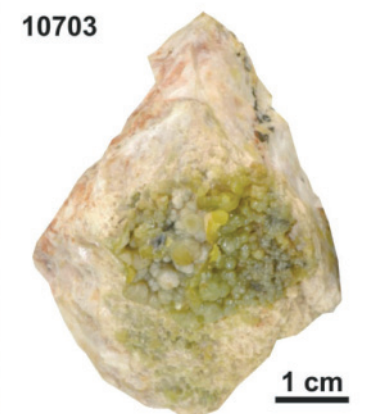
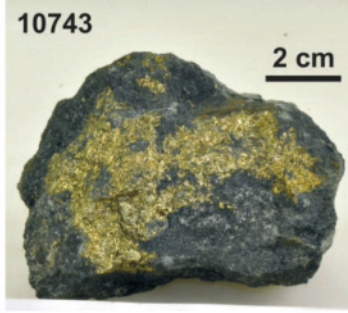
ANNEXED II

Photographic collection of the examples
shown in cabinet 112 - Madrid Region



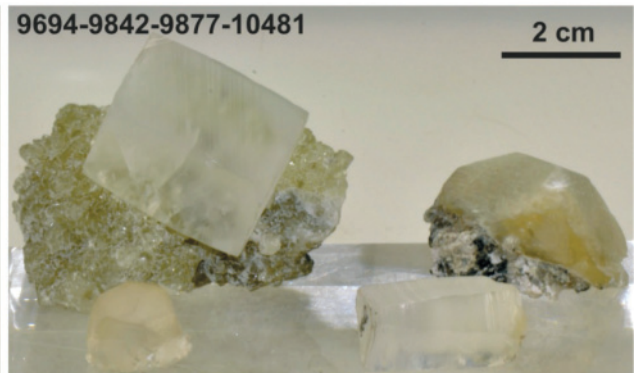
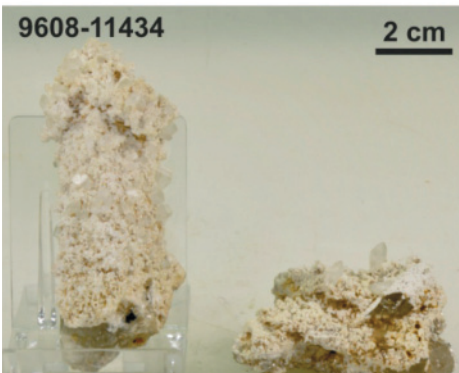
[Top left, hand shelf]

10495: Azurite (Colmenarejo); 7695: Bismuthinite (Garganta de los Montes);
10701, 10702: Malachite (Colmenarejo); 10781: Pharmacosiderite (Colmenarejo);
10493: Sphalerite (Gargantilla del Lozoya); 10488: Chalcantite (Colmenarejo);
10742: Plumbogummite (Navalagamella).



