

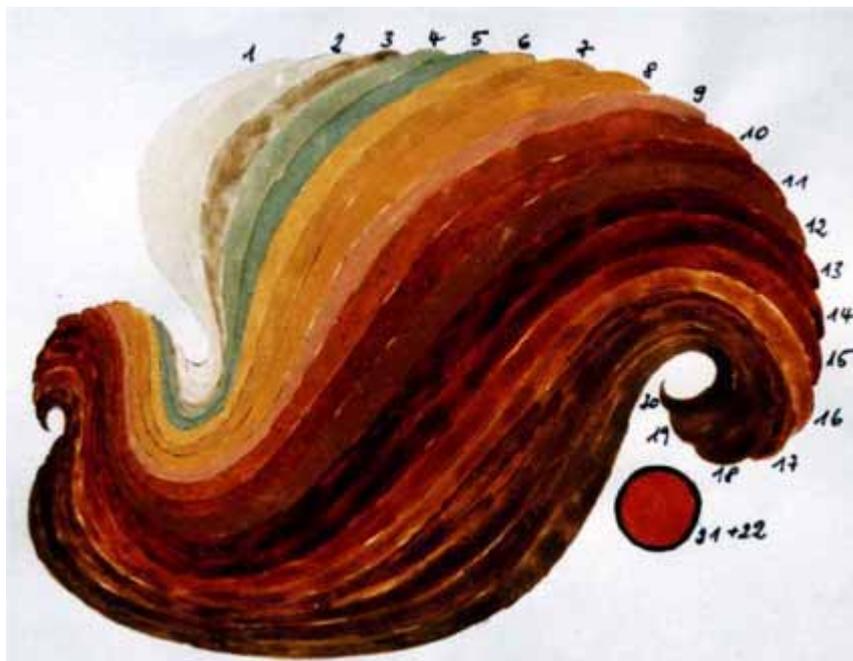
Workshop

in Addis Ababa, Ethiopia
December 7 – 12, 2003

The Source of Colours
Production Methods of Natural Colours
in Ethiopian Traditional Art

by

Annegret Marx



Basics on craftsmanship in painting
Preparation of colours of natural materials
Referring and revival of the old techniques
Better understanding of the work of the old Ethiopian painters
Using Ethiopian sources for painting

For (traditional) painters, teachers, art-students and conservators

The German icon painter Annegret Marx introduces in this workshop into the traditional practices of natural colour production, which has not been completely lost in Ethiopia. Mrs. Marx presents arguments for preserving and revitalising this old knowledge, since it is at risk falling into oblivion due to the availability of imported industrial fabricated pigments in our modern age. The workshop will mainly focus on the creative use of Ethiopian resources in painting referring to the tradition.

Organization of the workshop

Workshop	Four days practical workshop in the German Cultural Institute in Addis Abeba Morning 9-14.30 h, closing with having lunch together
Excursions	Two excursions by car to the surroundings of Addis Ababa for collecting materials
Exhibition	Preparation of a small exhibition with the painting material in the library of GCI, which was open to public people from Thursday evening to Wednesday noon (Dec. 11-17)
Lecture	Thursday, 11, 18.00 h, Public lecture: "Tradition as Resource: Traditional Paints and Ethiopian Church Art"
Visit at museums	Visit of the Museums of Institute of Ethiopian Studies, in particular the departments of icons and manuscripts Visit of the National museum, in particular presenting of the huge wall painting of the Mercureos-church in Lalibela, which was restored in Stuttgart in 1957.



