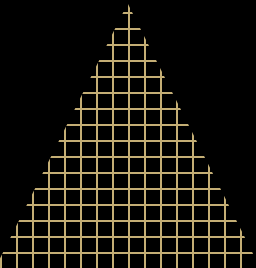




DOCUMENTATION IN
RESTORATION:
POSSIBILITIES AND
LIMITS OF
VISUAL
DOCUMENTATION FOR
MURAL PAINTINGS

JÜRGEN PURSCHE

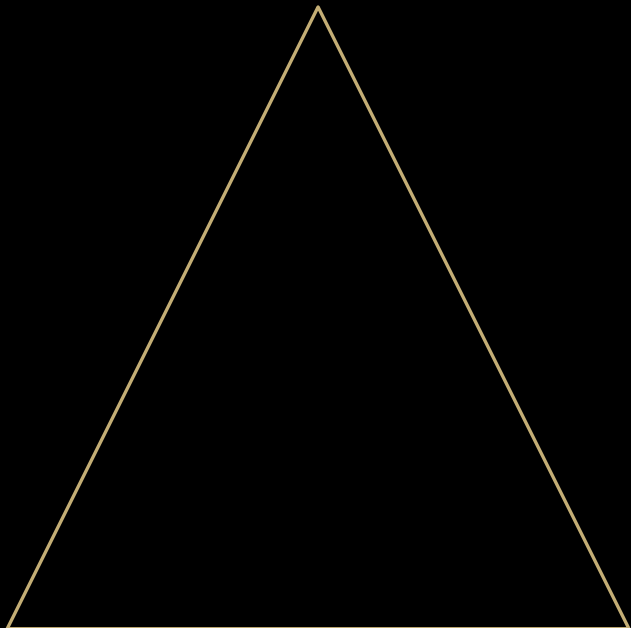
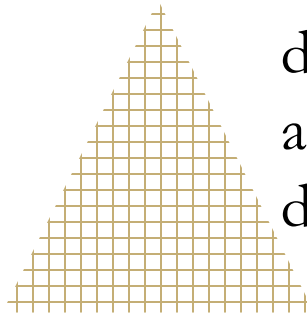




ABSTRACT :

The process of visually recording investigations and conservation efforts on wall and ceiling paintings poses challenges that extend beyond methodological and financial considerations; it is increasingly becoming a technological challenge as well. The primary concern lies in ensuring the long-term accessibility and archival quality of the documentation related to conservation efforts, with the intention of preserving this information for future generations. Essential elements for an effective documentation include not only the coordination and methodology of the process but also the choice of documentation medium and communication tools.

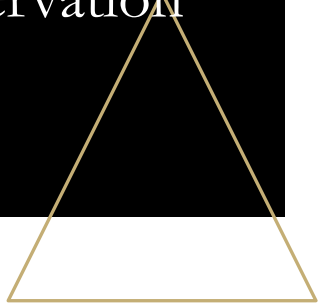
While the electronic utilization of data is anticipated to play a crucial role in future restoration and conservational documentation, there is still value in pursuing a systematic and traditional archival approach to ensure comprehensive documentation.





BACKGROUND :

To properly assess and preserve artwork, it's crucial to start with preliminary documentation using black-and-white (or color and digital) photos. These photos not only capture the type and extent of damage but also serve as a basis for quantifying and describing the damage visually. They are valuable for mapping findings and test results. By categorizing damage and painting techniques, coordinated documentation can reveal relationships and interactions among different damage types, helping identify the source of damage. This understanding is essential for developing an effective conservation and restoration plan. Typically, observations are made on an overlay placed on the photograph, serving as a bridge between the artwork and its image. This overlay facilitates interdisciplinary communication, playing a crucial role in the conservation process.



Two distinct modes of documentation, namely drawing and photography, are employed for the meticulous recording and evaluation of observations, discoveries, and experiences, guided by phenomenological, morphological, and structural criteria.

-The construction of a comprehensive glossary delineating various damage phenomena proves especially advantageous in this context.

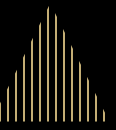
- The establishment of an 'alphabet' serves as a pivotal step wherein the translation of vital recorded data and essential information, such as analytical findings and technical evaluations, transpires. This process assumes significance in the formulation of a conceptual framework. It is imperative to underscore that the efficacy of documentation transcends the mere precision of observations; rather, it hinges on the adeptness with which these observations are communicated.

In the context of documenting the state of discovery, the conservator tasked with the preservation of wall paintings typically encounters two complementary responsibilities:

- 1. A preliminary examination of the mural painting, an imperative precursor to initiating any treatment, along with the meticulous mapping of these initial observations.
- 2. The ongoing documentation of each discrete step undertaken in the conservation process as the intervention unfolds.



Figure 1. From Carl Heideloff, *Ornamentik des Mittelalters*, 200 copper plate illustrations with explanatory texts; new edition, Nuremberg, undated (ca. 1850), Vol. IV, Pl. 6.



The initial documentation efforts undertaken by archaeologists, notably during the excavations at Herculaneum and Pompeii, have exerted a substantial influence not only on the historical understanding of mural painting but also on the broader narrative surrounding the restoration and conservation of historical monuments.

