

Describing the Indescribable*

Gerhard Jaritz, Barbara Schuh

"People are sexually aroused by pictures and sculptures; they break pictures and sculptures; they mutilate them, kiss them, cry before them and go on journeys to them; they are calmed by them, stirred by them and incited to revolt. They give thanks by means of them, expect to be elevated by them, and are moved to the highest level of empathy and fear. They have always responded in these ways; they still do."¹

While thinking about this more or less truism of a social history of art, the questions arise which aspects of an image effect such reactions and how the effects can be attributed to the images to be analyzed. Are those aspects definable and/or extractable? If so, to what extent can they be described and analyzed by conventional means?

To ask such questions is particularly relevant for the analysis of medieval images and not only from some art historian's point of view. This also proves true, e.g., with regard to a history of medieval everyday life and material culture for which (religious) images are to be used as one of the main sources for any interpretation.² Especially Gothic art with its 'quasi-realistic' visual integration of the late medieval world into the world of scripture and saints often seems to be a storehouse for a 'reconstruction' of quotidiankursiv.

Medieval religious images narrate scripture clearly, they are to evoke suitable and appropriate emotions, they impress the narrated matter on the memory. They are meant to cause lasting behavioural consequences.³ They are to be omnipresent, and not only in

* This paper summarizes different reflections and approaches in the course of image analysis with regard to the history of everyday life and material culture of the Middle Ages done at the "Institut für Realienkunde des Mittelalters und der frühen Neuzeit" of the Austrian Academy of Arts and Sciences.

¹ David Freedberg: *The Power of Images. Studies in the History and the Theory of Response*, Chicago and London 1989, 1.

² Cf. Elisabeth Vavra: *Mittelalterliche Kunstwerke – Illustration oder Quelle der Sachkultur-forschung, Bericht über den 16. österreichischen Historikertag in Krems an der Donau*, Vienna 1985, 430–447 (=Veröffentlichungen des Verbandes Österreichischer Geschichtsvereine 25); Gerhard Jaritz: *Finding the Signs: Pictures of Medieval Life, Computers in the Humankursivies and the Social Sciences*, ed. Heinrich Best, Ekkehard Mochmann, Manfred Thaller, Munich et al. 1991, 61–67.

³ Cf. Gerhard Jaritz: *Zwischen Augenblick und Ewigkeit. Einführung in die Alltagsgeschichte des Mittelalters*, Vienna and Cologne 1989, 76.

the church "as a focus for the mind at the most important moment of the devotion".⁴ In a number of those aspects, secular images follow similar patterns.

Trying to extract something out of medieval images, which appears to be depicted so realistically like everyday life, is a hard job out of a number of reasons:

- 1) We have to be aware of the fact that we are never dealing with a reality of everyday life but with the reality of its visual representation.
- 2) Attempting to perceive images of the past, we must be conscious of the numerous levels of cultural filters which are influencing reception and interpretation. They are caused by differences in cognitivive and reflective dispositions between the past and the present cultures, different visual experiences and different conceptual structures: "... what one offers in a description is a representation of thinking about a picture more than a representation of a picture."⁵
- 3) Of particular importance are the differences between the participant's understanding and the observer's understanding: the observer never will be able to have the same view and knowledge as the participant.⁶ He has only the opportunity to collect fragments of standards or rules and might try to put together such pieces of a jigsaw to get a more complex eye for the culture of the past.
- 4) To learn something out of images about other cultures, therefore, is comparable with learning a foreign language. Images are visual translations of the written or spoken word. Their description and analysis by the (art) historian are an attempt of a fragmentary retranslation of those visual translations. – Every translation naturally means loss of information, caused either by omission or by addition of 'text'. And such a loss even must prove more dramatic when (re)translating between different kinds of representation – between the visual 'text' and the written or spoken text.

In any case, every analysis must be based on the documentation of the source material. At the present state of the art in dealing with images this process still has to begin with some kind of verbal description, preferably following some standards. Proposals for the usage of such standards are numerous. Generally accepted is none of them. Manifold reasons for this situation might be mentioned, e.g.,

- 1) Various shortcomings of formal language: "In fact, language is not very well equipped to offer a notation of a particular picture. It is a generalizing tool."⁷
- 2) Very different interests and, therefore, very different approaches to the sources by different fields of (art) historical research.

⁴ Michael Baxandall: *Patterns of Intention. On the Historical Explanation of Pictures*, New Haven and London 1986, 106.

