A hand is holding a small, round, reddish-brown pigment sample. The background shows a workspace with a glass plate containing various pigments, a palette knife, a small container of liquid, and other materials. The text "Introduction to Pigments and Paints" is overlaid on the right side of the image.

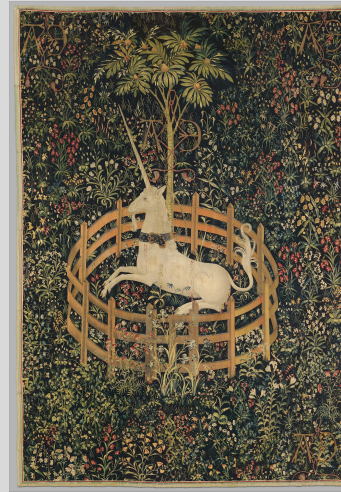
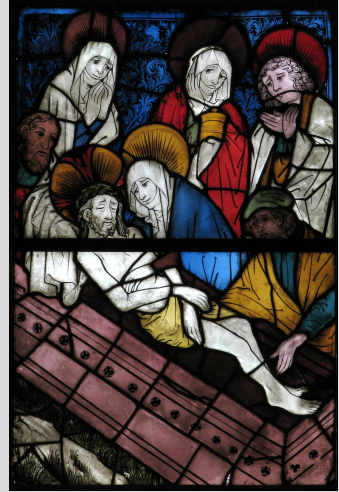
Introduction to Pigments and Paints