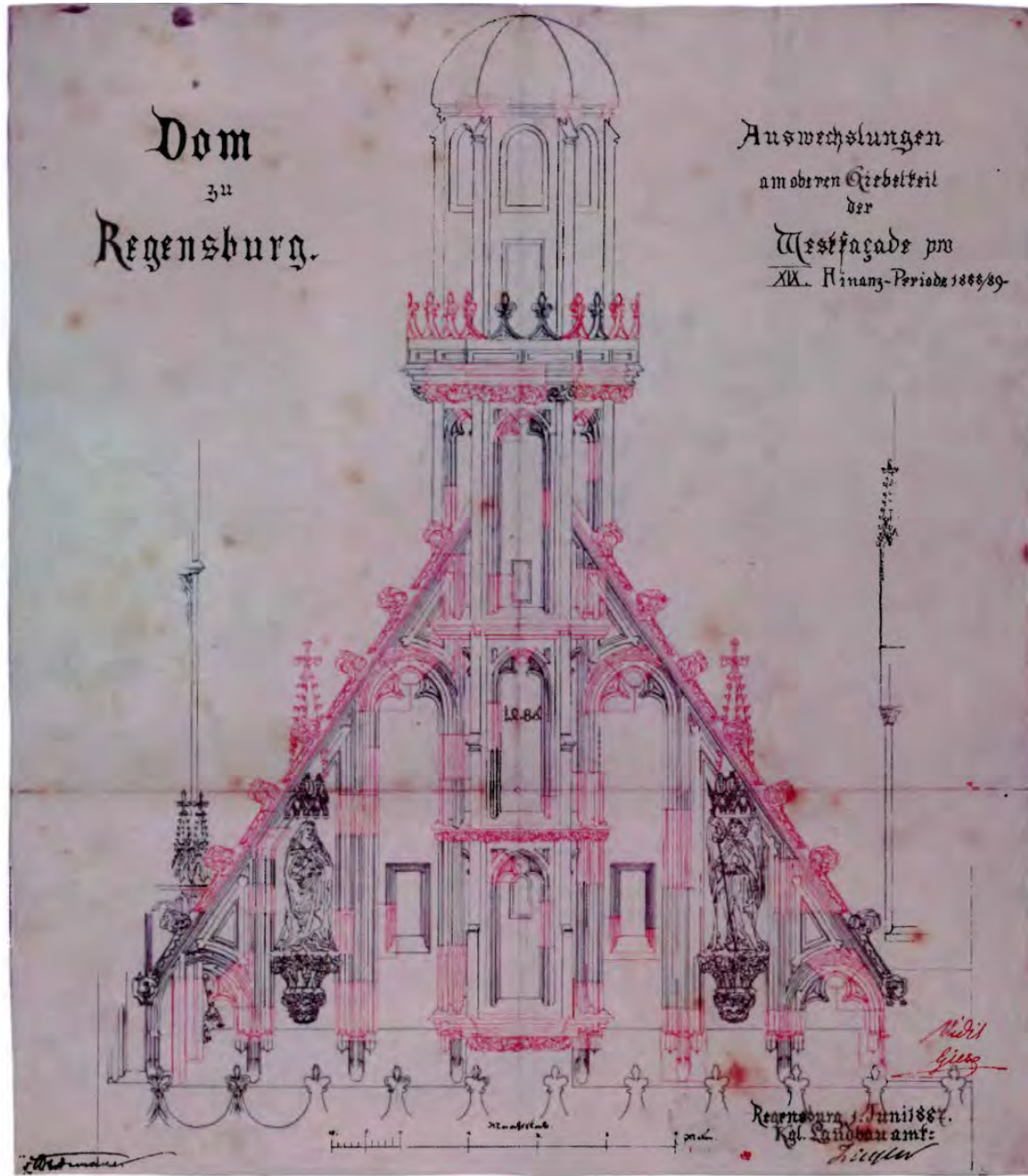
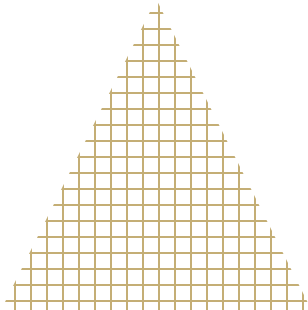


Figure 3. Restoration plan for the western pediment and the so-called "Eichelturn" from June 1st 1887. The parts to be exchanged are marked in red. Regensburg Cathedral workshop, from: *Der Dom zu Regensburg. Ausgrabung, Restaurierung, Forschung*, München 1989, p. 108.

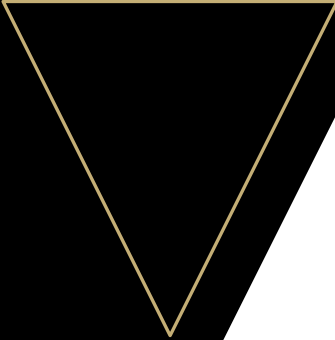
METHODOLOGY

- At the outset of any investigation and documentation, establishing preliminary research criteria, questions, and content, along with defining formats for presenting observed facts, is essential. The presentation of issues should be grounded in methodical investigations of objective facts rather than speculative assumptions, aligning with scientific ideals. The synthesis of conservator's empirical experience and knowledge with scientific research determines the standards for the investigation of works of art, resulting in a comprehensive amalgamation of individual findings.