Two nuns from Sebeta and one traditional female painter

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Program

Sunday, December 7 th , 03	Excursion with the GCI-Bus to Entoto, Maryam church, the road down to Shirro meda; further to Entoto, Gojjam road	Collecting of earth material
Monday, December 8 th , 03	GCI	Working with the collected earth material and egg tempera
Tuesday, December 9 th , 03	GCI	Working with the collected earth material and different binding agents
- afternoon	Excursion with the GCI-Bus to Entoto, some km behind the AA boundary; collecting plant material under the guidance of Henok Melkamzer	Collecting of plant material
Wednesday, December 10 th , 03	GCI	Working with the collected plant material, preparing extracts and colours
Thursday, December 11 th , 03	GCI	Working with the collected plant material, preparing extracts and colours; painting of samples on a parchment hide
- afternoon	GCI-library	Preparation of a small exhibition of the used materials
- evening	GCI-library	Lecture: "Tradition as Resource: Traditional Paints and Ethiopian Church Art" (Text attached)
Friday, December 12 th , 03	Visit of the IES Museum, especially the Departments of Icons and Manuscripts	Use of the gained experiences of the course for understanding the work of the old painters
	Visit of the National Museum, especially the big wall painting of Lalibela, which was restored at Stuttgart in 1957	
	Last meeting after lunch in the "pharmacy"	
	Reflection and brainstorming	Closing session: "What we have learned" "What we can do"

Report

Sunday, December 7th, 2003
Excursion for finding earth material



We went by GCI-bus and one private car to the parking lot at Entoto-Maryam-Church and walked down the road to *shirro meda* (the name *shirro* = yellow, gives a hint to the colour of the place); we found several different coloured earths along the road. The night before heavy rains had soaked the ground and the material was soft and could easily be collected and put into plastic bags. Henok Melkamzer suggested another place at the Gojjam Road for collecting plants, but instead of plants we found wonderful coloured earths: Lorries had deposited soil material for road construction beside the road and there we found big pieces of material in rose, red, brown, yellow, orange, grey, white, light green, dark green. Each of us was fascinated and we delayed the collection of plants. We finished the excursion with lunch at Veronika-restaurant.

Helen and Berhanu

Monday, December 8th, 2003 and Tuesday, December 9th, 2003, morning

The workshop

Introduction

Ethiopian culture has a long tradition in book writing and painting. Christians as well as Muslims belong to a culture of writing books and used many different techniques of preparing inks and colours since ancient times. Until today parchment is still prepared, books are still written by hand with self-prepared inks in the country, and *dabtaras* (lay church scholars) prepare scrolls with natural colours from plants. But during the last fifty years more and more ready-made oil

colours came from abroad and were used for the most paintings. The technology to work with the material from the nature – from abroad or from Ethiopia – is going to be lost as it has already vanished in Europe where the craftsmanship and knowledge of this technique was lost at last with the introduction of chemical colours during the 19th and 20th century. In the second half of the 20th century Art historians, chemists and physicists working to conserve and restore objects of art discovered that knowledge again.

Since 1987 I am working on Ethiopian icon painting. I copied icons by using the classical egg tempera technique and prepared colours of pigments by myself. Hereby I was advised by the restorer Fritz Weihs who has investigated the painting material of old Ethiopian icons and published the analyses in the catalogue of the big Exhibition "Religiöse Kunst Äthiopiens" in 1973.

Which Pigments did the Ethiopian masters use?

Object	Pigment		Analysis published in:
Icon IESMus 4187 Choj.Nr. 147, S. 170	Yellow: Red: Red: Blue:	Orpiment Cinnabar Red lacquer (presumably madder) Indigo	Religiöse Kunst Äthiopiens 1973, p. 306f
Icon IESMus 4126 Choj.Nr. 1, S. 1	Yellow: Red: Blue: Green: Black:	Orpiment not analyzed, presumably cinnabar Indigo Green earth Plant black, cinnabar	Religiöse Kunst Äthiopiens 1973, p. 306f
Wallpainting Mercoreos-Church Lalibela (today in National Museum AA)	Yellow: Red: Blue: Green: Other pigments:	Finest crystals Orpiment Finest natural Cinnabar Finest grounded natural Lapis Lazuli Malachite Ochres, burnt ochres, chalk	Maltechnik-Restauro, No. 1, 1959, p. 1-19

These paintings were predominately executed for the Royal Court or for important Churches, so it is not surprising that very precious material was used in the scriptoria or workshops of the monasteries. A lot of the precious material came from abroad, the Lapis Lazuli, the Indigo and the Orpiment presumably, Cinnabar was found in the country, green earth and other earth colours were used as well at icons, book illuminations and church walls. But it is well recorded, that the Ethiopian painters used to prepare their own colours, keeping the recipes secret as the painters in Europe did.