Color in Art

Painting
Drawing
Manuscripts
Sculpture

Stained glass
Ceramic
Textile
Jewelry



Paints

Pigments

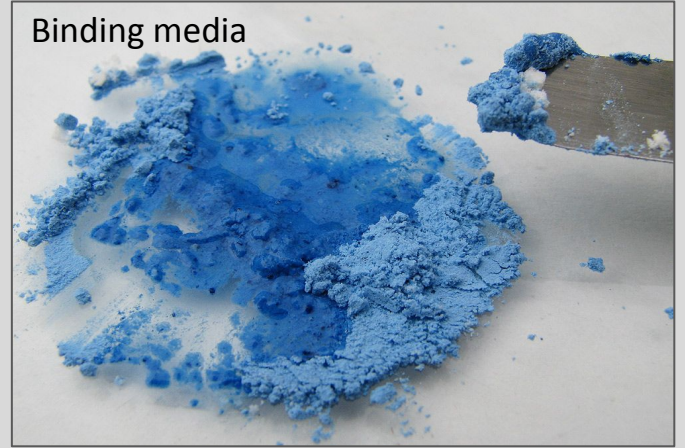


Paint = pigment + binding media

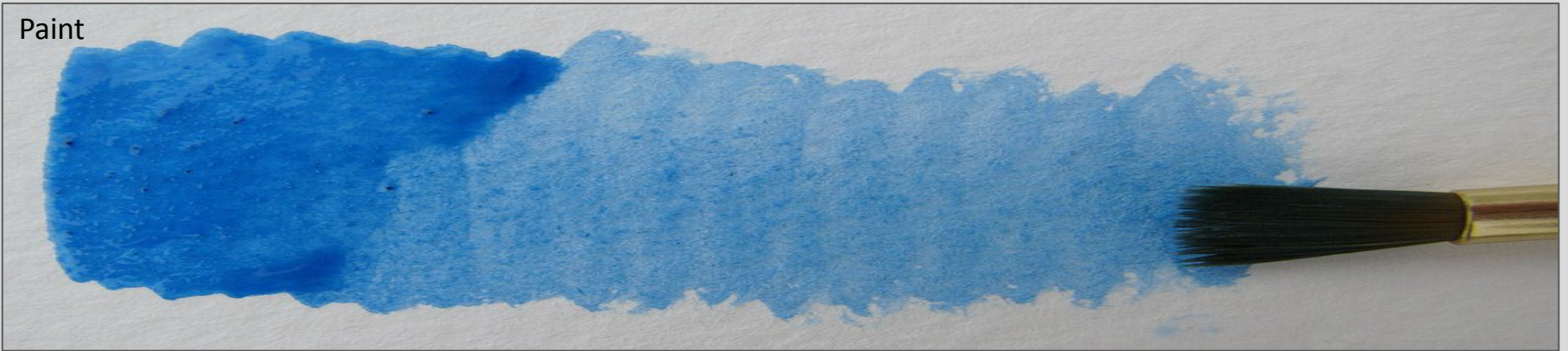
Pigment



Binding media

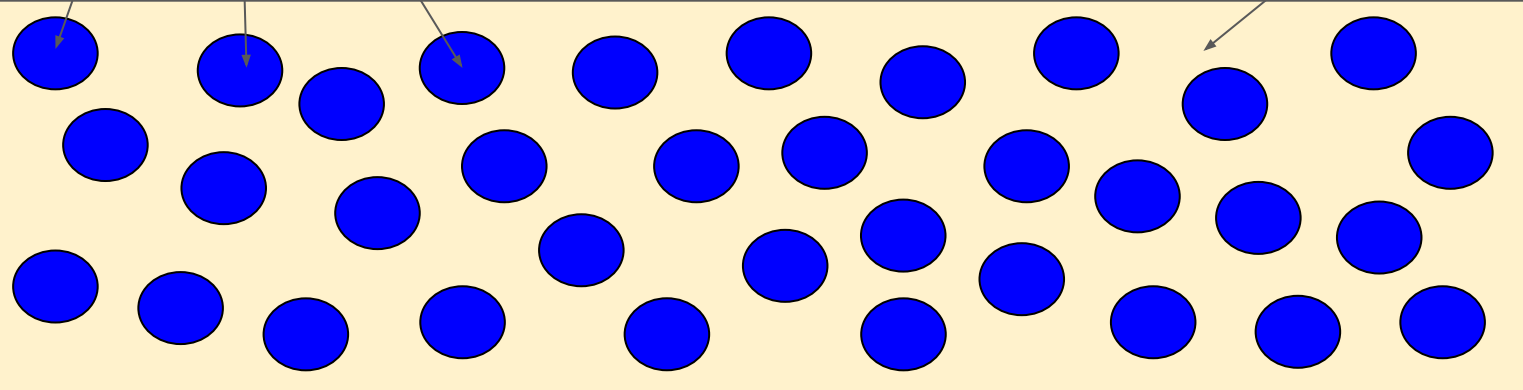


Paint



Pigment particles

Binding medium

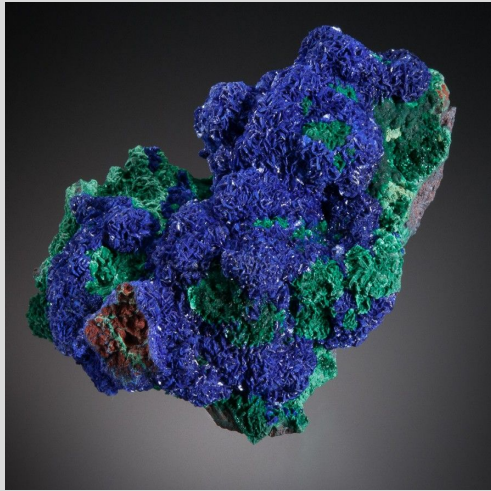


Substrate (paper, canvas, wood)

Natural Pigments

Mineral

“Mineral”



Azurite (copper carbonate)

Earth



Venetian Red (ochre)

Organic
Plant or Animal



Weld (*Reseda luteola*)

Brussels Manuscript, 17th century

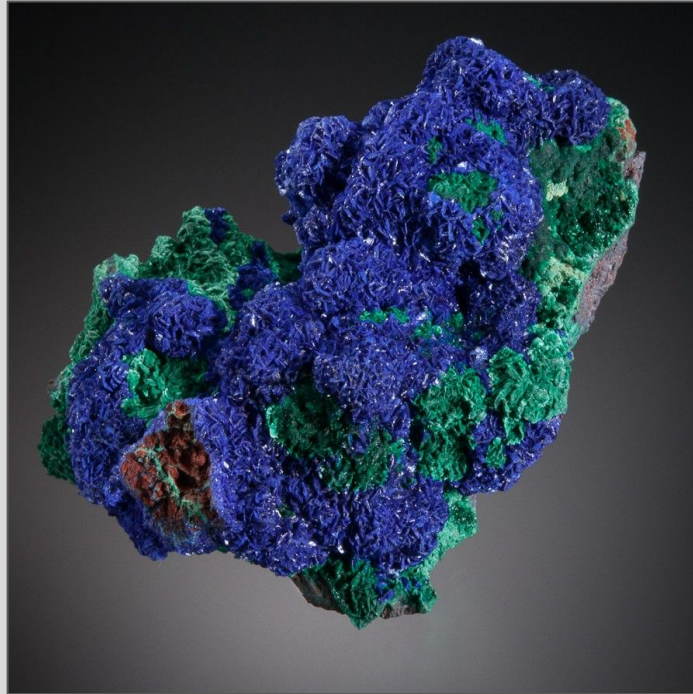
*Colours [pigments] are formed in the **earth** and in **mines**, or are **composed by mixtures and combination**, or are **extracted from herbs or otherwise**.*

OUTLINE

For each pigment type:

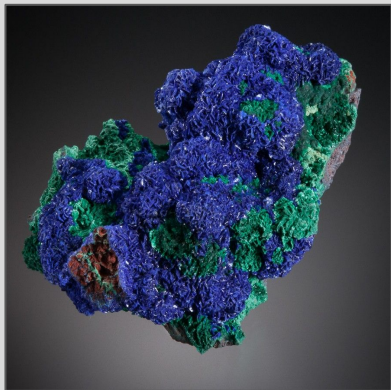
- Raw materials
- Context as pigment and paint
- Preparing and using pigment: historical recipe or application

“Mineral” Pigments

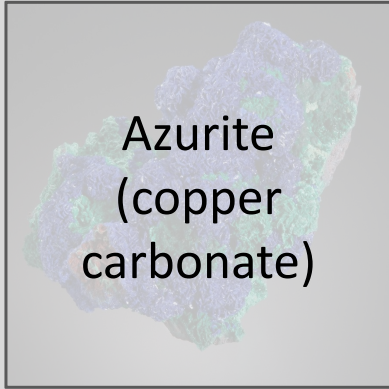


Azurite

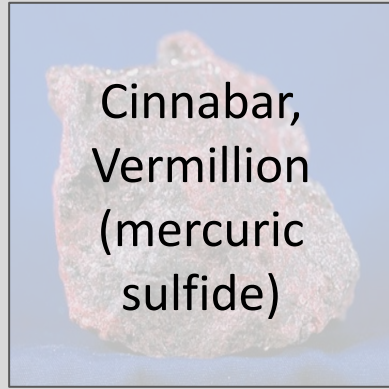
“Mineral” Pigments



“Mineral” Pigments



Azurite
(copper
carbonate)



Cinnabar,
Vermillion
(mercuric
sulfide)



Orpiment
(arsenic
trisulfide)



