

A Technical Study Of Fish Collagen-based Binder For Architectural Polychrome Painting In Jiangsu Province: History And Application

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Research Question

What was the historical application of fish collagen-based binders in architectural polychromatic painting and gilding in Jiangsu Province?

- Documentation in texts, oral histories, and craft practices
- Traditional recipes and preparation methods
- Lab-based reconstruction of fish glue binder & finishes
- Conservation potential and future testing directions

Map of China



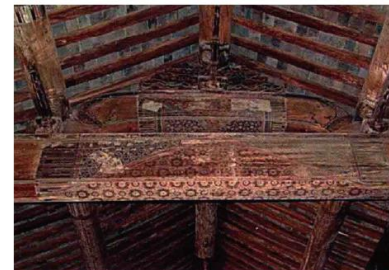
Dacheng Hall, Confucian Temple,
Jiangyin, Wuxi
无锡江阴文庙大成殿



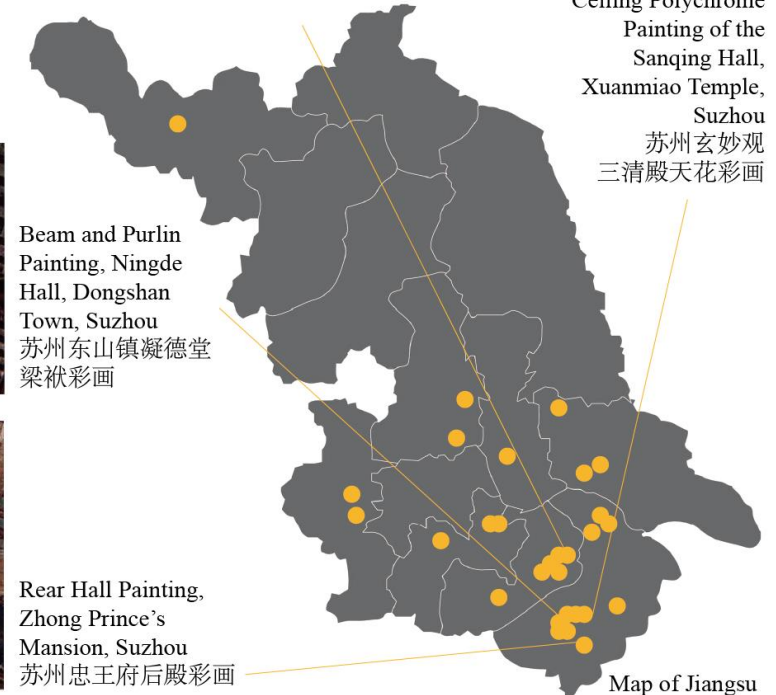
Ceiling Polychrome
Painting of the
Sanqing Hall,
Xuanmiao Temple,
Suzhou
苏州玄妙观
三清殿天花彩画