- Consequently, all recording in conservation, damage assessment, and documentation is rooted in this empirical synthesis. This process may involve various techniques such as climate measurements, thermography, and advanced detection methods like acoustic or ultrasonic techniques with computer-aided evaluation to identify irregularities in the plaster system of mural paintings. Scientific analyses are crucial for identifying causes of damage and enhancing understanding of technical and material aspects of the artwork. Thorough documentation holds a significant place in visually representing the actual state of preservation


- Over recent decades, the documentation of conservation measures and investigations has become a debated topic, with publications addressing it for didactic purposes. However, there is no consensus on the structure and presentation of such documentation, despite the commonality of mural paintings and damage assessment challenges. Standardizing archival parameters, particularly for documentation materials and presentation forms, would be desirable.

- Beyond the general obligation for investigation and documentation outlined in the Charter of Venice, questions regarding presentation and documentation setup have often found individual solutions. Recent concerns focus on the apparent gap between computer-aided and traditional documentation methods, with the flood of digital outputs raising issues of archival quality neglect. The ongoing debate emphasizes the importance of preserving knowledge about materials suitable for archiving and associated correct techniques amidst the increasing reliance on technology.



The unique attributes and efficacy of visual documentation are most evident in the analysis of architecture and related artworks, particularly mural paintings. The intricate nature of large surfaces demands a comprehensive understanding within the context of their complex spatial and physical characteristics. To effectively investigate mural paintings, record their as-found condition, and document findings, several considerations are essential:

1. Establishing qualitative and quantitative criteria for damage evaluation.
2. Determining the representative or subordinate importance of each damage phenomenon.
3. Employing exact, detailed, or summary mapping techniques.



For a meticulous, firsthand mapping of observations, an enlarged, high-quality photograph or a comparable drawing is sufficient. However, for long-term archiving, a black-and-white print on Baryte paper is recommended to meet the Charter of Venice requirements. The overlay, combined with the photograph, becomes the primary component in graphic documentation, serving as a communicating bearer of information. Precise damage assessment, crucial for certain parts of any wall or ceiling painting, is best achieved through detailed photographs and enlargements of specific areas. Direct mapping onto an overlay facilitates meaningful comparisons within the documentation, offering valuable insights into the determining factors and connections of damage phenomena.

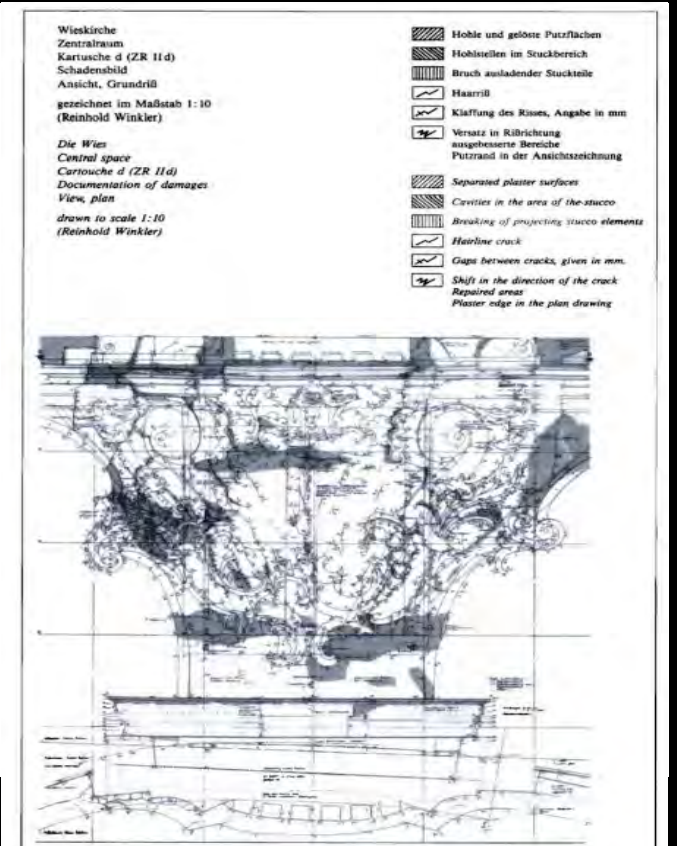
THE LINE DRAWING


FIGURE 4. WIESKIRCHE, DISTRICT OF STEINGADEN (BAVARIA), FRESCO IN THE CHOIR (J. B. ZIMERMANN, 1749), DRAWING BASED ON A PHOTOGRAPH WITH GRAPHICAL DAMAGE ASSESSMENT AND MAPPING OF RESTORATION INTERVENTIONS, FROM: DIE INES. GESCHICHTE UND RESTAURIERUNG HISTORY AND RESTORATION, ARBEITSHEFTE DES BAYERISCHEN LANDESAMTES FÜR DENKMALPFLEGE, BD. 55, MÜNCHEN 1992.