⁵ *Ibidem*, 5.

⁶ Cf. *ibidem*, 109.

⁷ *Ibidem*, 3; see also Ronald Stenvert: *Constructing the Past: Computer-Assisted Architectural-Historical Research*, Utrecht 1991, 65.

- 3) Massive lacks in certain areas of terminological research.⁸
- 4) The not unreasonable fear of loosing flexibility and openness by using a system of strict standards.
- 5) Necessarily different approaches caused by different amounts of pictures to cope with.⁹

This is not the place to repeat or to summarize the various efforts towards the standardization of the verbal description of images – some of them partly accepted, partly realized and partly used by more than one person or institution.¹⁰ In many cases compromises are indispensable. International standards on a higher level of documentation and particular terminologies out of the need of very specialized fields of research will often have to be supplementing each other. In any case, when using different standards for the verbal descriptions of images the following conditions should be considered:¹¹

- 1) To provide a high closeness to the source, context sensitive models should be used.¹²
- 2) The degree and depth of standardization must be defined or described respectively.

⁸ Cf. Gerhard Jaritz: *Mittelalterliche Realienkunde und Fragen von Terminologie und Typologie. Probleme, Bemerkungen und Vorschläge am Beispiel der Kleidung, Terminologie und Typologie mittelalterlicher Sachgüter: Das Beispiel der Kleidung*, Wien 1988, 7–19 (= Veröffentlichungen des Instituts für mittelalterliche Realienkunde Österreichs 10).

⁹ There certainly must be a difference between large scale image data bases, like, e.g., the collection of photographs and illustrations in the 'Witt Library' [cf. John Sunderland and Catherine Gordon: *The Witt Computer Index, Visual Resources IV/2* (1987) 141–151], the 'Princeton Index of Christian Art' [cf. Brendan Cassidy: *The Index of Christian Art: Present Situation and Prospects, Literary & Linguistic Computing 6/1* (1991) 8–14] or the 'Bildarchiv Foto Marburg' [cf. Lutz Heusinger: *Marburger Informations-, Dokumentations- und Administrations-System (MIDAS). Handbuch*, Munich et al. 1989 (= *Literatur und Archiv 4*)] with some hundreds of thousands of documents, and small image data bases following very specific aims of research, like, e.g., the Los Angeles IMMI [The Index of Medieval Medical Images in North America; cf. IMMI-Newsletter 1ff (1989ff)] or the Krems REAL (Database of everyday life and material culture of the Middle Ages; cf. Barbara Schuh: *Historical Image Analysis – A Field of Various Limits*, Conference Paper held at the 6th International Conference of the Association for History and Computing in Odense 1991, in press).

¹⁰ The leading role of ICONCLASS certainly has to be emphasized [Leendert Coupré: *Iconclass: an iconographic classification system, Art Libraries Journal* (1983) 8/2, 32–49]. For other systems cf. François Garnier: *Thésaurus Iconographique. Système Descriptif des Représentations*, Paris 1984; John Sunderland: *The Catalogue as Database: the Indexing of Information in Visual Archives, Computers and the History of Art*, ed. Anthony Hamber, Jean Miles, William Vaughn, London and New York 1989, 130–143; Colum Hourihane: *A Selective Survey of Systems of Subject Classification*, *ibidem* 117–129.

¹¹ Cf. Gerhard Jaritz: *Towards Standards of Very Different Materials: Problems of Standardization in EDP-supported Research on the Material Culture of the Middle Ages, Standardisation et échange des bases de données historiques*, ed. Jean-Philippe Genet, Paris 1988, 153–160.

¹² Cf. Manfred Thaller, *Warum brauchen die Geschichtswissenschaften fachspezifische datentechnische Lösungen? Das Beispiel kontextsensitiver Datenbanken, Computer in den Geisteswis-*

- 3) The depth of description must be standardized and defined as far as possible. Only an extensive documentation with regard to the model of such depth can offer the possibility to estimate to what extent we will be able to use the data for **systematic** retrieval and research.
- 4) Flexibility and openness must not be narrowed by using standards.
- 5) The value of a system of standardization must be doubted, if it could not be used as a documentation tool, an information tool and a research tool at the same time.

