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Restoration of a Large-Size 16th Century European Map, the "Mappe Monde Nouvelle Papistique"

Part I: Notes on the Restoration of the "Mappe Monde Nouvelle Papistique"

Hua Hai-Yen

In 1925, a rare 16th century map was discovered in the basement of the Land Administration Bureau in Sondershausen, an old town in Eastern Germany. It has been since then formed part of the collection of the local Castle Museum.



The map is a large woodcut made by the Swiss artist Christoph Schwitzer in Zurich between 1564 and 1567. Using vivid lay-out, moving lines, intricate details and lucid annotation in ancient French, he ridiculed and criticized corrupt church authorities and encouraged the French Huguenots to break away from Roman-Catholic belief. This work possesses a high artistic standard and is the only existing piece in the world today. It has a great significance to historical scholarship on the European continent.

This woodcut was done on coarse handmade linen paper and decorated with manually applied color. The paper has an average thickness of 0.3 mm and measures 183 by 139 cm. The map consists of 16 small sections, each measuring about 42 by 37 cm., and which have been joined together after printing. Except for the upper side, other sides bear a strip of border consisting of 18 small pieces. After enduring the ravages of five centuries, it was in a sad state of disrepair, its surface having been covered with scratches and mildews. After restoration was completed, the paper texture still shows a high degree of durability.

Paper-making technology reached Europe in the 13th century from China through the Arabs. In the beginning, the material used largely consisted of rags made of flax, hemp and other fibers. Paper made this way soon replaced sheepskin. In China, paper-making had by this time developed from its heyday in the Tang and Sung periods to the time of conservatism in the Ming Dynasty (1368-1634)—The masterpiece by Wen Cheng-ming, "Leisure Atop A Precipice", was done on linen paper crafted in one piece measuring 148.9 by 177.9 cm.

Contemporary artists of the time, such as Chou Ch'en, Shen Shih-tien and Tung Chi-chang used various types of fine paper for painting. As early as this period, which was also the Golden Age of woodcut in China, the technique of printing exquisite color for fine arts has already been mastered. In the 15th century, Gutenberg published the Latin Bible in Germany using movable-type printing. The 16th century witnessed the peak of the Renaissance. Michelangelo died in 1564, when the map was completed. Other Renaissance painters like Raphael, da Vinci, Holbein, El Greco, Durr later became the most influential artists in Western art history. From the 14th century onwards, Europe experienced a series of great events such as the Reformation and the discovery of new maritime routes, in addition to the Renaissance Movement.



The prestige of the Holy Roman Empire suffered greatly after successive failures of the four Crusades. Power struggles led to a succession of wars and persecutions. Finally, the people of Europe revolted against the Imperial Church. This was followed by the establishment of the new religion by the middle class. The Reformers of the time, such as Martin Luther (1482-1546) and John Calvin (1509-1564), are featured on the wood block print. John Calvin was a Frenchman who left Western Church to establish the Calvinist Church in Geneva. His sect put great emphasis on education and adopted strict religious dogma. All these turned a small town with a population of only 16,000 into a rustic, virtual heavenly paradise. People of the neighbouring France also yearned to form part of the church, especially traders, skilled workers and the middle class. They were later called the Huguenotten. Followers of the new religion were persecuted and were forced to flee to adjoining countries. The Prussian King Frederick welcomed them with open arms and bestowed them land properties. The skilled workers later contributed greatly to economic and industrial progress. Descendants of the Huguenotten still live in present-day Germany.



In those times of chaos, the people of Central Europe learned how to use the compass. They looked beyond the ocean for progress. Not long after, they discovered new maritime routes and started colonizing territories, events that greatly changed the course of world history.

A review of history is necessary for art restoration, since appreciation of art from various historical periods is a thing of great interest.

This revolutionary map has a special lay-out. It features a horned devil with a gaping mouth devouring a sad world governed by the pope. It is surrounded by ravines and firm walls. In the four directions are fire-belching monsters. The map is divided into 19 provinces that represent the papal domains. Vatican City is positioned near the upper right-hand corner while the pope is depicted as reclining on his throne as he swallowed beautiful women and flowing milk. The latter depict the alleged lechery as sins of church ministers. Scenes depicting bacchanalian drinking and merriment, as well as gold hordes, the selling of indulgences, vast engineering construction, slavery, licentious treatment of women and oppression of the innocent, are included in the picture. Church ministers are depicted as beast-headed humans dragging their long tails and holding rosary beads. Some are shown holding a bishop's staff and wearing a miter. Outside the walls, the various Reformers lead their followers. Luther and Calvin are depicted as holding swords of justice and bibles as they prepare to break through the walls and save the innocent from the tiger's mouth. The picture also includes warriors from other parts of the world coming from as far as China in support.



