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1- OBJECTIVE:

For an adequate restoration and conservation of the mosaic it is necessary to know its history, its techniques, the most used materials, the andamento, and the grammar of the tesserae.
In summary: "one must know how to make mosaics".

2- HISTORY AND EVOLUTION OF THE MOSAIC:

learning the history and evolution of the mosaic, as well as the most commonly represented themes.
The birthplace of the mosaic is found in Mesopotamia. Towards the end of the 4th Millennium b.C., the walls and columns of the temple of Uruk are decorated with geometrical motifs made with coloured clay and glass ceramics. Their city walls are coated with tesserae shaped as terracotta cones (red, black, and white) that make up geometric patterns. In a necropolis in Ur, the "Standard of Ur" was found. It is considered the first mosaic (between 2700 and 2500 b.C.).
Nonetheless, the mosaic itself is born in Frigia, made with dark pebbles, and later moves to Macedonia and Greece.
In Gordion, near Ankara, the most ancient mosaic paving known is conserved, from the 6th Century b.C., in black, white, and red pebbles, with an apparently chaotic or uncertain geometric decoration.
In the hellenistic world, the most ancient mosaics (from the end of the 5th Century b.C. to the beginning of the 3rd Century b.C.) are *lithrostratos* ("made with stones"), the pebbles coming from beaches and rivers. Bicolor at first, and white, red, and yellow later on. The geometrical motifs give way to vegetal and hunting themes, marine animals, and mythological creatures.
At the end of the 4th Century b.C they appear the mosaics of Pella, in them the tridimensionality is already appreciated, imitating the painting.
At the end of the 3rd Century b.C., the pebbles were substituted for stone or smalti tesserae, very small and with a high level of refining, thus making it possible to represent more realistic scenes, with human figures, animals, plants, and enormously precise landscapes, using both mythological and everyday life themes.
From the 1st Century b.C. onwards, the mosaic's technique is strongly implanted, and with Rome comes the peak of the mosaic. From the pictorial mosaics of the hellenistic tradition, we move on to pavings of large surfaces. Bicolor, black and white mosaics coexist with polychromatic ones. The themes also have a more practical character, the person who orders the mosaic will portray his world, without leaving behind the representation of historical and mythological passages. The represented drawings are called "cartone", and they spread all throughout the Empire thanks to workshops. This way, almost identical mosaics can be found in very distant places. The majority of the themes represented in the Pompeian mosaics come from already existing paintings, such as "The Battle of Issus", and in some cases the original painting is conserved, for example "The Wandering Musicians". Under emperor August, the *misivarius* art spread throughout the Empire, having its major peak between the 4th Century b.C. and the 3rd Century b.C.
With the official acceptance of Christianity in the year 313, sacred images start to be represented in places of worship, shifting from paving mosaics to mural mosaics. This tendency was adopted by the first Christians, but it will be Constantinople and the Byzantine Empire who really push it forward. The Byzantine Empire turns the mosaic into an identity mark and an essential feature of this period. They cover the walls and ceilings with exquisite mosaics, the themes being Christian imagery, in colorful flat colours over shiny golden and silver backgrounds, made in smalti tesserae.
Islamic mosaics are the work of Byzantine artists which were ceded or sent by the emperor in Constantinople when requested by the caliph Salid ibn Add al-Malik, in order to decorate the mosques in Mecca, Medina and Damascus. The techniques, materials, and themes are the same as the byzantine mosaics, but removing the characters in favor of the precepts of the Islamic religion.



Terracotta cones Uruk



Mosaics of Pella



Noheda Roman mosaic



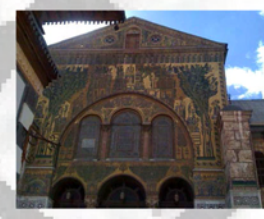
Mosaic and painting of "The Wandering Musicians"



Cartone: mosaics Piazza Armerina and Tunis



Hagia Sophia, Istanbul

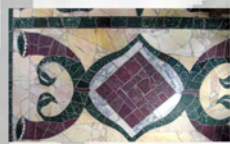


The Mosque of Damascus



The Cordoba's mosque

The generalized obscurantism and regression during the Middle Ages is also reflected in the mosaic, it usually takes paving purposes and is reserved for the altar, made in pebbles. The themes range from the Old Testament iconography to mythology, zodiac signs, real and fantastic animals, and legends.
In the 14th Century, the mosaic loses its artistic autonomy, subjecting itself to painting. During the Renaissance, in the 15th Century, the mosaic regains strength and in Venice a new mosaic schools is formed. In the 17th Century, Rome again becomes the producing center of mosaics, forming *misivarius* experts, especially for the Vatican decoration. In the 18th Century, the miniature mosaic or "micromosaic" predominates, with extremely small tesserae. In the 19th Century, imperial mosaic schools emerge, imitating ancient models and paintings.
In the beginning of the 20th Century, interest for the decorative arts grows, and together with it, the mosaic regains popularity and is again used as a mean of artistic expression and decorative elements for emblematic buildings and great architectural projects. Of special interest is the apparition of the so-called "trencadis".