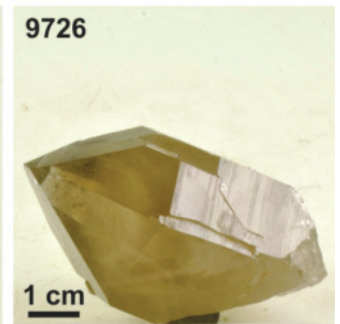
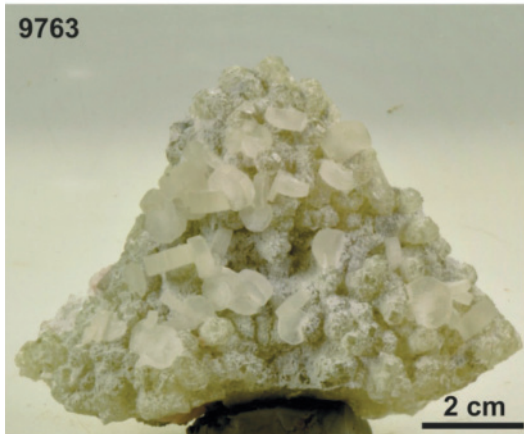
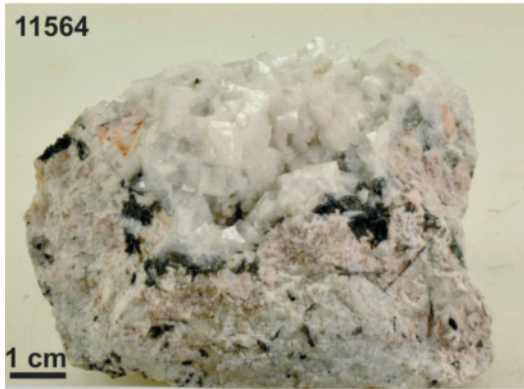
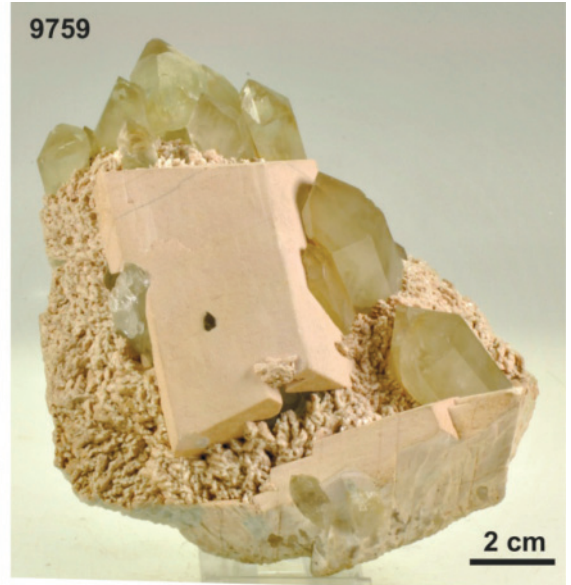
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10497: Pyrite (Colmenar del Arroyo); 10743: Chalcopyrite (Colmenar Viejo); 7802: Galena (Colmenar del Arroyo); 4838: Pyrargirite (Montejo de la sierra) 4860: Pyrargirite (Prádena del Rincón); 2748: Wolframite (Collado Mediano); 10778: Arsenopyrite (Valdemanco); 10492: Molybdenite (Hoyo de Manzanares); 10703: Pyromorphite (Navalagamella).



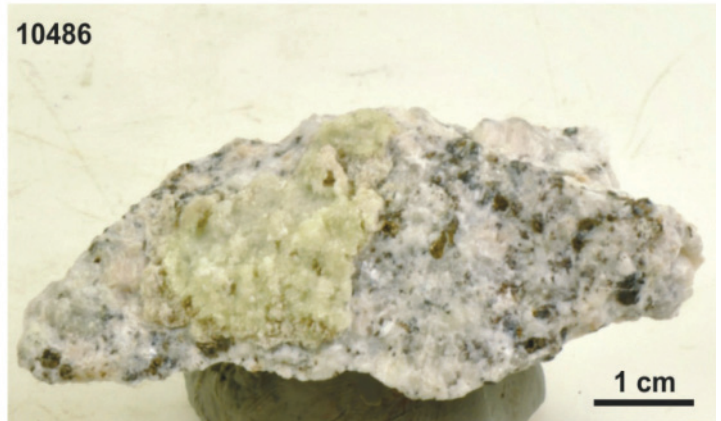
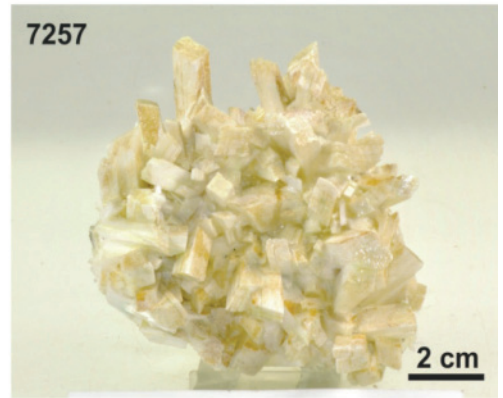
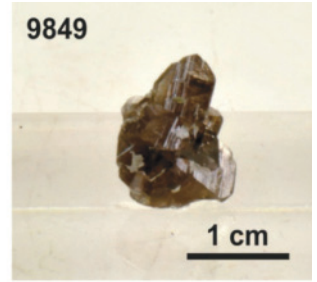
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9756: Phehnite (EL Berrueco); 10922: Beryl (Soto del Real); 9748: Quartz (El Berrueco); 9736: Quartz Crystal (EL Berrueco); 9608, 11434: Stokesite (Valdemanco); 9694, 9842, 9877, 10481: Calcite (Valdemanco-El Berrueco).