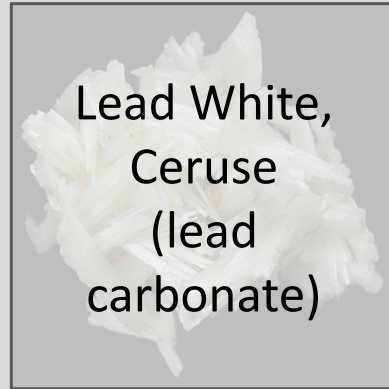
Verdigris
(copper
acetate)



Minium,
Red Lead
(lead tetroxide)



Malachite
(copper
carbonate)

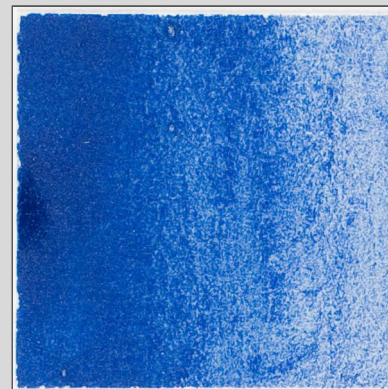
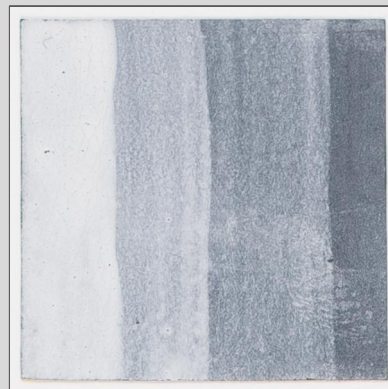
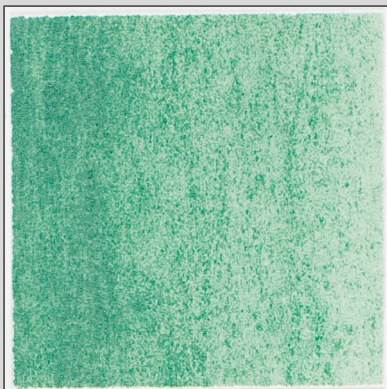
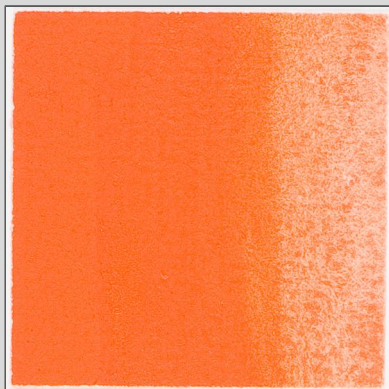
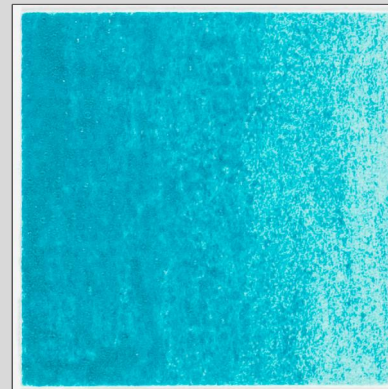
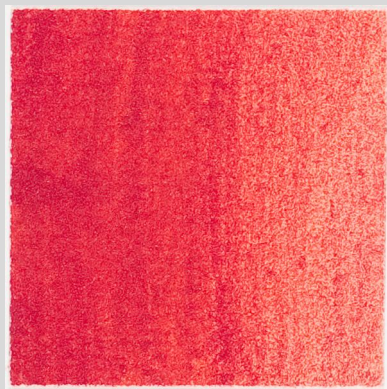
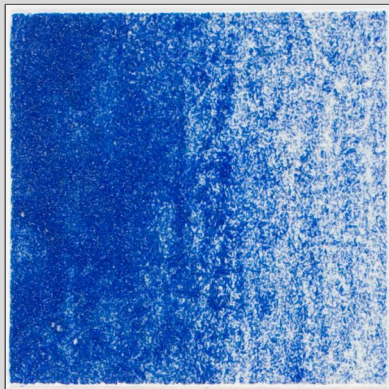


Lead White,
Ceruse
(lead
carbonate)



Lapis Lazuli,
Ultramarine
(lazurite)

“Mineral” Pigments



Preparing and Using “Mineral” Pigments

BnF Ms. Fr. 640

Painting *esmail d'azur* in oil ([fol. 11r](#))

*To make azures beautiful, they wash or soak them in a **rock water**, as they call it; it is a **water distilled from mines** where azure or vert d'azur is found, which distills naturally through the **veins of the mountain** or is distilled through an alembic par from **mineral stones of azure or copper**.*

Preparing and Using “Mineral” Pigments



Painting esmail d'azur in oil (fol. 11r)

The main thing is to **grind it well on marble**, and before that, to **have washed it thoroughly**.

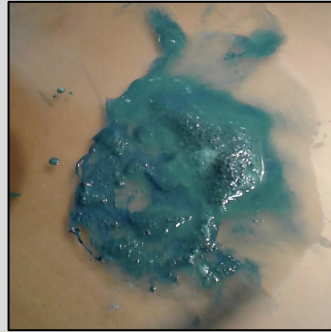
Preparing and Using “Mineral” Pigments



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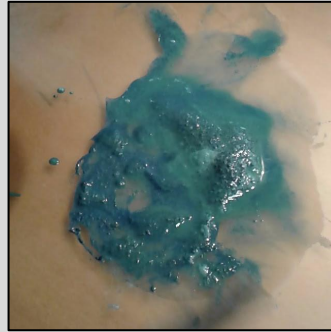
Preparing and Using “Mineral” Pigments