Beam and Purlin
Painting, Ningde
Hall, Dongshan
Town, Suzhou
苏州东山镇凝德堂
梁袱彩画



Rear Hall Painting,
Zhong Prince's
Mansion, Suzhou
苏州忠王府后殿彩画



Map of Jiangsu

Historic Content

宋 《营造法式》

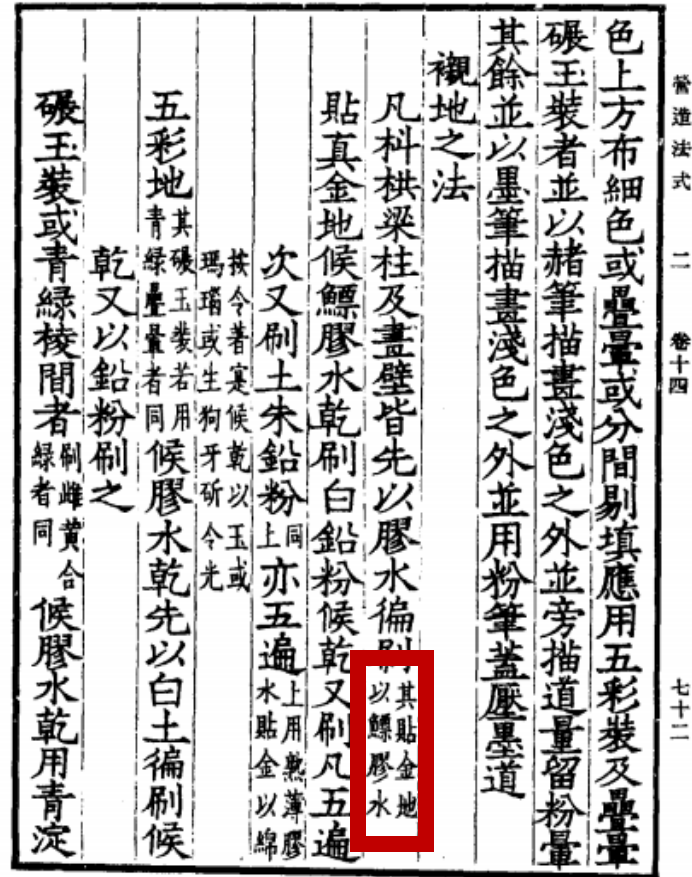
贴真金地：候鰾胶水乾，刷白铅粉。候乾又刷。凡五遍。

Song dynasty - *Yingzao Fashi*

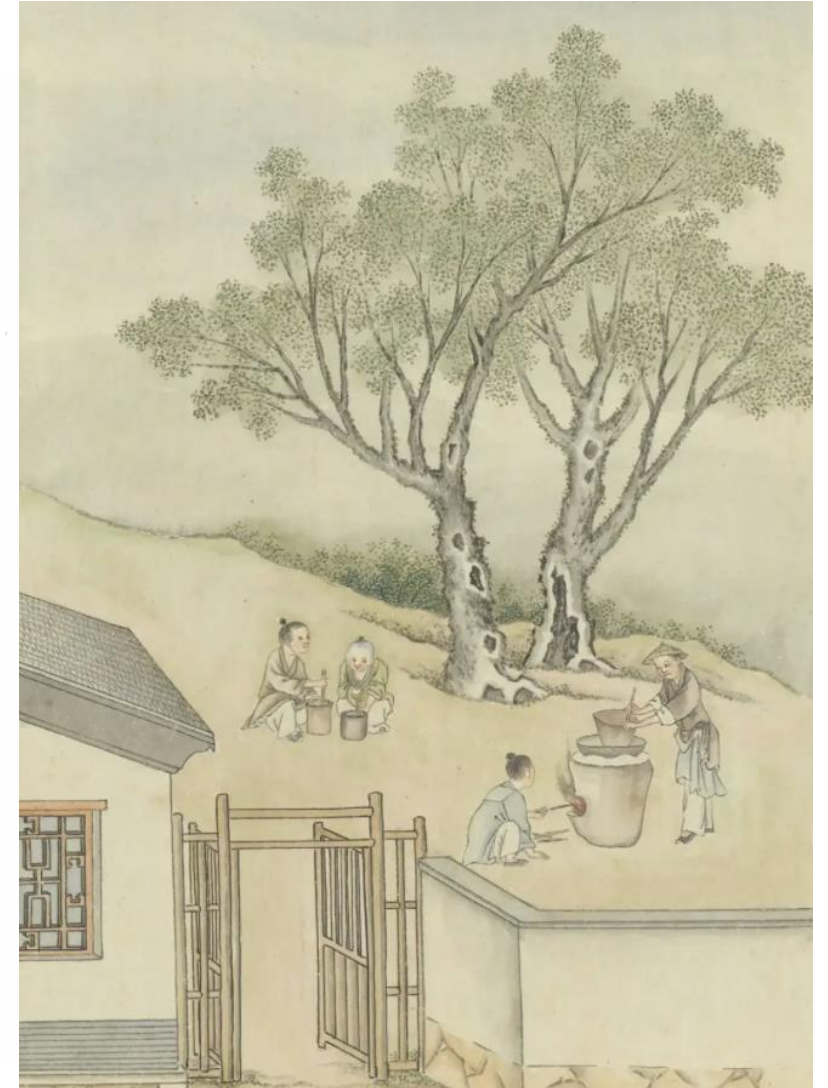
For areas intended for gilding, fish glue is applied.