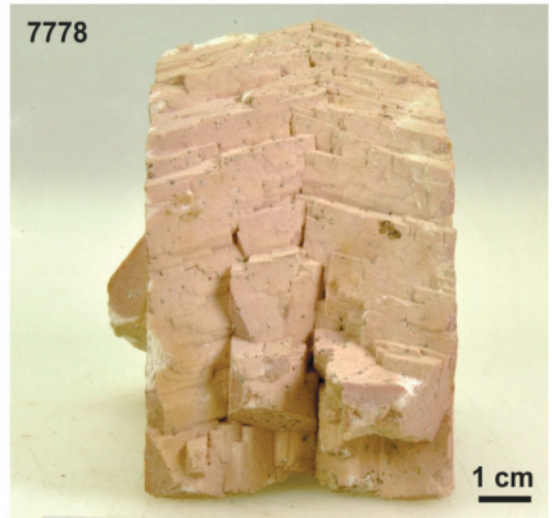
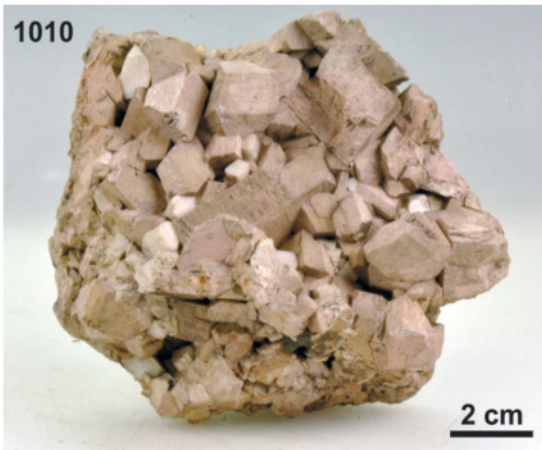
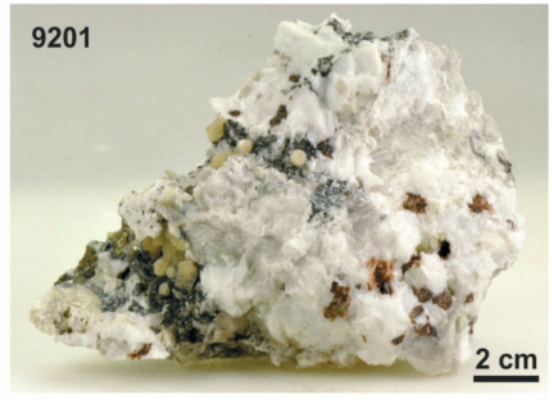
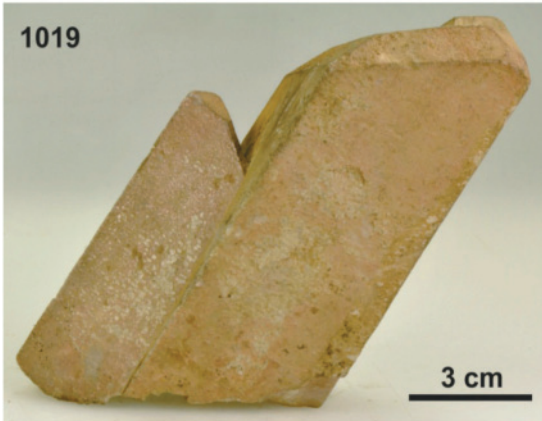
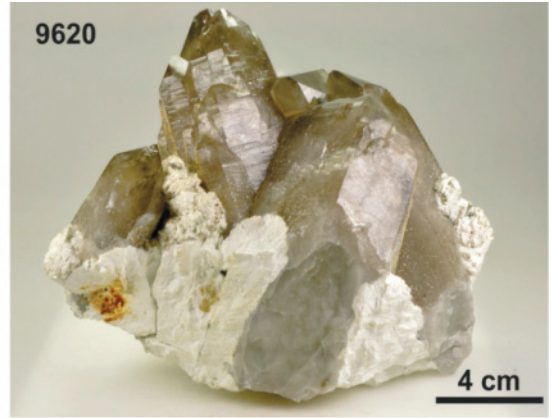
[Middle left, hand shelf]

9776: Quartz amethyst (Puentes Viejas); 9759: Orthoclase (EL Berrueco); 11564: Chabazite-Ca (Sieteiglesias); 9728: Quartz Crystal (Valdemanco); 9763: Calcite (El Berrueco); 11563: Fluorapophyllite (Sieteiglesias); 9726: Quartz smoky (El Berrueco).