Today most paintings in Ethiopia are prepared with oil colours, readymade modern tube paints. In most cases I found the craftsmanship of these paintings to be very poor, probably because the painters lack the knowledge of how to prepare and how to use the material. Moreover, the ignorance of some of the painters destroys

old paintings, as it can be observed in many manuscripts embellished with oil paintings to achieve a better selling price, but on the price of destroying the parchment by the oil painting. Numerous examples of such destructions of paintings can be found in collections of aethiopica.

During several visits in Ethiopia I collected earth material of the country and started to prepare colours with it. In 1993 I worked with three groups in Addis Abeba painting icons, in 2000 I visited twice the Nunnery in Sebeta and worked with a small group of nuns painting cards with self prepared colours.

The life conditions in the seventeenth century were not better than today: It should not be attempted to work with the famous cinnabar, orpiment and lapis lazuli, but besides that precious paints the Ethiopians have used (and some of them still use today) the other material of the nature for painting. I am very confident that it should be possible, to work with the material, earths and plants, you can collect in your immediate environment and use it for painting.

Preconditions of the participants

At the beginning of the workshop nobody of the group except the conservator and the *dabtara* had any knowledge on painting material. The participants had used to paint only with ready-made tube colours except the *dabtara*. So we started with the basic facts "What is a paint". For two reasons we concentrated in this course on tempera painting:

It was the most often used technique of the Ethiopian masters
Binding agents for tempera painting are cheap and easily available.



Melake and Tadesse

Preparation of the collected material

In order to obtain a pigment from the earths collected at the Entoto we had, in the first step, to grind the material. Because of the heavy rainfall during Saturday night the collected earths were wet and soft, so that we were lucky and could continue satisfactorily even without better tools. I had asked for stone mills in advance, but unfortunately we could not obtain even one. But I informed the



Helen grinding earth with a tile and a runner.

participants that tools like a raw glass plate and a runner or a mortar and a pestle are necessary tools. During this workshop we could only use some normal plates, a tile and some knives.

The painting technique of tempera – use of different binding agents

For preparing colours, the group had to learn the technique of *Tempera* and one of the most common binding agent the *egg*.

The Egg

The Egg is a natural emulsion of top quality and was the most used binding medium in painting since Antiquity.

Egg yolk was used especially in icon painting in Russia and Greece, while yolk and white (full egg) was used for panel painting and wall paintings in Western Europe

Egg white was the classical binding agent for book painting, and some of the

yolk was added, if the parchment was not of finest quality.

When we exchanged the recipes for the preparation of the emulsion of white egg, that of the Ethiopian dabtara Henok Melkamzer was exactly the same as that used by Cennini (he reported the recipes of ancient and medieval times)!

The gum

The Gum is the binding agent of watercolours also of crayons. It is soluble in water, and the colours are not water-resistant.

Gum was an important binding agent in Ethiopian book painting. It was the gum from different *Acacia*-trees, known to the Ethiopians as *grar-mucha*; it is also used like chewing gum and can be collected from the trees. In the nunnery of Sebeta we could collect it from a tree in the schoolyard, but in Addis Ababa the *Acacia* is also growing. Due to limited time in the workshop we bought the gum.

Hide glue

Hide glue was used extensively in book illuminations. Cooking the soaked small remains of cutting parchments for manuscripts with water, the bookmakers receive hide glue. With the same procedure using hides of small land animals (lapins, goats) it can be produced easily.

Another glue can be bought at the slaughterhouse in Addis Ababa, it is known as "pearl glue", but it is made of bones and not so useful as a binding agent.

Casein

Casein has been used as binding agent since the earliest beginning of art. Casein is the strongest glue, used for centuries by joiners and cabinet-makers, who require a glue that will stand up out of doors. In Ethiopia it was used for wall paintings.



Berhanu, Henok and Shibeshi

Plant colours

Tuesday, December 9th, 2003, afternoon

Excursion

On Tuesday afternoon we made a second excursion to the surroundings of Addis Abeba. Some kilometres behind the Boundary of the City the member of our group Henok Melkamzer, an experienced *dabtara* and artist guided us to a small stony hill beside the Gojjam Road. There we collected the plants, which are listed in the following table, for the preparation of colours.