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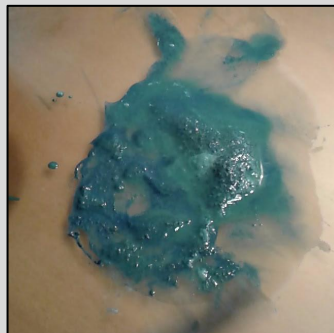
Preparing and Using “Mineral” Pigments



Painting esmail d'azur in oil (fol. 11r)

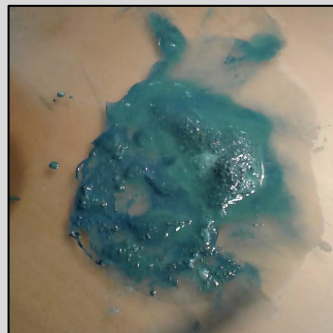
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Preparing and Using “Mineral” Pigments



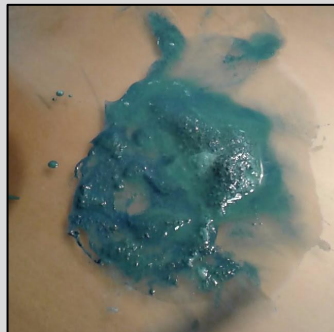
Painting esmail d'azur in oil (fol. 11r)
Wash it in clear water & with a sponge remove the colored water after it starts to go to the bottom, and in this manner you will extract the very delicate flower, which will be easy to work with.

Preparing and Using “Mineral” Pigments



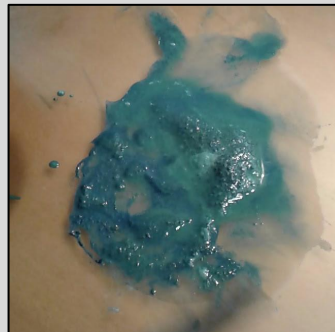
Painting esmail d'azur in oil (fol. 11r)
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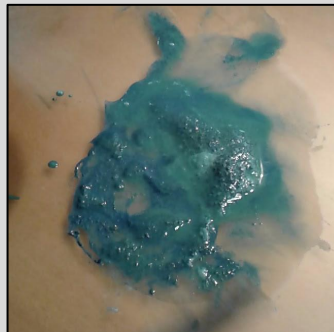
Painting esmail d'azur in oil (fol. 11r)
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Preparing and Using “Mineral” Pigments



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Preparing and Using "Mineral" Pigments

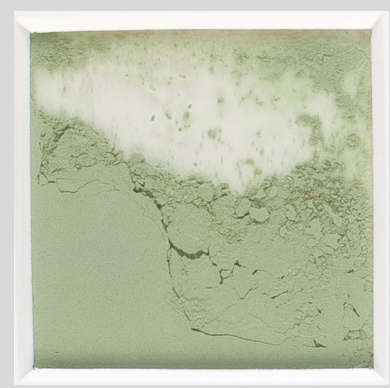
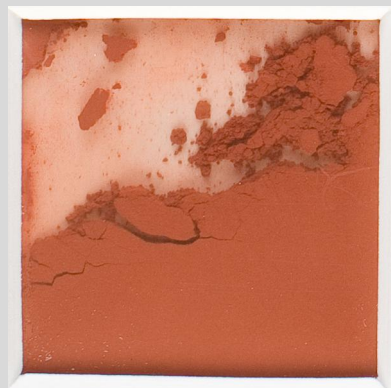
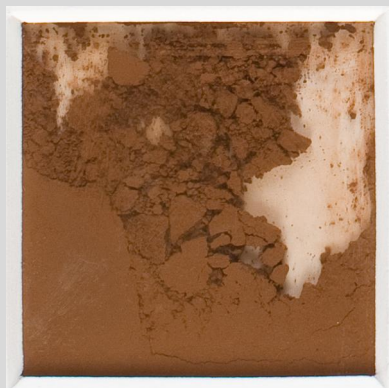
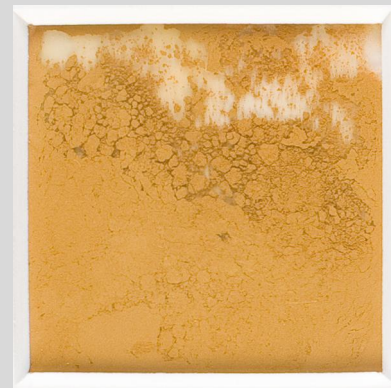
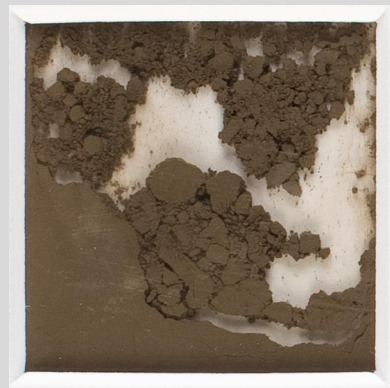
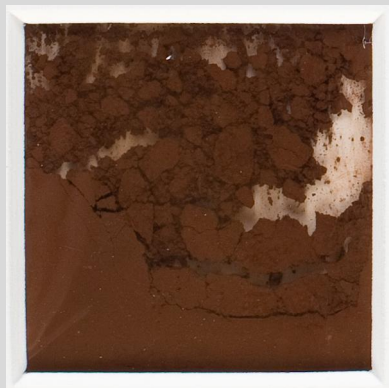