Line drawings play a pivotal role as information carriers, offering a schematic representation and simplifying reproduction of a painting's composition. In conservation practice, these drawings typically replicate the painting's disposition from a photograph, akin to an under-drawing. Drawings on paper serve as crucial communication tools in conservation investigations. Such line drawings can be based on photographs from pre-investigations, orthogonal measuring systems like photogrammetry, or digitized and corrected photographic material (orthorectified). When available, precise hand-drawn architectural surveys or photogrammetric plans enhance the accuracy of these drawings. Fig 4-5

FIGURE 5. WIESKIRCHE, DISTRICT OF STEINGADEN (BAVARIA), STUCCOED AND PAINTED CARTOUCHE (ZR II D) NEAR A SUPPORTING, STATICALLY RELEVANT POSITION OF THE VAUFT, MANUAL ARCHITECTURAL DRAWING (HANDAUßMAß), DRAWN IN A SCALE OF 1:10 (R. WINKLER), WITH CRACKS AND HOLLOWES INSCRIBED, FROM: DIE WIES. GESCHICHTE UND RESTAURIERUNG / HISTORY AND RESTORATION, ARBEITSHEFTE DES BAYERISCHEN LANDESAMTES FÜR DENKMALPFLEGE, BD. 55, MÜNCHEN 1992.





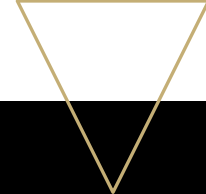
To enhance the visualization of crucial interrelationships, integrating an architectural survey with graphic recording on transparent film proves advantageous. This yields a map on a graphic support, imparting a schematic 'survey character,' akin to a static filling of the spread-out, two-dimensional outlines of specific damage types.

This type of record offers fundamental information that can be further leveraged to:

- Facilitate evaluation, presentation, and publication.
- Streamline copying processes for project partners.
- Enable efficient archiving and digitization without additional costs.

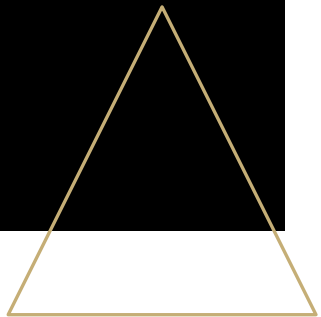
The photograph and mapping layer in this integrated system function cohesively as communication tools and information carriers. The mere visualization of data through this approach facilitates:

- A critical analysis of the as-found condition.
- Yielding valuable results for the development of a conservation concept.
- Ensuring secure findings and documenting them for future reference.



In combination with scientific, climatic and environmental investigations, this documentation will prepare the ground for the definition of damage processes on one hand, and for their removal or repair on the other.

It will also help to identify ways of controlling damaging influences appropriate to the nature of the artwork, such as appropriate means of protection against weathering, change of use of the building or monitoring of the environmental climate. Fig 6-7



Schadensglossar
Deckenfresco von C.D. Asam/ Ovalsaal Schloß Alteglofsheim






Malerei und Trägerputz	
P	 <p>Entlang den Haarrissen in den unteren Bereichen der Deckenmalerei sind einige Putzabplatzungen zu vermerken.</p>
P _H R _H	 <p>Hohle Putzpartien sind in den Verästelungen der Haarrisse in den westlichen Zwickeln des Gewölbes zu finden.</p>
M _A	 <p>Vereinzelte trennen sind in dem nach außen exponierten Teil des Gewölbes kleinere oder größere Malschichtschollen von der Putzoberfläche.</p>

Figure 6. Alteglofsheim, district of Regensburg, palace, oval room, ceiling fresco by C. D. Asam, 1730, damage glossary.

BEFUNDPROTOKOLL	FORTSETZUNG	Blatt
PLZ/Ort <input type="text"/>	Str./Platz/Nr. <input type="text"/>	Belund-Nr. <input type="text"/>
Garmisch - Partenkirchen, St. Anton Deckenfresco von Joh. Ev. Holzner, 1736 Untersuchung: 1995, H. Zernickel		
Legende der graphischen Dokumentation, Beschreibung der vorgefundenen Phänomene, Zustände / Schäden		
04 Abplatzende Malschicht, Malschichtfehlstellen.		
		
		

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Figure 7. Damage glossary, visual definition of damage phenomena: bursting or detached paint layer losses.

A damage glossary serves as a systematic compilation and visual representation of representative damage phenomena in art or buildings, serving as an initial step in problem-solving. It offers:

- Qualitative orientation for the overall complex.
 - Delimitation and definition of damage categories.
 - Systematic visualization of concrete damage contexts through various photographic methods.
- Comprising image and textual components with explanatory drawings, the glossary aids in systematically registering and detecting aging and damage processes. Its advantages include:
- Collection of damage pictures interpreting phenomena and processes.
 - Representation of individual damage elements as representative for entire categories, streamlining documentation.
 - Photographic documentation highlighting typical features and variations.
 - Facilitating a precise comparison and diagnosis through region-specific or building-related damage symptomology, linking with environmental factors and preservation methods.
 - Conducting a non-destructive initial examination to survey damage types, preparing a list of cases requiring more extensive examination, such as sampling or laboratory analysis, for clarifying damage relevance.