Collected Colour Plants				
	Däbtära's name	Botanical name	Used part of the plant	Colour
1	Yenewan haräg (Ye'ayt haräg)	<i>Ipomea tenuirostris</i>	a) the upper part of the plant, leaves b) the bottom, leaves c) the trunk (branches)	violet light green dark green
2	Etse birgrig	Not yet cleared	a) leaf b) branch	blue light blue
3	Etse Roman	<i>Aloe berhana</i>	a) flower b) branch	yellow light yellow
4	Etse Mebrahi	Not yet cleared	a) root b) leaf	red light red
5	Etse Woin Alem	<i>Bothriocline schimperi</i>	flower	violet
6	Etse Hamelmal	Not yet cleared	a) leaf b) branch	light grey grey
7	Etse Mushra	<i>Rumex nervosus</i>	flower	orange
8	Buna	<i>Coffea arabica</i>	leaves	brown
9	Damàkesi	<i>Plectranthus lanunginosus</i>	leaves	brown
		<i>Sap used against headache</i>		
10	Zeytun	<i>Psidium guajava</i>	leaves	green

Wednesday, December 10th, 2003 – Thursday, December 11th, 2003

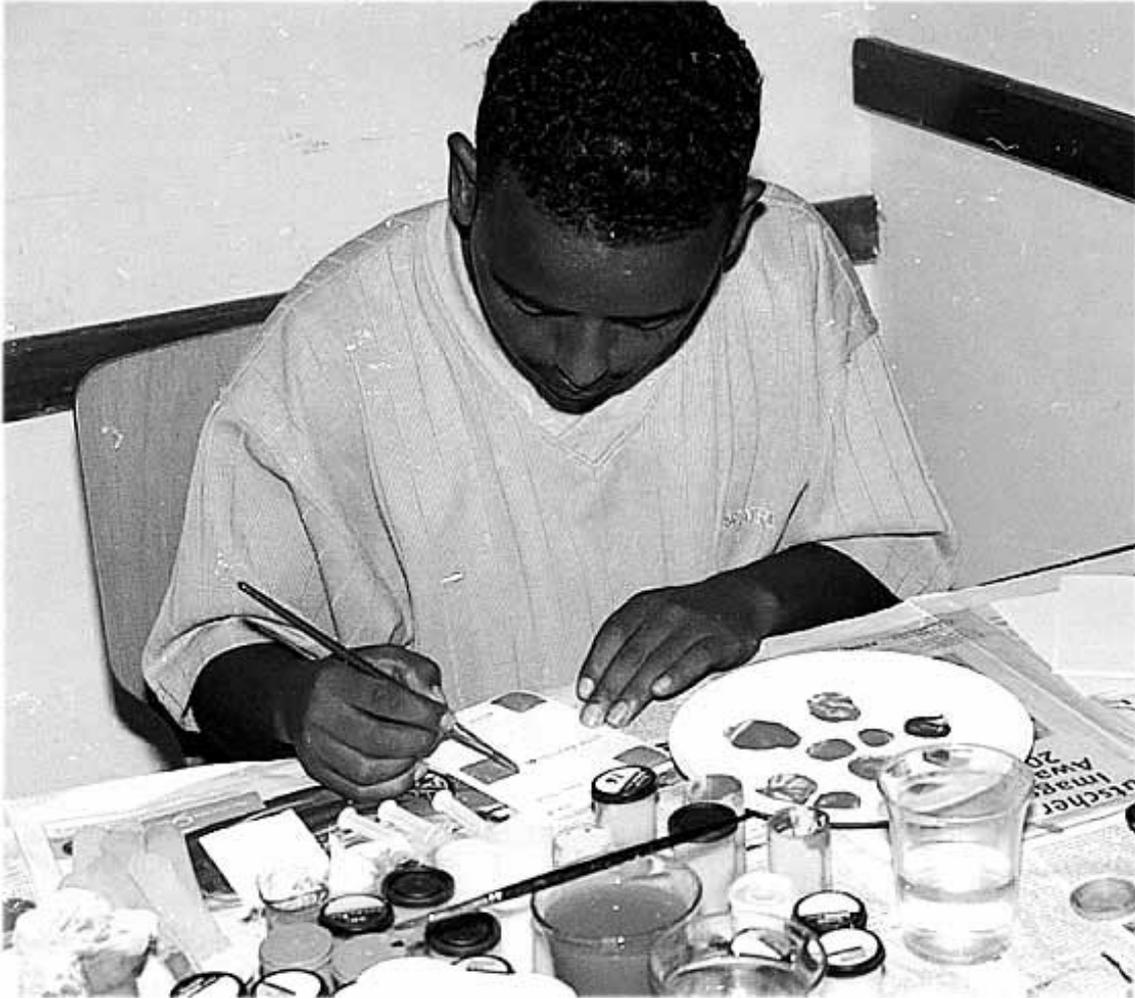
The preparation of colours of the plants