Earth Pigments

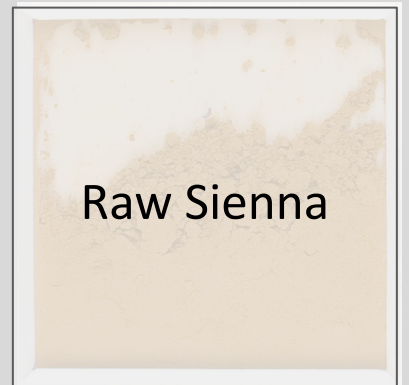
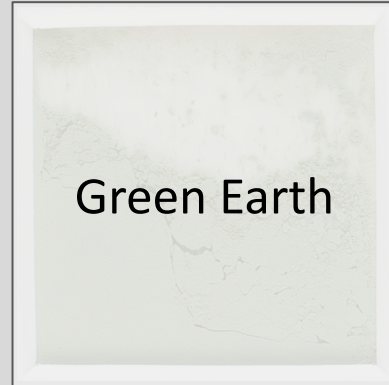
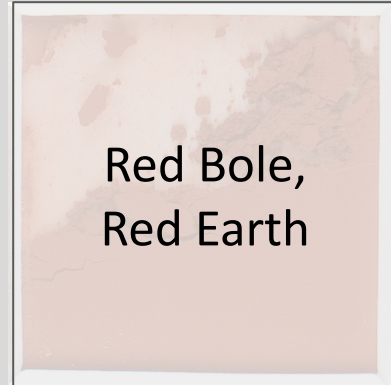
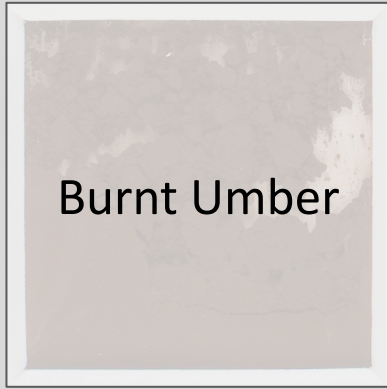


Venetian Red (ochre)

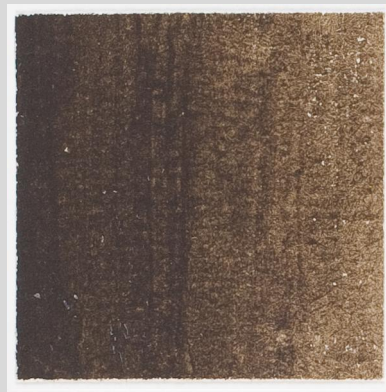
Earth Pigments



Earth Pigments



Earth Pigments



“Brussels Manuscript”

- *Ochre-coloured earth being taken from the veins of marble*
- *“ Rubricks,” or “ bloodstones,” are also taken out of the earth*
- *Green chalk, or “ verd de terre,” —that brought from Smyrna is the best*
- *English red, otherwise called brown red, red ochre, yellow ochre, umber, and yellow earth, are formed in the earth*

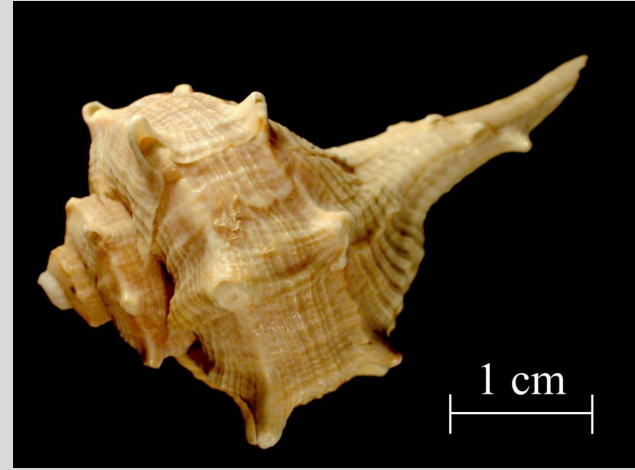


Organic: Plant or Animal Pigments



Weld

Organic: Plant or Animal Pigments



Organic: Plant or Animal Pigments

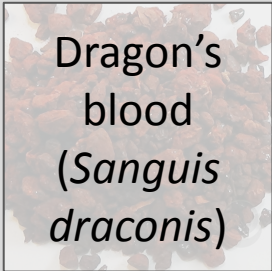


Madder
(*Rubia tinctorum*)

1 cm




Weld
(*Reseda luteola*)



Dragon's
blood
(*Sanguis draconis*)



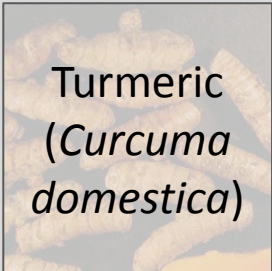
Buckthorn
Berries
(*Rhamnus frangula*)



Brazilwood
(*Caesalpinia echinata*)



Indigo
(*Indigofera tinctoria*)



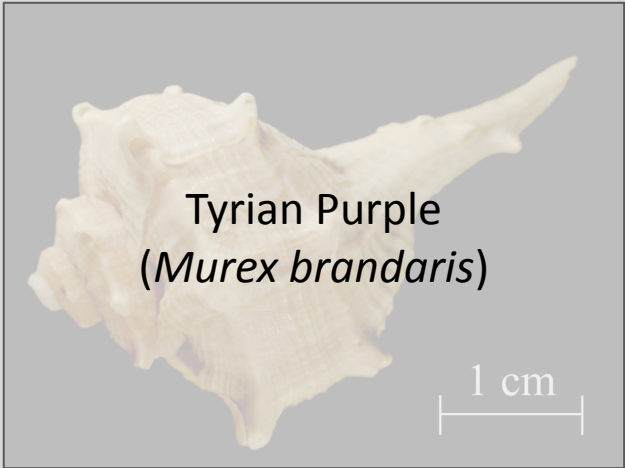
Turmeric
(*Curcuma domestica*)