MEDIATION FORMS OF CONSERVATION DOCUMENTATION

Text and symbols constitute the fundamental elements of our communication. The qualitative and quantitative information within maps necessitates verbal explication, intertwining with imagery and complemented by a graphic system of symbols and design colors to enhance comprehension. A legend, comprising standard graphic symbols or color features, is essential in elucidating the conveyed information. Fig 8-9-10

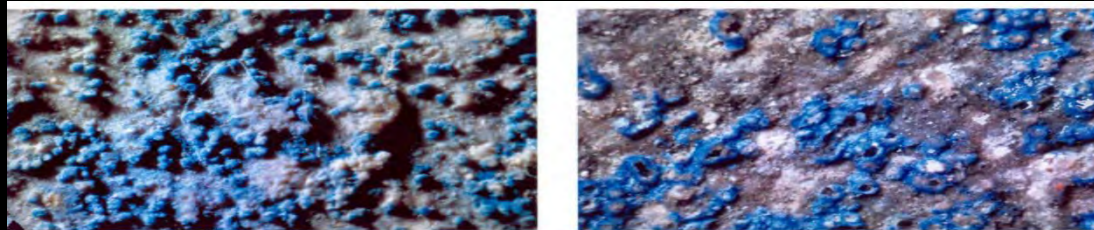


Figure 9 a/b. Blue colour layer (lapis lazuli) on grey veneda, dot-like and/or spherical changes in the paint layer (mostly through influence of humidity and the formation of gypsum).

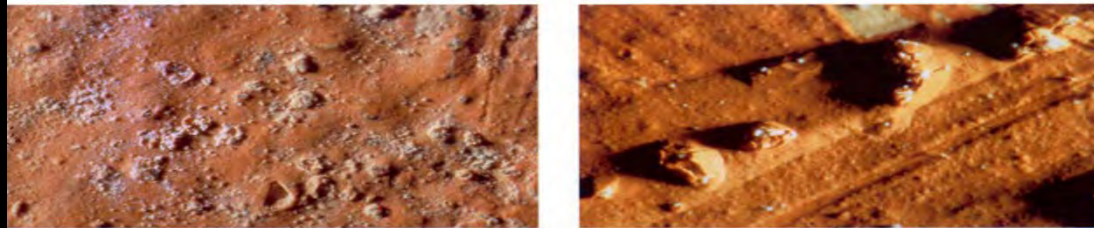


Figure 10 a/b. So-called pustules, dot-like crystallizations of salts (mostly through the formation of gypsum on the surface).

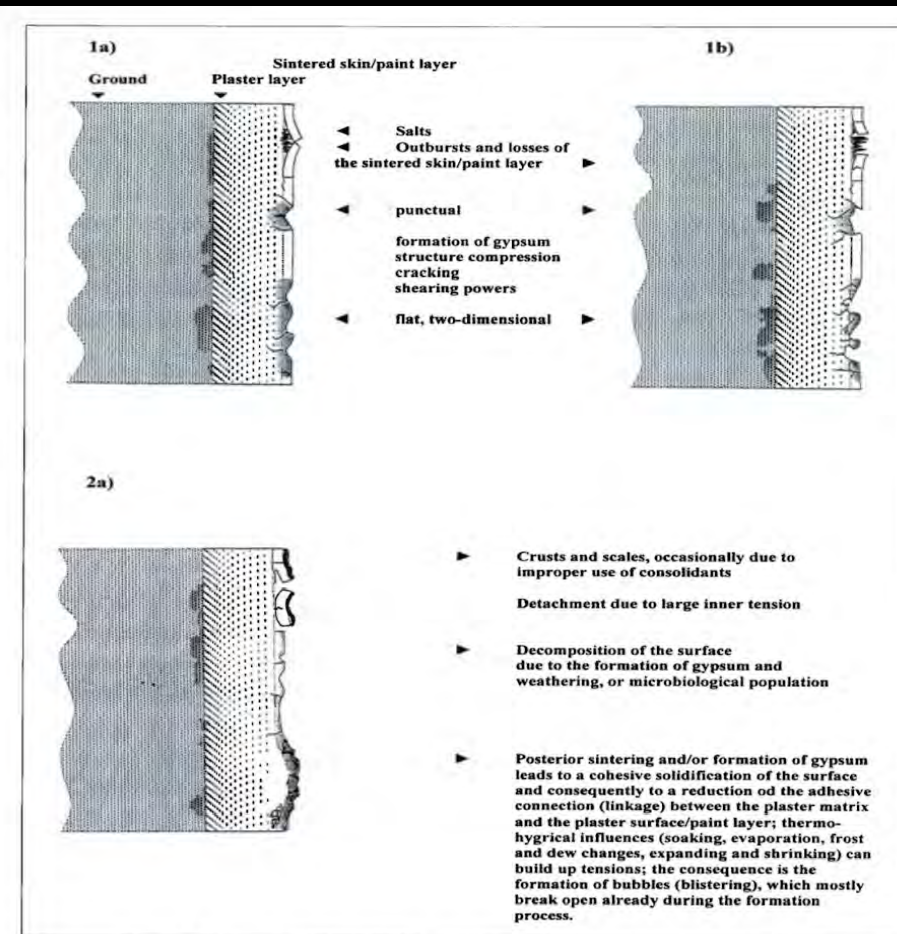


Figure 8. Typology of the damage genesis; Schematic sketches exemplifying the surface weathering of facade paintings (cf: damage definition and damage glossary for wall paintings; Schadensdefinition und Schadensglossar in der Wandmalerei; Seminar thesis by Peter Ehrhardt, Hochschule für Bildende Kunst Dresden, Studiengang Restaurierung, 1996).