The preparation of colours was the identical for all plants: We put the part of the plant in a mincing machine, squeezed out the mashed plants through a piece of gaze (*shash* or *voile*), so we got a plant extract.

The binding agent for plant colours

We used linseed slime with name *talwa*, which we had gotten by soaking linseed overnight in water, as the binding agent of all the plant colours.

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Alemayehu worked very carefully and concentrated

We prepared colour by mixing both plant extract and linseed slime and received by this process a very fluid substance. Drying can reduce it. Henok Melkamzer told us, that the most of the plant colours should be exposed to the sun to become deeper.

I think it should be possible at the same time, to use the other mentioned binding agents like gum arabicum, egg, hide glue and casein, instead of linseed slime.



Tehwbo and Henok

Work for investigations

We prepared samples from all used materials, and applied especially the plant colours on parchment and on acid-free paper. These samples will be used for further investigation in the University of applied Sciences in Cologne. For the same purpose we also put samples of the colours in small proof glasses.

The practical workshop ends – Painting on a parchment hide

We prepared a sample of all colours, which we had collected and produced in the workshop:

On a complete parchment skin we painted a large circle, which was divided into twelve sections, one for each participant. In the centre we put the colours of the traditional Ethiopian painting since they are the precious ones:

1) Cinnabar	→	Red
2) Orpiment	→	Yellow
3) Indigo	→	Blue
4) Mixture of 2) + 3)	→	Green

Outside the center we placed the earth colours and in the fields of the last circle outside we painted the plant colours (see Fig. 6).

Friday, December 12th, 2003

Visit of the IES Museum and the National museum

Ato Ahmed Zakaria (head of the museum) has prepared our visit. At the beginning we saw the ethnological department and concentrated later on the department of icons. In the department of manuscripts we had the chance to see beside a famous Gunda-Gunde-manuscript many other old precious manuscripts. After having attended the workshop all participants could observe and understand the paintings in a different and comprehensive way. Most of them hadn't seen the paintings before.

In the National museum we focussed our interest only on one painting: The big wall painting from the Mercureos-church in Lalibela. This huge painting (3.00m x 6,80m) was discovered in a very bad condition by the German Irmgard Bidder and brought by her to Stuttgart in 1957. On the order of the former Emperor Haile Selassie it was restored there and brought back to Addis Abeba. Here it remained in the National museum. For this enormous and difficult restoring work the first analyses of Ethiopian painting material were made and published.* Today the wall painting has a dominant place in the museum standing free in the hall upstairs, but the conservator, one of our participants, told us, that the museum curators consider to put it in a glass case for keeping out the dust.

* Wehlte, Kurt. Die Restaurierung einer äthiopischen Wandmalerei und Denninger, Edgar. Untersuchungen an einer äthiopischen Wandmalerei, Restauro 1, München 1959

Closing Session

After a good traditional meal in the "pharmacy" we finished the workshop with a closing session for collecting questions, suggestions, criticism and further plans as there were:

Which varnish could be suited best for paintings with natural pigments?

How to prepare an icon?

Recipes for preparing oil colours

Workshop at the Art school

Small course "How to find and identify colour plants" at the National Herbarium

Foundation of a small society of painters who work partly with natural colours
Exhibition of these paintings in the German Cultural Institute

The participants were very satisfied on the workshop. Especially the art students told me that they have learned more than they ever expected, they never had heard about the technology of traditional painting (unlikely the traditional painters who partly had worked with some plant colours); but none of them had any basic knowledge of the preparation of earth colours. All participants were extremely surprised by the experience to take some material from the ground in their neighbourhood and prepare a wonderful colour with it, opening a door to future possibilities.