Chen Wei - *Ming Dynasty Polychrome Paintings in Jiangnan region*

Fish collagen binder for sizing and grounding layers.



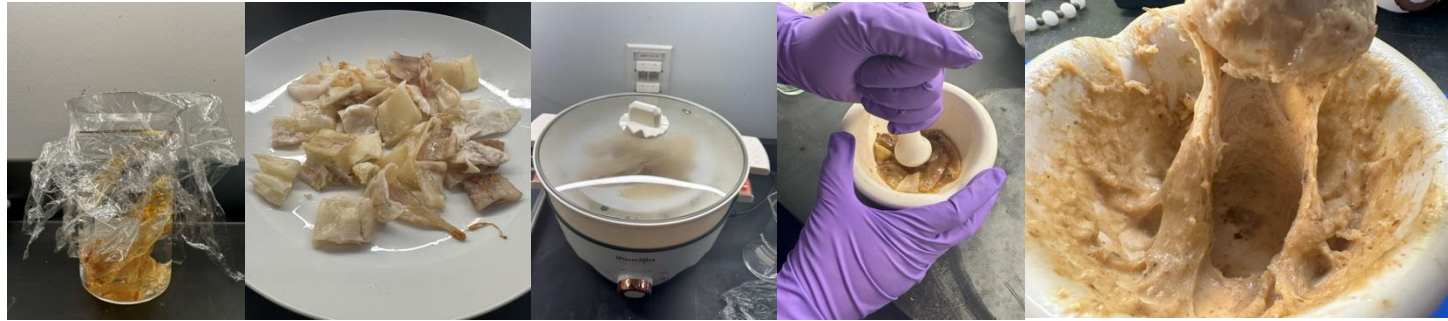
▲ Yingzao Fashi 营造法式 (Li Jie, 1091)



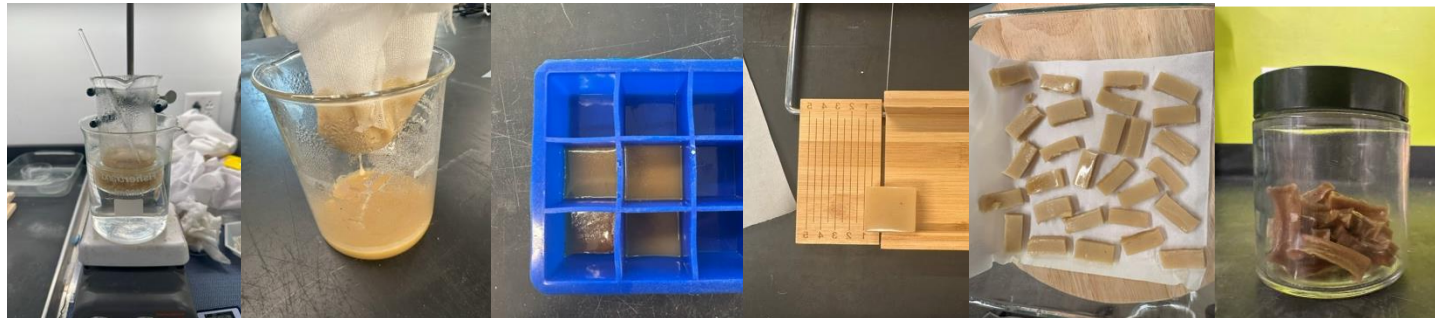
▲ “Melting Glue” Woodblock Illustration from the Mofa Jiyao 墨法集要 (Shen Jisun, 1775)

Preparation

• Traditional Method



Soak → Cut → Steam → Grinding →



→ Heat → Filter → Cool → Cut → Dry → Storage

• Modified Method



Soak → Cut → Heat →



→ Filter → Dry → Storage

Durability Testing

- Tape Test and Color Measurement



- Accelerated Weathering

72h, 12 Cycles

- 4 hours of UVB
($0.95 \text{ W/m}^2/\text{nm}$ and 55°C)
- 2 hours of condensation (50°C)