Saffron
(*Crocus sativus*)

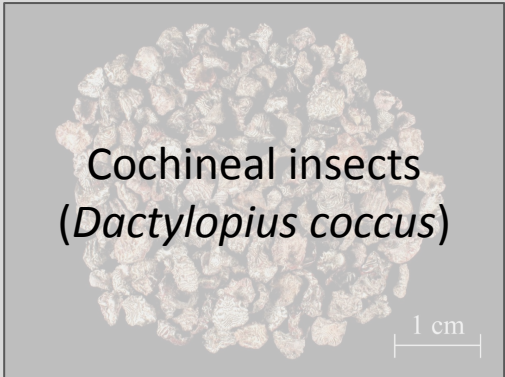


Woad
(*Isatis tinctoria*)



Tyrian Purple
(*Murex brandaris*)

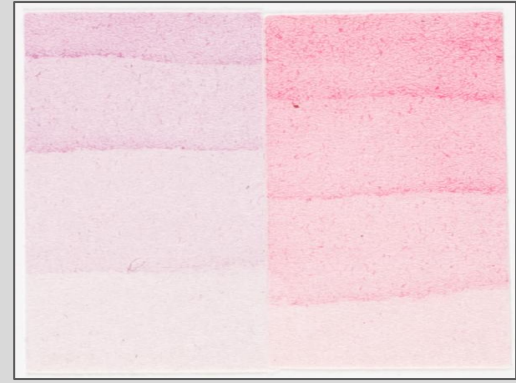
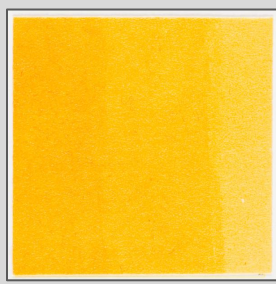
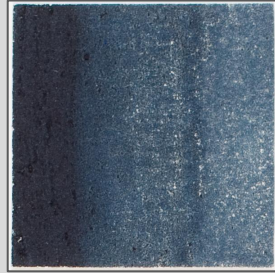
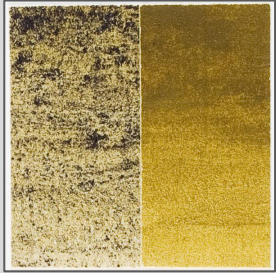
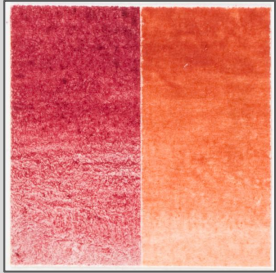
1 cm



Cochineal insects
(*Dactylopius coccus*)

1 cm

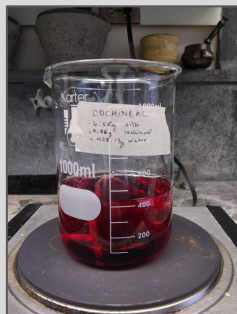
Organic: Plant or Animal Pigments



Preparing and Using Organic Pigments



Crush dried cochineal



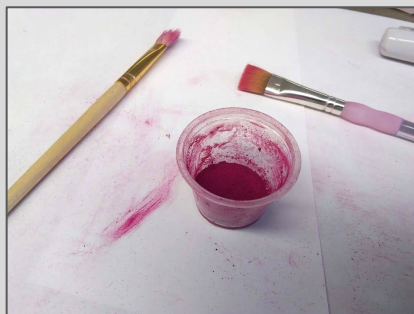
Extract



Precipitate



Filter and wash



Pigment



Paint

Recipe Example: Making Pigment from Cochineal

Another sort of fine lake. Take 12 grains of powdered cochineal or fine grana, add to it 2oz of ley; leave the infusion for about 2 hours; strain it through a linen cloth and put it over hot cinders; When it boils add to it pulverized roche alum of the size of 2 peas then the ley will make a thick red scum; as soon as this happens throw it all onto a stretched linen cloth, when the clear ley will pass through leaving the coagulum on the cloth, which coagulum must afterwards be dried and made into tablets.

“Paduan Manuscript,” (anonymous, Venice, late 16th-17th century)

Mary P. Merrifield, *Medieval and Renaissance Treatises on the Arts of Painting: Original Texts with English Translations* (1849, Dover Publications, 1969), p. 702.

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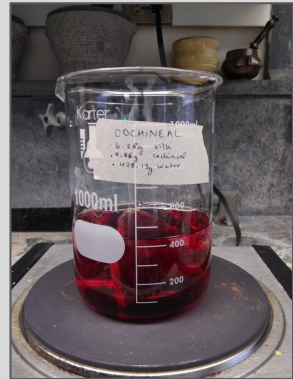
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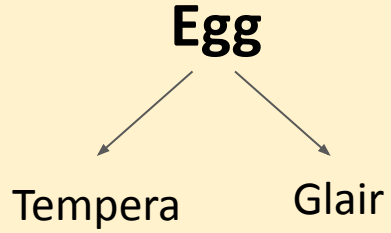
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Binding Media