I promised to prepare a documentation of the workshop where all recipes are given. It will be send to each participant.

Resonance

Guests

Due to the good relationship of the GCI to the Institute of Ethiopian Studies (Ahmed Zakaria), the National Herbarium, Science and the Art school, we had very often visitors.

Because a lack of time I couldn't follow the invitation to give a lecture at the art school.

A very fruitful meeting I had with the Art teacher of the German Embassy school, Mrs. Jutta de Muynckh.

A future production of colour?

On December 17th, I packed the material of the small exhibition in my suitcase. Just when I started with the earths, a young Ethiopian came and asked me very surprised: "From where did you got this material?" I answered: "From Entoto, GojjamRoad!" He was shocked: "And I buy it spending a lot of money in Germany!"

Mr. Tassew Negash made his master in chemical engineering in Krefeld and runs a small company of Supplying & Formulation of Chemical in Addis Ababa.

At the same afternoon he started testing the earth material and when he spent my lecture at the meeting of the Society of Friends of Ethiopian Studies he told us, that the material will work for anti-rust-paint.

In the meantime I could made the contact the AMR of the RWTH Aachen* to give him advice in the work of preparation of the natural materials.

* Das Lehr- und Forschungsgebiet Aufbereitung mineralischer Rohstoffe (AMR) der RWTH Aachen ist die einzige Hochschuleinrichtung bundesweit, die sich ausschließlich mit der Aufbereitung von mineralischen Rohstoffen befasst. Es werden in enger Zusammenarbeit mit Anlagenbauern und Betreibern praxisnahe und anwendungsorientierte Forschungsarbeiten im ganzen Spektrum mineralischer Rohstoffe (Erze, Steine und Erden, Industriemineralien, Kohle, mineralische Reststoffe) durchgeführt.

Part of basic information and recipes

Some basics about Colours

Paint or Colour		
Is a composition of:		
Pigment	<i>and</i>	Binding agent

Tools like a raw glass plate and a runner or a mortar and a pestle are necessary tools. During this workshop we could only use some normal plates, a tile and some knives.

Colours (for Painting)

Pigments

Anorganic:	Organic:	Chemical
Yellow ochre*	Madder lake	White Lead
Brown others	Carmin (Cochenille)	Smalt
Lapis Lazuli		Cobalt blue
Red others	Indian yellow	Malachite
Vermilion	Indigo	Vermilion*
Green Earth	Plant green	Cadmium colours
Malachite	Plant Black	Artificial ultramarine
Umber	Plant yellow	Zinc white

**If burns it
 becomes red*

**Artificial
 vermilion was
 known in the
 middle ages*

Dye:

With dyes one can give colour to textile fabrics or leather. Dyestuffs can be made of plants, insects (purple snails, cochenille), also we have chemical dyes

Ink:

Fluid colour – plant extract and alum, with ink you can't paint in layers.

Lake:

Precipitation made of plant extract, alum and wood ash or another (potash, ammonia etc), the result is an organic pigment. Add a binding agent – with this colour you can paint in layers. (At icons of the early Gondar period the dark red is layer of madder pint on a light red layer of cinnabar (vermilion), the layers did not mix.

**The technique of *Tempera*
and one of the most common binding agent the *egg***

Tempera painting – temperare (lat.) = to mix
emulsion = mixture of oily and watery constituents:
water in oil - oil in water
Nature has a large number of emulsions

The Egg

The Egg is a natural emulsion of top quality and was the most used binding medium in painting since Antiquity.

Egg yolk was used especially in icon painting in Russia and Greece, while yolk and white (full egg) was used for panel painting and wall paintings in Western Europe. Egg white was the classical binding agent for book painting, and some of the yolk was added, if the parchment was not of finest quality.

Egg - the yolk	50 % water 22 % fat + oil 9 % lecithin + others <i>the adhesive substance</i>
Egg – the white	85 % water 0,5 % oil 12 % albumin <i>the adhesive substance</i>

Yolk bleaches out in a few weeks, it becomes fully transparent. It dries, forming a very elastic skin and becomes waterproof and very hard within a year. And is much more resistant than oil colour, showing typically a meagre, airy and light character.