Efficient graphic damage assessment relies on a well-defined legend and symbols. Given the global communication network's functionality and its growing alignment with conservators' needs, the manner in which observations are presented in writing and visually becomes increasingly crucial. While some flexibility is warranted, establishing a common foundation for maps and documentation is desirable, especially concerning archival longevity.

The critical question emerges: What criteria should dictate the preference for color or black-and-white representation? When is the use of colors more appropriate, setting the stage for introducing universally understandable symbols, signs, figures, or letters in documentation? Random use of symbols or colored legends hampers national or international comparison of investigation results.

Practicality dictates that a wealth of possibilities can be achieved with a limited number of symbols and colors, ensuring consistency across diverse mapping contexts. Crucially, the evaluation of mural paintings' as-found condition should not only depict phenomenological features of damage but also illustrate cause-and-effect relationships, including influences like thermo-hygrometric conditions and resultant physical and chemical reactions. Fig 11-12-13-14-15-16-17-18






e: <u>TECHNOLOGIE</u> (mural paintings)		
fr: <u>TECHNOLOGIE</u> (peintures murales)		
it: <u>TECNOLOGIA</u> (pitture murali)		
esp:		
dt: <u>TECHNOLOGIE</u> (Wandmalerei)		
e:		e: fr: limite del'enduit (Pontate etc.)
fr: noir		it: Pontate etc. .esp:
it: <u>nero</u>		dt: Verputzgrenze (Pontate etc.)
esp: negro		
dt: schwarz		
e: dark red		e: fr: Giornate (joints:2sur1)
fr: rouge foncé		it: Giornate, esp:
it:		dt: "Tagewerke" über lappt 1
esp:		
dt: dunkelrot		
e: yellow red		e: fr: incisions dans l'enduit frais
fr: rouge jaune		it: esp: dt: Vorritzung
it:		
esp:		
dt: gelbrot		
e: light brown		e: fr: cal que au poinçon
fr: brun clair		it: esp:
it:		dt: Kart ongravur
esp:		
dt: hellbraun		
e: blue green		e: fr: poncif, it: spolveri
fr: vert.bleu		esp: dt: Kartonpauspunkte, spolveri
it:		
esp:		
dt: blaugrün		

Figure 11. Study on a multilingual definition and a code for representing damage phenomena on mural painting (Ivo Hammer), ICOM-CC Group "Peintures Murales et Mosaïques," Réunion du 25.11.1988.

Objektkennzahl: _____	Bearbeitungsfläche: _____
Ort: _____	Kartierungsthema: _____
Landkreis: _____	Datum: _____
Objekt: _____	Bearbeiter: _____

Merkmal/Bezeichnung	Ziffer/Buchst.	Symbol	Signatur	Farbton		
Abb. 1	1	A	I	△	RAL 1016 Stabilo 87/205	
	2	B	II	△	RAL 1033 Stabilo 87/215	
	3	C	III	▽	RAL 2008 Stabilo 87/235	
	4	D	IV	▽	RAL 3002 Stabilo 87/315	
	5	E	V	□	RAL 3015 Stabilo 87/355	
	6	F	VI	▣	RAL 4006 Stabilo 87/340	
	7	G	VII	◇	RAL 5012 Stabilo 87/450	
	8	H	VIII	◇	RAL 5002 Stabilo 87/405	
	9	I	IX	○	RAL 6017 Stabilo 87/575	
	10	J	X	⊖	RAL 6005 Stabilo 87/520	
	11	K	XI	⊕	RAL 8001 Stabilo 87/685	
	12	L	XII	⊕	RAL 8014 Stabilo 87/635	
Risse	13	M	XIII			
Salzausblühung	14	O	XIV			
Reliefbildung	15	P	XV			
Verfärbung	16	Q	XVI			

30 Blatt-Nr. ○

Figure 12. Example for a systematic documentation of the as-found condition of wall paintings; Blank Form 1; from: Bestandsaufnahme und Bestandsanalyse an Kulturdenkmälern. Materialien zur Fort- und Weiterbildung 1, Niedersächsisches Landesverwaltungsamt/Institut für Denkmalpflege Hannover, 1993. This system is based on the results of a research project on "Steinerfall und Steinkonservierung" (Destruction and Conservation of stone) as well as "Wandmalereischäden" (Damage on wall paintings of the Bundesministerium für Forschung und Technologie (BMFT); first published under the title "Systematik und Legende für die darstellende Dokumentation in der Bestandsaufnahme von Kulturdenkmälern," in a special edition of the periodical *Bautenschutz/Bausanierung*, 1992. Another blank form (Form 3) is available for data on object and location, with space left for drawings or photographs in the centre of the sheet as well as legends for the mapping contents. Both legend and 'mapping mask' can be used for manual descriptions as well as for further CAD reworking.