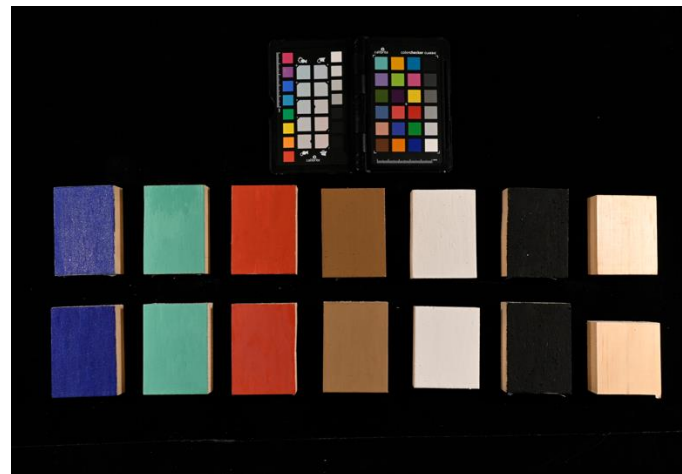
- Tape Test and Color Measurement



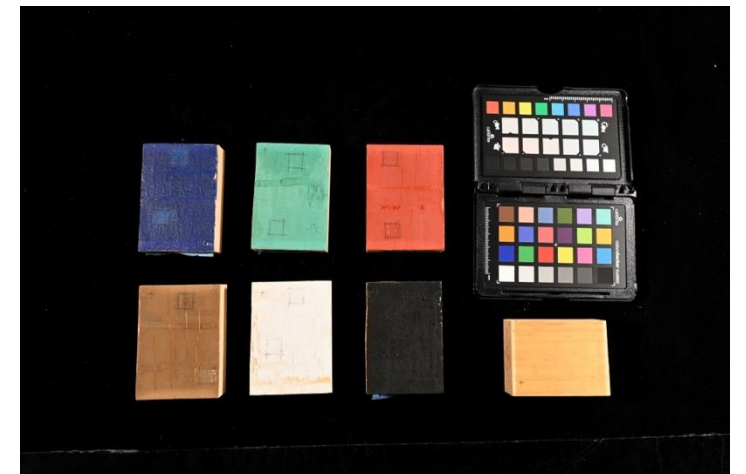
▲ Qlab QUV Accelerated Weathering Tester