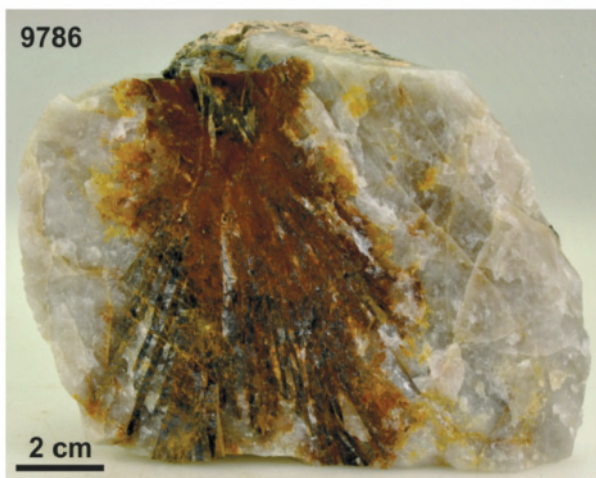
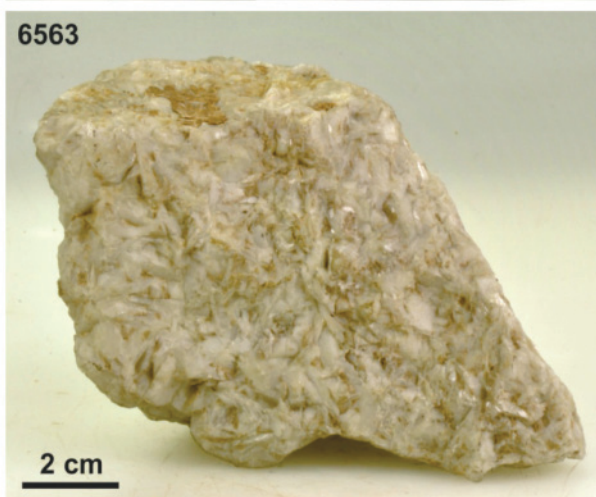
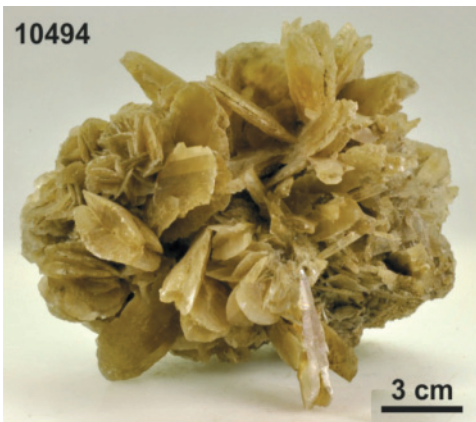
[Middle left, hand shelf]

13020: Quartz amethyst (Cervera de Buitrago); 9846: Axinite (El Berrueco); 10774: Scheelite (Valdemanco); 2065: Quartz Crystal (Lozoyuela); 7257: Laumontite (Valdemanco); 9295: Milarite (Cadalso de los Vidrios); 10486: Opal (Valdemanco).



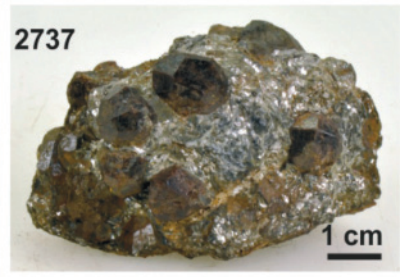
[Lower left, hand shelf]

7248: Quartz smoky (Valdemanco); 9620: Quartz smoky (Valdemanco); 1019: Orthoclase (Bustarviejo); 9201: Bavenite (Cadalso de los Vidrios); 1010: Orthoclase (Bustarviejo); 7778: Orthoclase (Valdemanco).