Legende für zeichnerische Dokumentation / Key for the graphic documentation	
Vorgefundener Zustand / Schäden Condition / damages before restoration	
Hohlstellen Cavities	Übermalungen und Retuschen / Lasuren Overpaintings and retouching / glazes
Lattung (Linien sind Zwischenräume) Lathing (lines are interstices)	Übermalungen auf rauhem Putz Overpaintings on coarse plaster
Niveaunterschied Differences in level	Verschraubungen Screw joints
Abhebbende Putzteilchen Separating plaster particles	Neuputz und rekonstruierte Malerei New plaster and reconstructed paintings
Risse (statisch bedingt) Cracks (caused by structural problems)	Kittungen Fillings
Schwundrisse (Krakelee) Cracks caused by shrinkage (crackle)	Probeentnahme Sample removal
Ausbrüche entlang von Rissen Breaks along cracks	Maltechnik / Painting technique
Pudernde Malschicht Powdering paint layer	Arbeitsgrenzen («Tagewerke») Giornati
Abplatzende Malschicht Flaking paint layer	Quadratur Grid
Fehlstellen Malschicht, abgeplatzt Gaps in the paint, flaked off	Vorritzung – Intonacozeichnung (Kohle = K. Ritzung = R, Doppellinie = DL, Mehrfachlinie = ML) Preliminary incising – intonaco drawing (charcoal = K, incising = R, double line = DL, multiple line = ML)
Malschicht reduziert (r) / gedünnt (g) Paint layer reduced (r) / thinned (g)	Pentimenti / Pentimenti
Fehlstellen Putz und Malschicht Gaps in the plaster and paint layer	Unbemalte Putzflächen Unpainted plaster surfaces
Wasserflecken – Wasserränder Water spots – water edges	Maßnahmen / Restoration measures
Fleckenbildung Formation of spots	Hinterspritzungen Injections behind the plaster
«Krokodilhaut» «Crocodile skin»	Abhebbende Putzteilchen gesichert, gefestigt Separating plaster particles secured, consolidated
Sichtbarer mikrobiologischer Befall Visible microbiological infestation	Pudernde / abplatzende Malschicht gefestigt Powdering / flaking paint layer consolidated
Pigmentverfärbung Pigment discoloration	Pigmentverfärbung entfernt / reduziert Pigment discoloration removed / reduced
Schleierbildung Cloudings («sfumato»)	Übermalungen, Retuschen entfernt / reduziert Overpaintings, retouching removed / reduced
Schroteinschlüsse Pitell holes	Retuschen Retouching

Figure 13. Legend for graphic documentation, from: *Die Wies. Geschichte und Restaurierung / History and Restoration*, Arbeitshefte des Bayerischen Landesamtes für Denkmalpflege, Bd. 55, München 1992, p. 229; cfr. Figure 4.

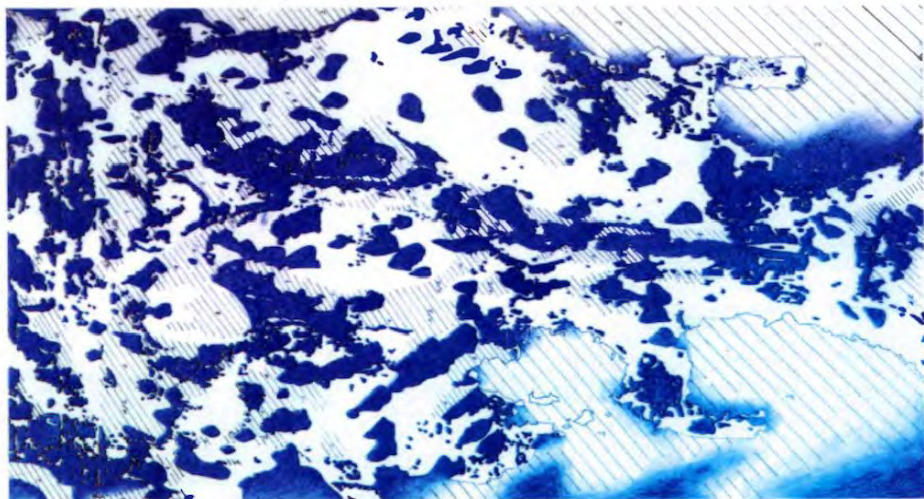


Figure 14. Augsburg, Fugger House, interior decoration of the so-called "hall of the muses" by F. Sustri/A. Ponzano 1570/71; detailed mapping of the heavily damaged original wall paintings on two plastic overlays over a detailed black-and-white photograph, coloured pencil and black ink (by C. Salzberger)



Figure 15. Munich, Ludwig-Maximilian University, lecture room no. 115, Ludwigstr. 28, R. V. Langer 1834, mapping of the salt efflorescence, foil on a black-and-white photograph, coloured pencil (detail).