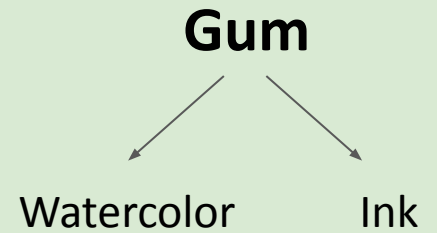
Binding media



Glue



Oil



Binding media



Egg

Tempera

Glair



Glue



Oil



Gum

Watercolor

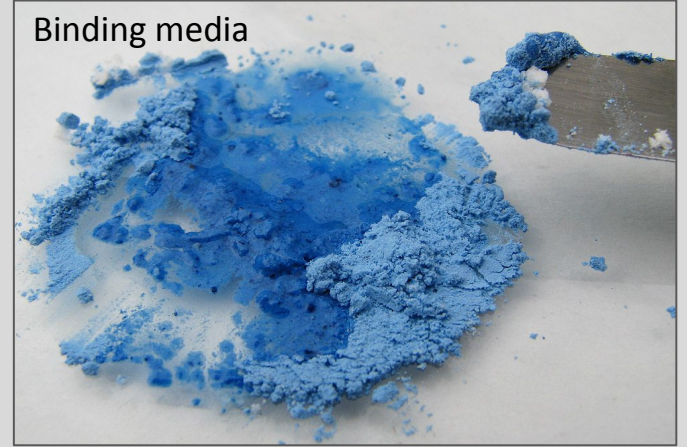
Ink

How the binding medium and pigment are combined

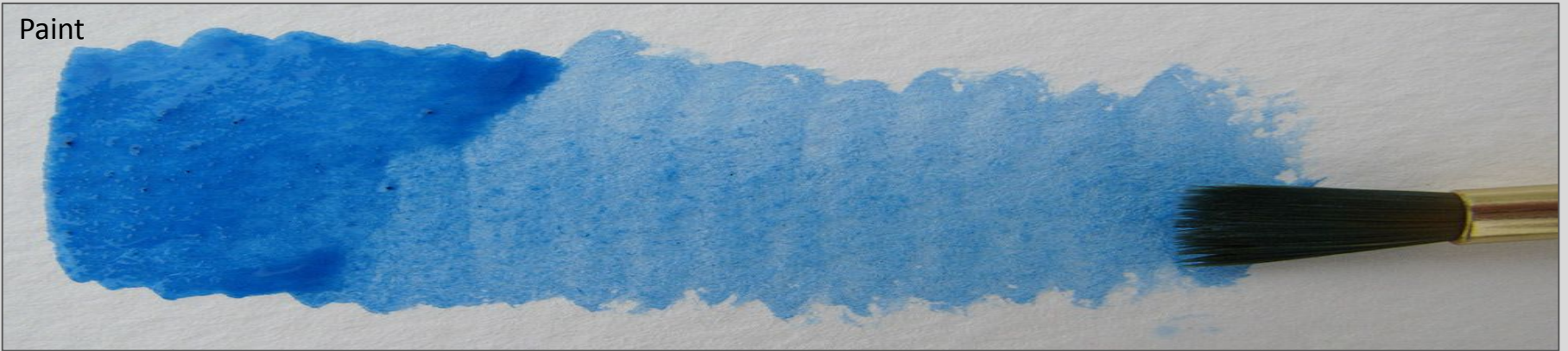
Pigment



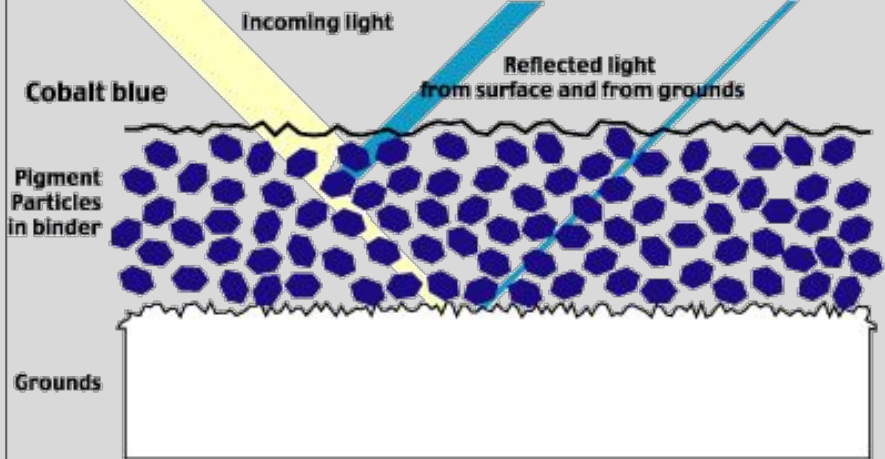
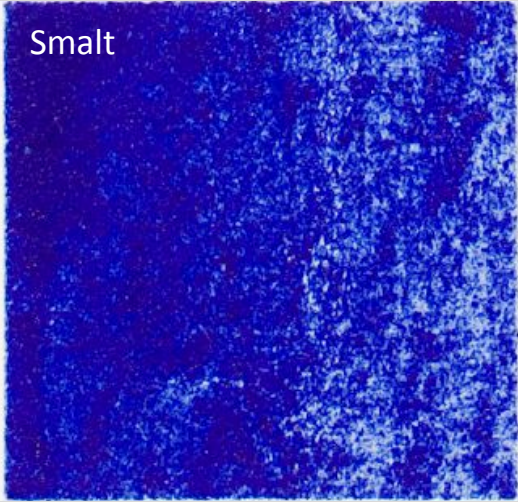
Binding media