▲ Modified Method Samples Before Accelerated Weathering Test



▲ Samples Before Accelerated Weathering Test

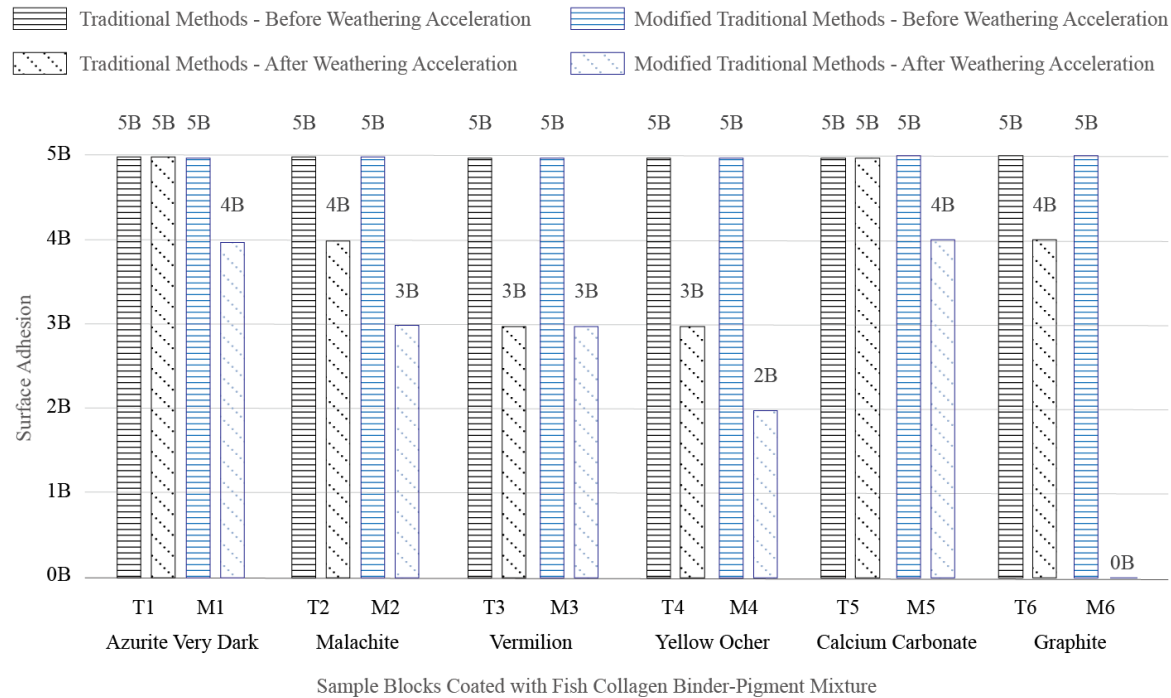


▲ Traditional Method Samples Before Accelerated Weathering Test

Durability Testing

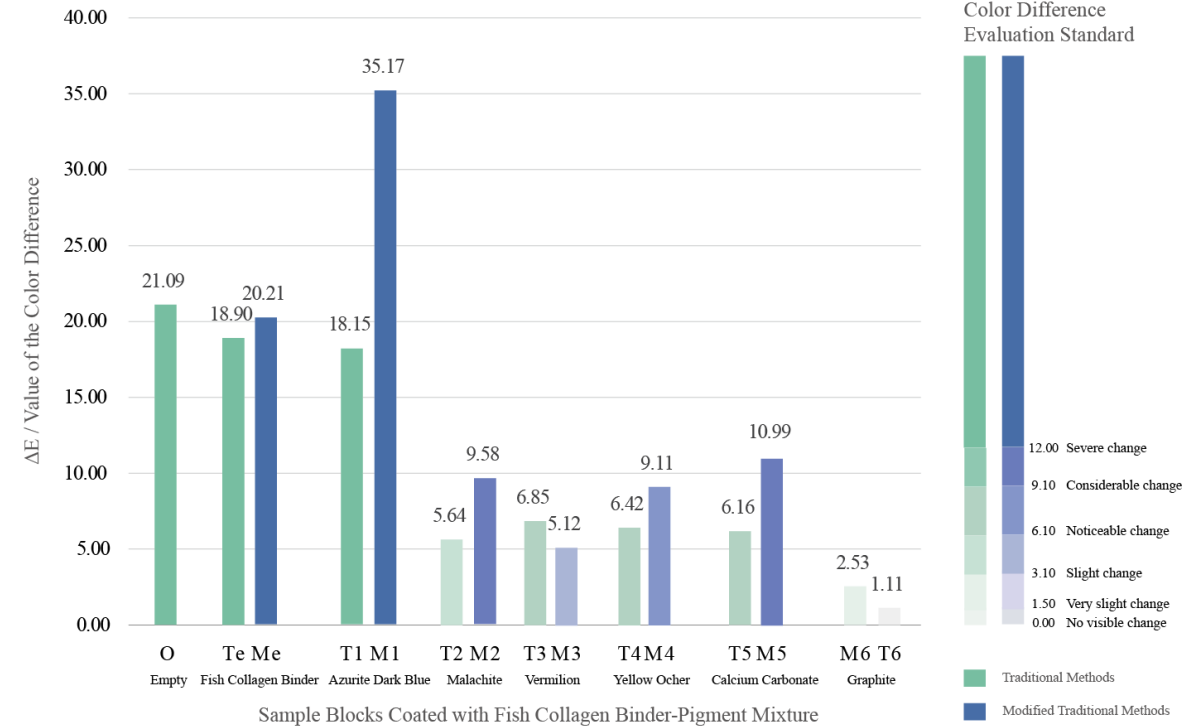
Tape Test Results

Surface Adhesion of Traditional and Modified Fish Collagen Binders Before and After Weathering



Color Measurement Results

Color Differences After Weathering: Traditional vs. Modified Fish Collagen Mixtures