The upper and lower parts of the map illustrate how man is cheated by the church from birth to death. With a cow head at the middle and to its left, newly born infants fall in line to receive baptism. To the right is a scene depicting a funeral with the dead depicted as donkeys. To the rear are a group of pig-headed widows with raised heads and a group of relatives with large ears and whose facial expressions show neither crying nor laughing. The scenes are repeated continuously to show the cycle of life and death. Flanking these are scenes showing confession in which a beaver-headed priest appears to be violating a kneeling woman follower.

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The whole picture is presented with great vividness and exquisiteness similar to an illustrative picture of officialdom.

When the map was discovered in 1925, it had been damaged by water and showed signs of mold and mildew. The biting marks of insects and rats were also clearly visible here and there. The museum keeper had the wooden frames removed and nailed the map on a large wooden board. The map was again framed, this time under glass, after a layer of pesticide was applied on the surface to prevent further deterioration. The map was again lapsed into oblivion until it was discovered after the German unification. The glass-framed map was yellowed with moldy growth. It was so covered with mold that the wrapping paper and cloth for shipping were stained yellow in color.

Experts were consulted on how to restore the piece. One year later, the map was sent to the studio for careful restoration which was to last for one whole year.

The first task before cleaning and determining what process of restoration to adopt was to identify the yellow moldy growth. Fortunately, a chemist working at the studio provided valuable help. Now, let us listen to this expert's narration of his experience. Each step of the restoration will be illustrated by using slides.

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Part II Yellow Coloring of the "Mappe Monde Nouvelle Papistique"

Dr. E. Stroefler



Before restoration, the MAPPE MONDE NOUVELLE PAPISTIQUE showed an intensive yellow coloring. The paper of the woodcut and the underlying linen both were penetrated by some yellow dyestuff. It was unequally distributed on the surface and

especially intensive at those parts which showed signs of biological attack. The yellow color was transferred to the skin by touching the object. The acid free paper in which the map was wrapped for shipping was colored, too.



It was the aim of the restorical treatment to remove the color from the map. In this presentation, I will show the way to reach that aim. Further, I want to lecture on yellow colors and yellow discoloration in general. Very often the restorer is confronted with the problem to make a judgment on such colors and discoloration. In case the examination results in the recommendation that the discoloration should be removed, a reliable method of removal must be worked out. Doing so, the restorer has no unlimited resources:

1. He must finish the examination and restoration within scheduled time. Quite often the restoration proceeds an exhibition whose opening date is already fixed.
2. It cannot be the purpose of a restoration to apply the latest analytical techniques. This is the objective of special scientific examinations. The restorer i.g. has to rely on shortcut methods which give him a general overview of the nature of the materials which compose the piece of art.

Table 1 gives a summary of yellow colors and discoloration. Hints are given on the treatment recommended and on the literature, At that point we want to acknowledge the special advice of Dr. Schweppe on the research of yellow dyes (1)

In the case of the MAPPE MONDE NOUVELLE PAPISTIQUE, quite simple considerations led to the determination of the color's nature:

1. It was soluble in water and
2. It showed a characteristic reversible change in color from yellow to colorless in the pH range of 3.5 to 4.0.

This last observation is of special importance. The material changed to colorless by acidification. In case the pH was raised, the yellow color showed up again. By addition of acid it disappeared and so on. It showed the typical behaviour of an indicator.

Table 2 summarizes the underlying theory. The behaviour of the indicator is determined by the pKa value of the substance and the color of the chromophor.

Table 3 summarized some pKa values of organic substances. Going through the table there is strong evidence that the yellow discoloration is due to a substance which is a phenolic derivative, a nitrophenole.

As we showed in the first table, nitrophenols were early industrial dyes. Furtheron, they were used as insectizides or fungizides.

There is strong evidence that the nitrophenols were applied in a restoration process in the thirties of this century. In 1925 the Swiss/French MAPPE MONDE NOUVELLE PAPISTIQUE was discovered in the archive of the small town of Sondershausen in Eastern Germany. It is speculated that it came to this place by French Protestants who had to leave France in the 16th century because of their non Roman-Catholic belief and who were invited by German sovereigns to settle in German provinces. After discovery, the MAPPE MONDE NOUVELLE PAPISTIQUE was framed and obviously treated because of biological attack..