Recipe for Meagre Egg Tempera

- 1 yolk (1 measure)
Open and share the egg, open the thin skin of the yolk with a needle and give the fluid in, a glass, add
3 measures water
and shake it very well!

Some hints

Water can be replaced by:
Dry white wine
Glue water from hide glue
Beer
Ouzo

The gum

The Gum is the binding agent of watercolours also of crayons. It is soluble in water, and the colours are not water-resistant.

Gum was an important binding agent in Ethiopian book painting. It was the gum from different *Acacia*-trees, known to the Ethiopians as *grar-mucha*; it is also used like chewing gum and can be collected from the trees. In the nunnery of Sebeta we could collect it from a tree in the schoolyard, but in Addis Ababa the *Acacia* is also growing. Due to limited time in the workshop we bought the gum.

Recipe for gum-emulsion

1 measure of gum pieces
6 measures of water

Soak and solve it overnight, sieve out the impurities and use it. You can add some honey or sugar for making it smoother, also egg or hide glue in small parts can be added.

Hide glue

Hide glue was used extensively in book illuminations. Cooking the soaked small remains of cutting parchments for manuscripts with water, the bookmakers receive hide glue. With the same procedure using hides of small land animals (lapins, goats) it can be produce easily.

Another glue can be bought at the slaughterhouse in Addis Ababa, it is known as "pearl glue", but it is made of bones and not so useful as a binding agent.

Recipe for hide glue

1 measure dried hide glue
4 measures water

Soak and solve it overnight, heat it carefully in a water bath up to 60Y and use it. You can add some egg.

Casein

Casein has been used as binding agent since the earliest beginning of art. Casein is the strongest glue, used for centuries by joiners and cabinet-makers, who require a glue that will stand up out of doors. In Ethiopia it was used for wall paintings.

Recipe for Casein-Tempera

Fresh white curd – casein of good skimmed milk – with the addition of 1/5 of its volume of certain constituents becomes liquid. (Milk from powder is not very successful, but it *can* work). Now it can be easily emulsified, and can be thinned with water.

You can prepare casein glue with:
Slaked lime (for walls etc.)
Ammonia

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Potash
Borax
Try also wood ash

Prepare it always fresh, don't use it for several days!

Ato Wolde Tadesse Aregaye reported that a friend of him in Tegre has prepared priming of milk and wood ash.

Recipe for wall paint (Casein tempera)

10 - 20 m²

1 kg curd
40 g borax or slaked lime
1 – tablespoons oil
200 ml water

Solve borax or lime in water, heat the curd (carefully only up to 40°C !) and give this fluid addition into the curd. Stir well!
Add the pigment (ca. 200 g or as much you need) for paint.

The painting ground

We used some sheets of watercolour paper to try out the colours, but the participants expressed their interest also to learn the technique of priming panels. This is an important precondition in painting and I hope that this technique can be treated in more detail in the future, because I observed that the priming in Addis Ababa is very often of bad quality.

Priming for Panel painting with Pigments ground

6 g hideglue
animals and dry it)
200 ml water

(cook slowly parchment pieces or hides of small

Soak overnight, warm it up slowly in a water bath (ideal up to 40° C); put into the

Solved glue 3- 4 tablespoons of *gesso* (mixture 1)

Cover the panel (which you have prepared with line by a scraper, that the glue will fix better on the ground) with this solution

Take a piece of *shash*, dive it into the glue and put it straight on the panel. Let it dry for 24 hours.

Put in mixture no.1 now again 8-9 tablespoons of *gesso*, do not stir, let it sink slowly to the ground, than tip it with a brush on the ground. Let it dry very well. Make 5 -7 layers, let it all dry well.

Polish the surface with fine sand paper; finish with wet palms.

Cover the finished surface with a very thin layer of thinned meagre egg tempera (egg water, use a flat, broad brush very dry and cm per cm), let it dry

Begin with the drawing of the painting and consider the special rule for the layers of tempera painting!

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Fig. 1 + 2:
 Place where we found the coloured earths just along the Gojjam road



Fig. 3: Basic material for colours prepared from the coloured earths collected along the Gojjam road



Fig. 4: Samples of earth colours on paper



Fig. 5: Exhibition - samples of plants and plant-colours



Fig. 6: Group Painting on a parchment hide