Figure 16. Pilgrimage church Vierzehnheiligen, district of Lichtenstein (Bavaria), J. I. Appiani 1764, choir fresco, graphic documentation drawing copied after a survey photograph (see Figure 4) with partial mapping with a lead pencil of repainting from the 'restoration' of 1959.

- Legende zur Schadenkartierung
 Dokumentation von C. D. Asam, Oberpfalz
-  Feinschichten
 -  Keine Feinschichten
 -  Beschädigung oberer Malschicht
 -  Gut erhaltene, obere Malschicht
 -  Feinschichten
 -  Keine Feinschichten
 -  Keine Feinschichten
 -  Keine Feinschichten
 -  Keine Feinschichten
 -  Keine Feinschichten
 -  Keine Feinschichten

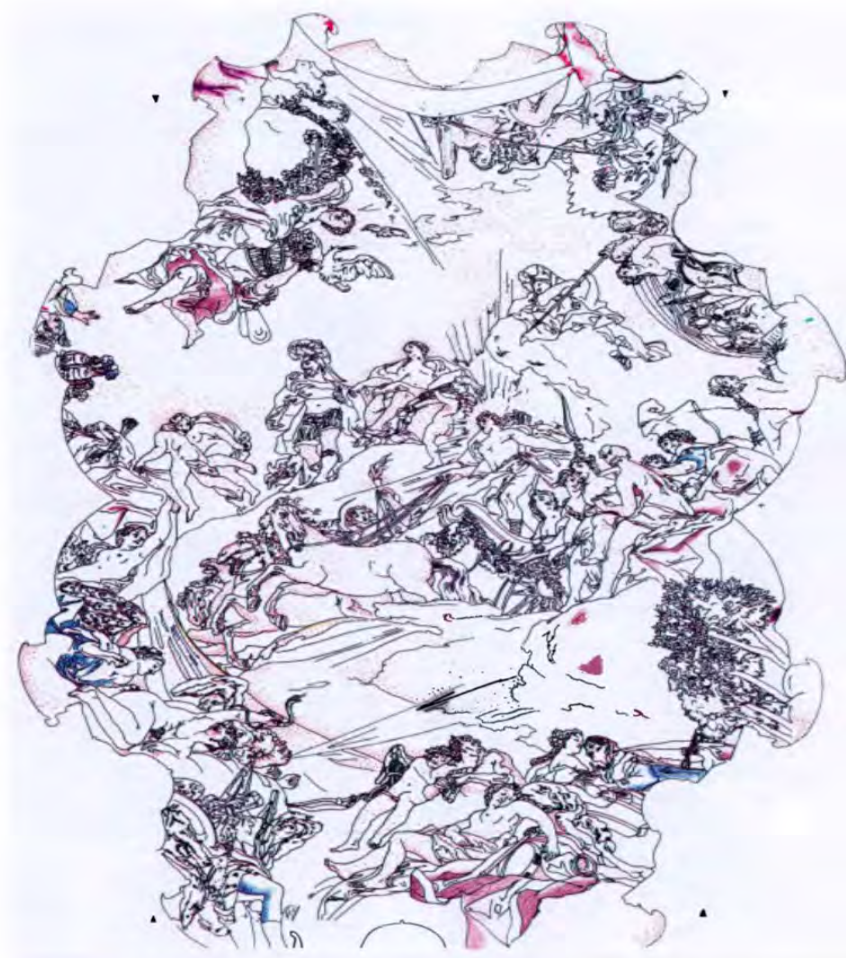


Figure 17b.
 See Figure 17a.

Figure 17a. Alteglöfshheim, palace, so-called "oval hall", C. D. Asam, 1730, graphic documentation drawn after a survey photograph (see Figures 1 and 16), mapping of paint-layer damage with a coloured pencil.

Objektkennzahl: Ort: Landkreis: Objekt:	84208 Landshut, Freyung 630 A Stadt Landshut Carossa Gymnasium (chem. Hl.Kreuz Kirche)	Bearbeitungsfläche: Kartierungsthema: Datum: Bearbeiter:	Bild E - Kartierung 3 MS-Schäden: Oberfläche Nov. 98 Lise Thillemann
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<ul style="list-style-type: none">  MS großflächig mechanisch verletzt  Feinschichten verletzt, tiefere Spuren  Bereich ist eingrenzt  Bereich ist nicht eingrenzt 	<p>Generelle Anmerkung:</p> <p>Im ganzen Deckenbild sind mechanische Verletzungen vorhanden, hauptsächlich kleine ca. 1cm lange Spuren, die die Malschicht bis auf den Feinschichten zerstört haben. Nur tiefere Verletzungen wurden kartiert, ebenso Bereiche mit großflächiger MS - Verletzung</p>	
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Figure 18. Landshut, former Holy Cross Church, G. Asam 1698; documentation of the damage on the paint layer and plaster surface:
 1. Mapping of singular phenomena on location on black and white laser copies; 2. Transfer to a PC onto scanned photographs; 3. Coloured laser print.