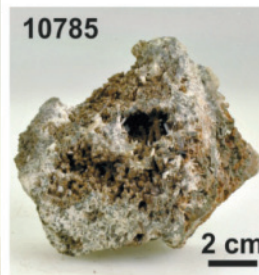
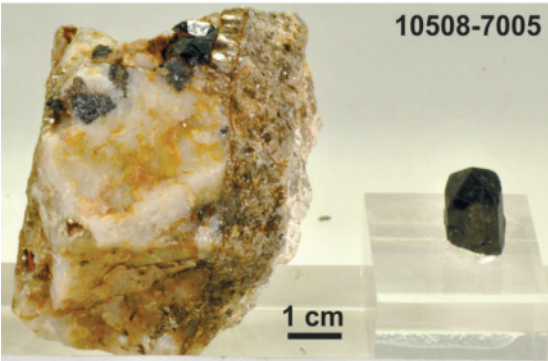
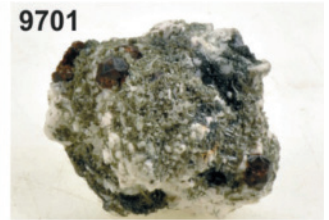
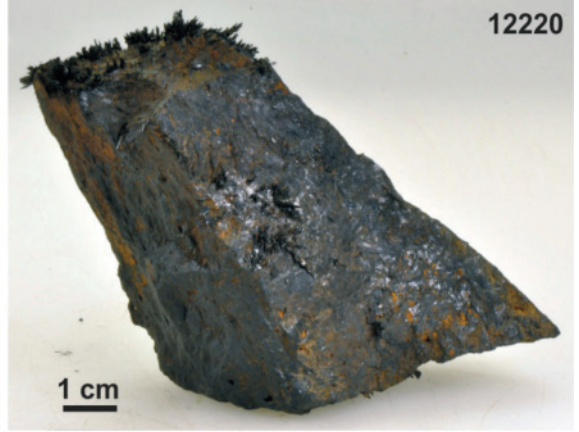
[Lower left, hand shelf]

10494: Gypsum pink (Villalbilla); 9046: Staurolite (Montejo de la Sierra); 10745: Graphite (Horcajuelo de la Sierra); 6563: Magnetite (Santa María de la Alameda); 891: Talc (Santa María de la Alameda); 9786: Ilmenite (El Vellón).



[Top right, hand shelf]

10489: Sillimanite fibrous (Horcajuelo de la Sierra); 5834: Rutile (Montejo de la Sierra); 1363: Kyanite (Montejo de la Sierra); 10507: Rutile (Horcajo de la Sierra). 6268: Andalucite (Montejo de la Sierra); 1345: Almandine (Montejo de la Sierra); 544: Staurolite (Prádena del Rincón); 2737: Almandine (Venturada).



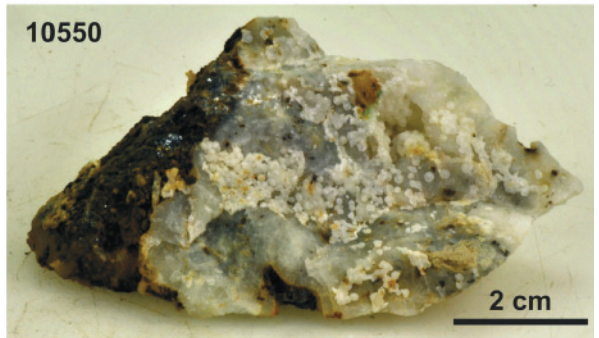
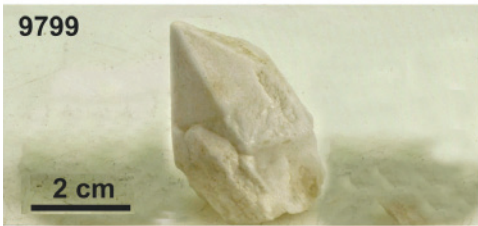
[Top right, hand shelf]

10498: Wollastonite (Colmenar Viejo); 12220: Magnetite (Santa María de la Alameda); 11569: Chloritoid (Cervera de Buitrago); 10741: Wulfenite (Navalagamella); 9701: Spessartine (Valdemanco); 3008: Magnetite (Santa María de la Alameda); 10508, 7005: Cassiterite (Hoyo de Manzanares); 10785: Vesuvianite (Horcajo de la Sierra); 10783: Grossular (Horcajo de la Sierra).