Table 4 gives examples of phenols and their applications .

Under these circumstances, it is obvious that the colored substance had to be removed. The method of restoration took advantage of the behaviour of an indicator. The yellow color was removed by repeated washing with slightly alkaline water.

In the present case, we showed that obviously because of biological attack a means of protection was applied to the piece of art. The chemical compound had its effect but it had a side effect, too: the yellow color. There are other examples where protective measures result in undesired side effects, in discoloration. Antioxidants are applied to textiles to slow down degradation of fibers by the combined action of ultraviolet radiation and oxygen.

Table 5 demonstrates how these antioxidants react by themselves forming colored bodies which result in final discoloration of textiles (2). The chemicals BHT and BHA form stilbenquinons.

The restorator works with complex systems. Besides the main components like e.g. cellulose, starch, they contain additives. Protective additives and antioxidants have the aim to protect the main components against biological or oxidative attack and degradation. This presentation was about to show that those protective measures many have side effects, too.

Reference:

(1)Roth, Komann, Schweppe
Farbepflanzen - Pflanzenfarben

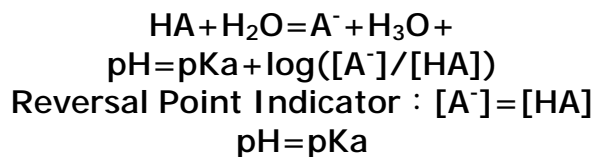
Ecomed
 (2)Schmidi
 Textilveredlung 17(1982), p.254

Stroofer-Hua/Folie 1

Table I Yellow Colors

Yellow material	Example	Judgment
Inorganic Mineral	Ochre, Auripigment Schramm, Hering: Historische Malmaterialien	Part of piece of art
Lignin Products of Degradation	Phenolic Polymer	Removal by Bleaching
Organic Aromatic Dyes	Hydroxiflavons Roth, Kormann, Schweppe: Farbepflanzen	Part of piece of art
Synthetic Acidic Dyes	Martius' Yellow Picric acid Nitrophenols	Part of piece of art or Pestizide
Synthetic Redox Compounds	Quinon	Part of piece of art or Product of Degradation

Stroofer-Hua /Folie 2

**Table II Yellow Color
pH - Indicators**

Name	pH - interval	Color acidic	alkaline
2,6 Dinitrophenol	2.4 - 4	colorless	yellow
4 Nitrophenol	5 - 7	colorless	yellow
Picric acid	0.5 - 1.5	colorless	yellow
Bromphenolblue	3 - 4.6	yellow	blue
Congored	3 - 5.2	blue	red

Stroofer-Hua /Folie 3

**Table III Yellow Colors
pKa – Value of org. Substances**

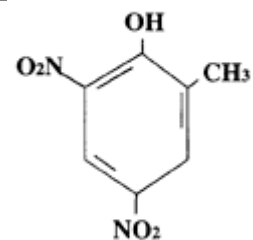
Name	Formula	pKa
Ethanol	C_2H_5OH	17
Phenol	C_6H_5OH	10
Cresol	$CH_3C_6H_4OH$	10
Chlorphenol	ClC_6H_4OH	9.1 - 9.8
Nitrophenol	$HOC_6H_4NO_2$	7.2 - 8
Aminophenol	$HOC_6H_4NO_2$	8.2 - 9.7
Hydroquinon	$C_6H_4(OH)_2$	10
Pyrogallol	$C_6H_3(OH)_3$	7
Picric acid	$HOC_6H_2(NO_2)_3$	1
Dinitrophenol	$HOC_6H_3(NO_2)_2$	4

Stroefer-Hua /Folie 4

**Table IV Yellow Color
Phenols and their Application**

Dinitro - Methyl - Phenol

Insecticide, Fungicide

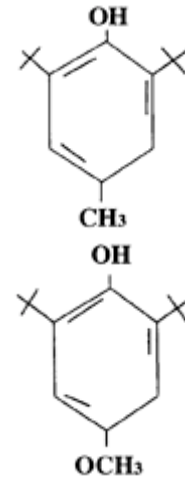


Buty1 - Hydrozi - Toluene) BHT

Antioxidans

Buty1 - Hydrozi – Anisol BHT

Antioxidans



Stroefer-Hua /Folie 5

**Table V Yellow Color
Yellow Spots on Stored White Textiles
Stibenquinone from BHT, BHA**