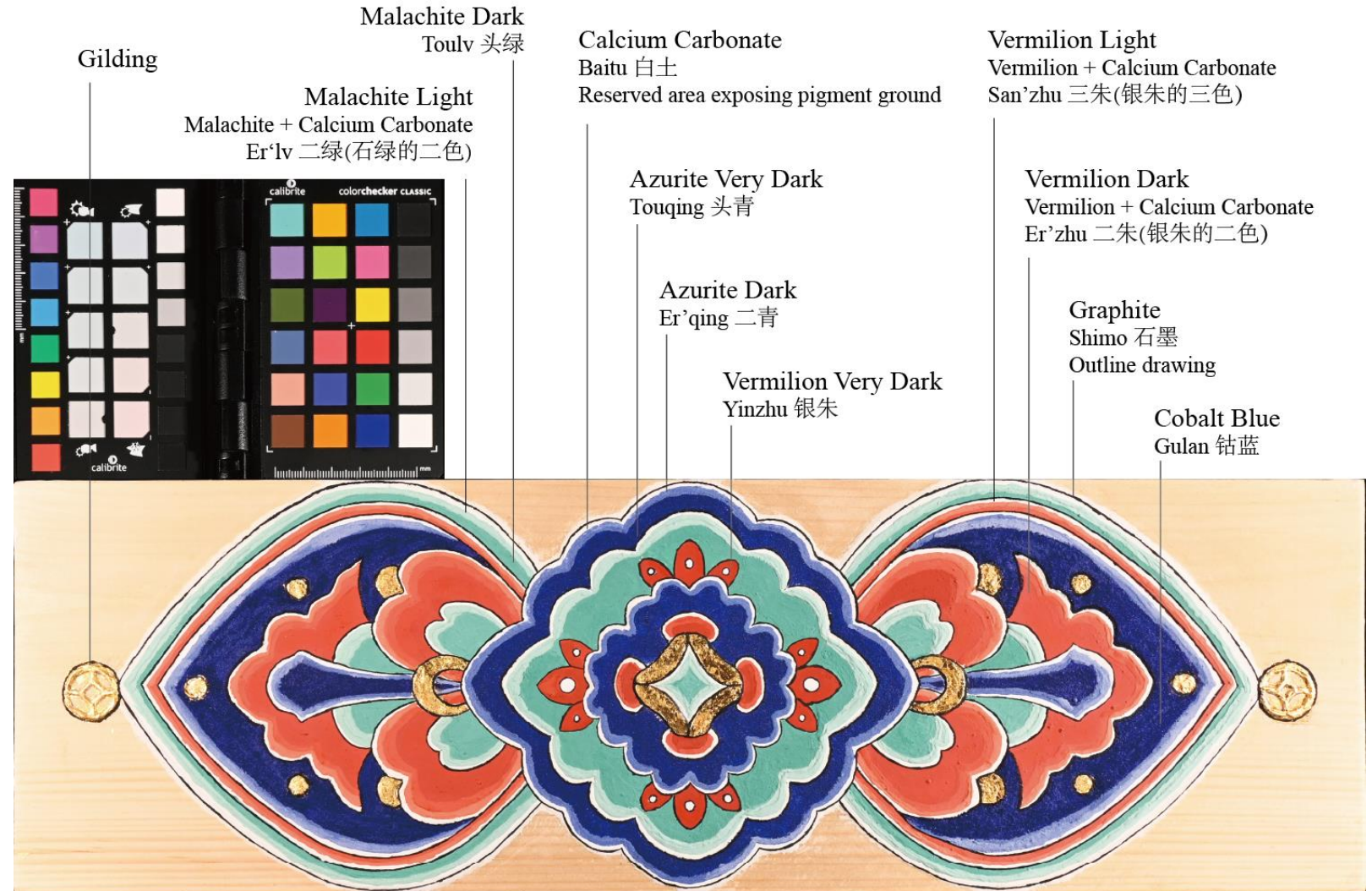


The traditional binder performed better post-aging, with relatively stronger adhesion and less color change.

Replication

- Limited workability due to high viscosity and fast drying

▼ Polychrome Painting in Caiyi Hall, Jiangsu (Author,2025).



Fish collagen binders have a well-established historical role in sizing, grounding, and gilding in Jiangsu polychrome painting. Their strong adhesion, reversibility, and moderate durability suggest potential for conservation use, pending further research.



Thank you!

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