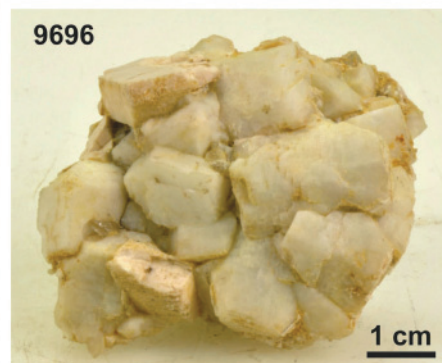
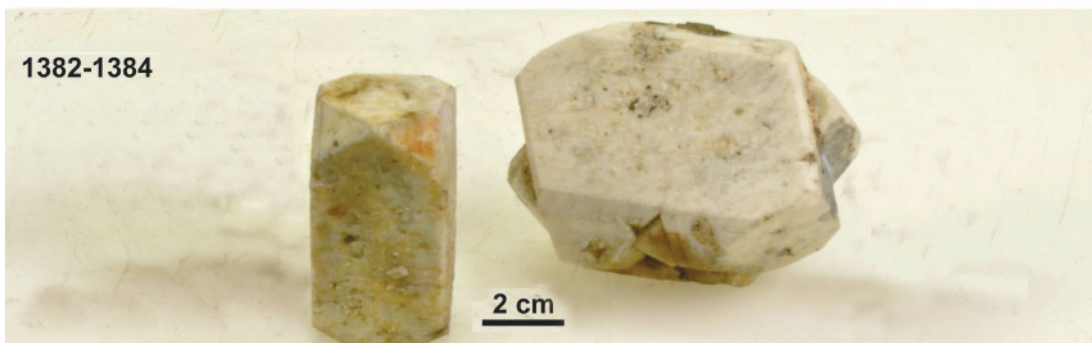
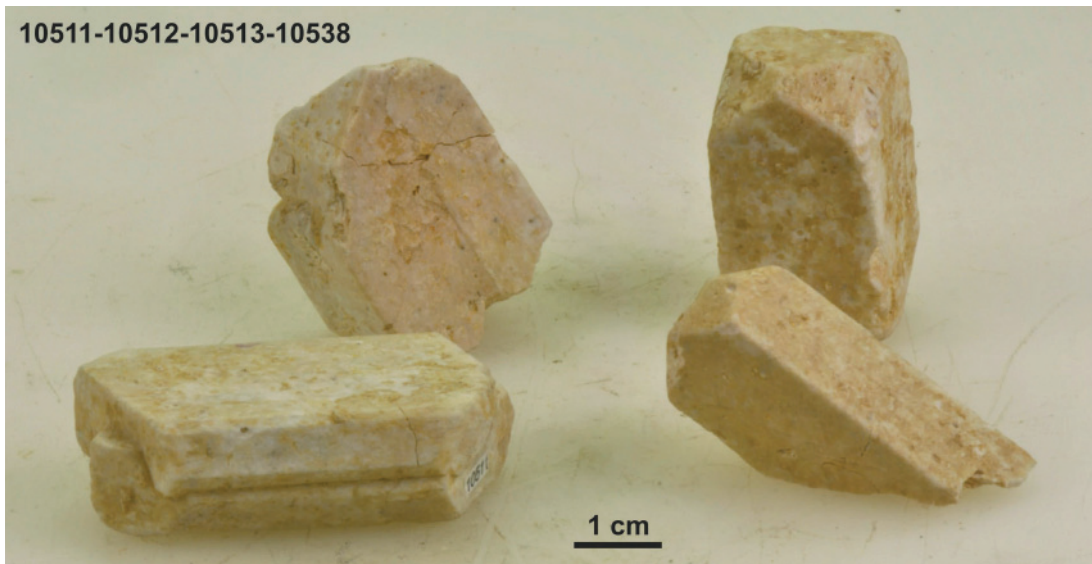
[Middle right, hand shelf]

40: Quartz Crystal (Horcajuelo de la Sierra); 1395: Biotite (Montejo de la Sierra); 738: Beryl (San Lorenzo de El Escorial); 6276: Schorl (Buitrago del Lozoya); 6393: Fluorite (Colmenar de Arroyo); 10496: Fluorite (Colmenar del Arroyo); 10482: Fluorite (Colmenar del Arroyo); 2431: Fluorite (Fresnedilla de la Oliva).