Cosmati mosaic



San Marco, Venice



Basilica of St. Peter's, Vatican



Micromosaic



Palace Stoclet, Brussels

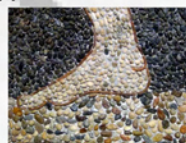


Parc Güell, Barcelona

3- MOSAIC TECHNIQUES:

knowing the different types of mosaic. According to the size and shape of the tesserae, the orientation (*andamento*), and how they are arranged (the grammar of the mosaic), we can differentiate between several types of mosaics, being the most outstanding:
Pebble mosaics: these are the most ancient mosaics, developed in Greece and made with pebbles from beaches and rivers.
Opus Signinum: embedded tesserae in a lime mortar, marble dust, and ground ceramic, making very simple drawings. Its name comes from the city of Signa.
Opus Tessellatum: regular tesserae of uniform size.
Opus Vermiculatum: very small tesserae that adapt themselves to the contour of the drawing, like a worm (*verme*). In most cases, the emblema is done in "opus vermiculatum" and the rest in "opus tessellatum".
Opus Sectile: marble plates fragments of different colours forming geometrical drawings.
Trencadis: "broken", in catalan. The tesserae in this case are ceramic fragments irregularly placed.

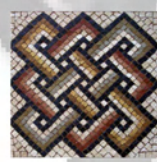
One must also differentiate between paving mosaics and wall mosaics.



Pebble mosaic



Opus Signinum



Opus Tessellatum



Opus Vermiculatum



Opus Sectile



Trencadis

4- MATERIALS AND METHODS:

learning how to make a mosaic.
A) MATERIALS FOR THE TESSERAE: one must know the most commonly used materials in the making of the mosaic (natural stone, pebbles, smalti, ceramic, filati, etc). The stone (marble, limestone, sandstone, granite, and porphyry) has been the predominant material in the ancient mosaic thanks to its extensive natural color range, as well as its resistance. In the Byzantine mosaics, marble tesserae painted in red are used. The pearl oyster and semi-precious stones are used in primitive Christian mosaics. The use of jade and turquoise was common in precolumbian cultures, applied to masks and sculptures. Other materials are smalti, also used in Roman mosaic although it is more common in Byzantine and Islamic mosaic. Ceramic and tiles are also used. Other, more modern, materials are the Nolla and the vitreous glass, and nowadays one could add to mosaic-making a never-ending list of alternative materials.

Nonetheless, what has barely changed throughout the centuries are all the tools used, being the hammer and hardie the essentials.

Smalti Donà



Materials



Tools: hammar, hardie and nippers



B) METHODS: nowadays, several work methods for making a mosaic exist, depending on materials, functionality, and the school or artists.

Direct Method: the tesserae are placed over its definitive support (ply wood, ceramic, ...) with a permanent adhesive (ready to use paste adhesive, ...).
Indirect Method: also known as "reverse method". The tesserae are stucked upside down on a provisional support (paper, fabric, ...), on which the design is drawn in reverse. It is later consolidated (epoxy, silicone, cement, lime, ...), turned around and cleaned.
Double-reverse Method: the tesserae are sticked in a positive sense, provisionally on an adhesive surface (lime, acetate adhesive, ...), the tessellation is fixed in order to be hablo to turn it around (gauze and with rabbit glue, tape, ...), the first support is eliminated and the mosaic is consolidated the same way as in the indirect method.



Direct Method



Indirect Method



Double-reverse Method



5- AVAILABLE RESOURCES:

In order to acquire this knowledge, one can go to official centers and regulated schools, the most relevant being: Scuola Mosaicisti del Friuli, Accademia di Belle Arti di Ravenna, Escuela de Arte y Superior de Diseño de Mérida, MIMAR (Madaba Institute for Mosaic Art and Restoration), Istituto d'Arte per il Mosaico Monreale, Mosaikon, Saint Petersburg Mosaic School, The Chicago Mosaic School...
In this centres one can acquire a complete knowledge and understanding of the different materials, tools, the techniques, and methods.
Other non-official type of education (courses) are: workshops in museums, outreach days, courses in workshops (KOKO Mosaico, Ex Officina Antea), master in Mosaic ORSONI, Mosaic Classes SONIA KING.
In these courses, the student learns, at least, a specific material and technique.



Scuola Mosaicisti del Friuli



Accademia di Belle Arti di Ravenna



Istituto d'arte Gino Severini Ravenna



Mosaic School Madaba



Escuela de Arte y Superior de Diseño, Mérida



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6- CONCLUSION:

Through the theoretical and practical knowledge of the mosaic, a much better restoration and conservation will be achieved. If a restorer dominates the art of the mosaic, it will be shown in a correct execution of their job.
In Mérida, a great work of divulgation and teaching of the mosaic is being carried out, and to this have contributed: the exhibition TESELAS at the Museo Nacional de Arte Romano de Mérida, the Cursos Internacionales de verano de Conservación y Restauración de mosaico del Consorcio de la Ciudad Monumental de Mérida (which includes a practical workshop), the visit of Sonia King to Mérida, the Escuela de Arte y Superior de Diseño de Mérida, and the workshop Ex Officina Antea.

6 - RECOMMENDED BIBLIOGRAPHY :

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The Exhibition TESELAS M.N.A.R.



The visit of Sonia King



Courses CONSORCIO



Workshops EMERITA LUDICA