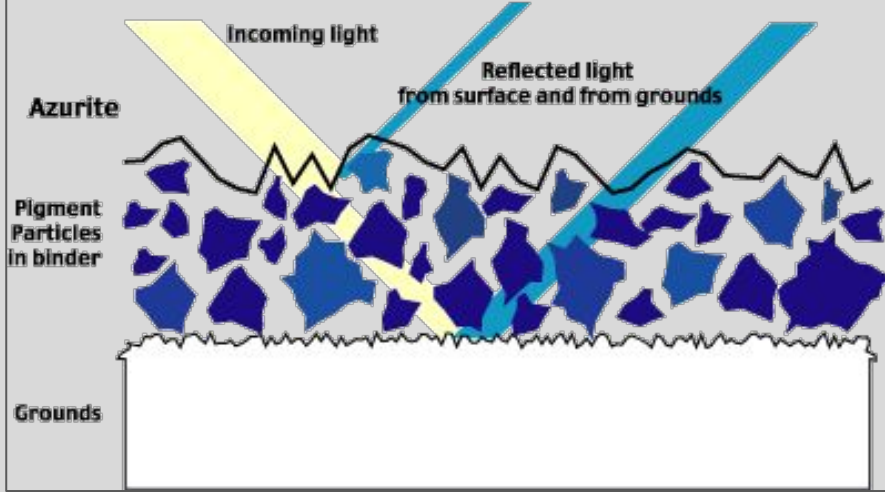
Paint



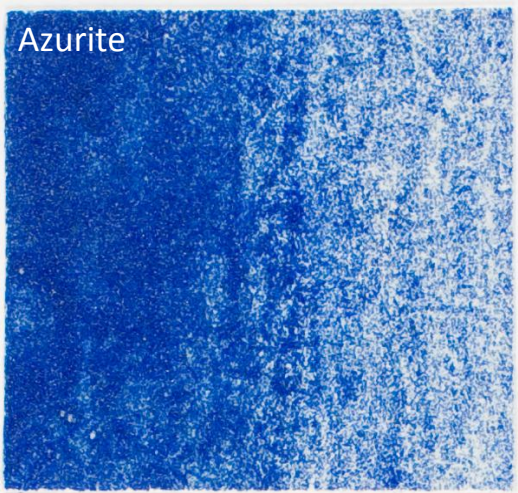
Smalt



Tinting strength
 Covering power
 Opacity
 Translucency



Azurite





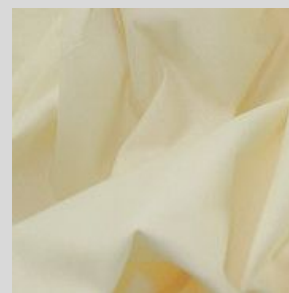
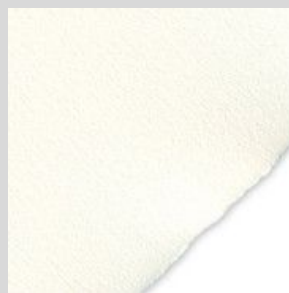
BnF Ms Fr 640, [Folio 32r](#): *“The one who knows to work well in distemper will work well in oil. But, on the contrary, the one who knows how to work well in oil will not work in distemper.”*



Substrate

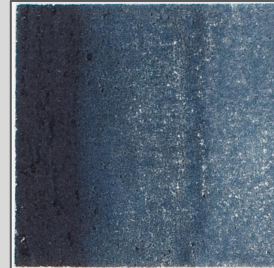
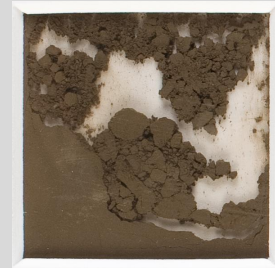
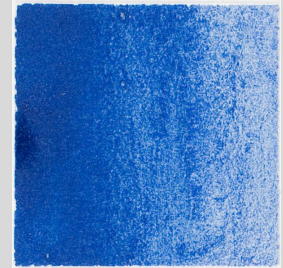
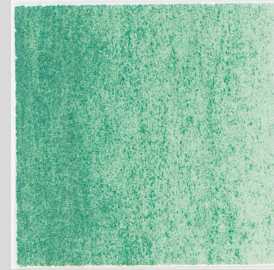
Substrates or Surfaces

- The surface upon which paint is applied is often referred to as the substrate
- Common examples include:
 - Paper
 - Usually “sized” with gelatin or gum to help paint adhere and to make the paper more hydrophobic—preventing it from tearing or bleeding if it absorbs too much water
 - Parchment
 - Canvas
 - Woven linen cloth stretched to create a taut surface, sometimes also aided by a layer of animal glue size. Ground layers consisting of opaque paints such as lead white are also often applied below the painting
 - Wood panel and board
 - Typically prepared as a painting surface by applying layers of gesso (animal glue mixed with very fine chalk) to create a very smooth surface
 - Plaster or chalk (fresco or mural paintings)
 - Metal
 - Glass



Summary

- Different categories of pigments reflect their different sources
- These categories often require different methods of preparation (and, as we will see, application)
- Different binding media also have their own particular characteristics
- The substrate the paint is applied upon interacts with the binding media and the paint, sometimes requiring special preparation
- The way paintings look depend on the various properties of the pigments, the binding media, and their combination as a paint
- To understand paintings, we need to know about
 - The materials themselves
 - Their preparation
 - Their application
 - Their optical properties



Questions for consideration

- **Embodied experience:**
 - How does it feel to grind pigment into the linseed oil using the muller?
 - How does this compare to the mixing required for the glue?
 - How does it feel to apply a glue-based paint vs. an oil paint?
 - Is there a difference in the way each paint wants to be handled or flows off the brush?
 - What kind of movements help you apply an even layer?
- **Artisanal knowledge:**
 - What kind of knowledge would you need in order to prepare, apply, handle, appreciate these materials?
 - How might you acquire that knowledge today and historically?
- **Asking new questions:**
 - What new questions does this experience cause you to ask about paintings or other works of art in general?



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