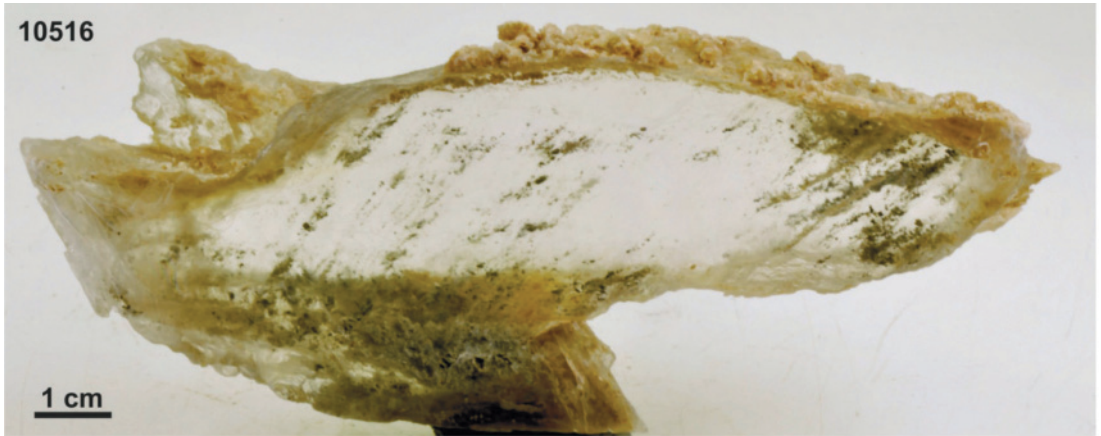
[Middle right, hand shelf]

10786: Triplite (Soto del Real); 6362: Muscovite (Montejo de la Sierra); 9799: Quartz milky (Bustarviejo); 10550: Hemimorphite (Robledo de Chavela); 94: Actinolite (Montejo de la Sierra); 10483: Schorl (Piñuécar-Gandullas).



[Middle right, hand shelf]

10511 to 10513, 10538: Orthoclase (Cervera de Buitrago); 1382, 1384: Orthoclase (Zarzalejo); 9643: Orthoclase (Sieteiglesias); 9696: Albite (Valdemanco).



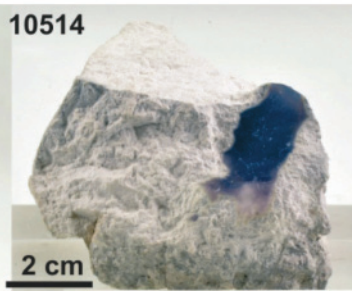
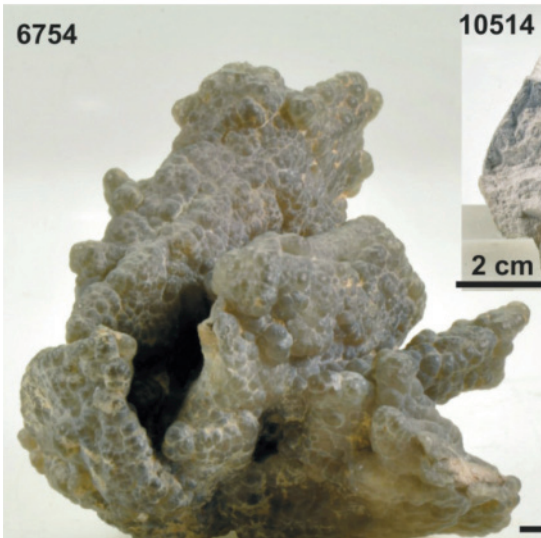
[Lower right, hand shelf]

10516: Gypsum (Chinchón); 383: Opal milky (Madrid); 10510: Epsomite (Chinchón);
341: Quartz flint (Madrid); 10761: Microcline (Somosierra).



[Lower right, hand shelf]

51: Quartz smoky (Madrid); 1315: Opal (Madrid); 3167: Calcite (El Vellón); 2064: Calcite speleothema (Patones); 10521: Calcite “scalenohedral crystals” (Soto del Real).



[Lower right, hand shelf]

4164: Glauberite (Chinchón); 298: Quartz agate (Madrid); 10935: Halite (Aranjuez); 1961: Glauberite (Ciempozuelos); 6754: Quartz chalcedony (Getafe); 10514: Sepiolite (Madrid); 9217: Amber (Soto del Real).



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