Dealing with images certainly also means the need of quite a lot of additional contextual knowledge about cultural, social, religious and symbolic concepts – comparable with Panofsky's third level of "intrinsic meaning or content"¹³. It is indispensable for every image-analysis, but cannot and must not be part of the description of every single image. Recent developments in the computer-assisted application of 'historical background knowledge' data bases¹⁴ show a vast amount of new possibilities to combine various levels of the mentioned third-level-information with the (first and second level) description of the images during the process of analysis. To name an example: A recently developed dictionary of medieval dress can be consulted while working with the data base.¹⁵ Informations out of this dictionary as any other additional information can be overtaken in a kind of separated private notebook without changing the actual description of an image or adding room consuming 'ballast' to it.

* * *

But, we certainly must be conscious of the limits and the inability of creating a comprehensive, unambiguous, intrinsic, objective and accurate reflection of images by verbal means. What still remains rather indefinable through words are many aspects of "the pictorial grammar, based upon current rules for the representation of images within a given culture".¹⁶ This proves particularly true for those phenomena which impress above all by their relation and/or antagonism to other phenomena. In the course of different research projects in the field of everyday life and material culture of the Middle Ages the followings aspects proved specially relevant:

- 1) The possibility of comparing objects in the course of analysis is certainly one of the most important parts of the historical research process. In connection with context manipulation – creating kinds of meta-sources – it seems to be most essential to be able to extract details out of the images (getting them out of their original context) as well as to increase the closer context between the image and its verbal description.

senschaften. Konzepte und Berichte, ed. Manfred Thaller and Albert Müller, Frankfurt and New York 1989, 237–264 (=Studien zur Historischen Sozialwissenschaft 7).

¹³ Erwin Panofsky: *Meaning in the Visual Arts*, Harmondsworth 1987, 55ff.

¹⁴ Cf. Manfred Thaller: *The Daily Life of the Middle Ages*, Editions of Sources and Data Processing, *Medium Aevum Quotidianum-Newsletter* 10 (1987) 26f.

¹⁵ Cf. Schuh: *Historical Image Analysis*, in press.

¹⁶ Stenvert: *Constructing the Past*, 28.

This may be done either by simply cutting out objects and creating user-defined archives with specific contents (Figure 1) or by connecting the verbal description with the corresponding part of the image (Figure 2), which delivers at any kind of retrieval based on the description the text as well as the referring digitized part of the image. Today, producing typological image-archives of objects at least allows visual comparisons. It might be helpful to realize adequate applications, when the long awaited 'better world' of automatic pattern recognition will have come.

Another field of such context manipulation is highly important in the case of doing research on illuminated manuscripts or illustrated texts. The binding of parts of digitized text to the corresponding details of an image (Figure 3) offers a number of new possibilities concerning the analysis of problems like, e.g., the relevance of the depiction of certain objects being dealt with in the text, the accuracy, patterns and/or topoi being used to visualize the written word, etc.¹⁷

- 2) Comparable with the above mentioned lexical background knowledge it is useful to provide users of the system with certain levels of visual background knowledge. Considering the intentions which underly the certainly not accidentally chosen positions of religious images, it might be helpful to get informations about the (spatial) contexts in which the images appear(ed): as part of an image set (e.g., winged altarpieces), as part of series of images, as part of a church decoration in relation to other images (Figure 4), etc.¹⁸
- 3) In the course of analysis it sometimes also seems to be of advantage to use image processing routines, which reduce the information in a way which makes comparisons easier and clearer to visualize. Such routines may lead to the result of getting just the outlines of the objects to be dealt with, may they be ornaments, gestures or pots and jugs¹⁹ (Figure 5).
- 4) The attempt to extract messages out of images has to be made with special regard to medieval symbolic oppositions concerning colour sequences like, e.g., light and dark, flashy and gloomy colour shades, intensity, combination and gradation, which might have been intended to evoke certain impressions and visual classification in the eyes of the beholders. Moreover, colours themselves play an important and sometimes ambivalent role in medieval sign language.²⁰ An impressing example and result about the relation between depicted social groups, image themes and certain colours of depicted

¹⁷ Cf. Gerhard Jaritz: *Images and Text, Text of Images, ALLC-ACH '92. Conference Abstracts and Programme*, Oxford 1992, 4.

¹⁸ Cf. Cassidy: *The Index of Christian Art*, 12.

¹⁹ The (art) historian often looks enviously at the possibilities opened to archaeologists dealing with ceramics for whom the automatic tracing of contours and their comparison is not anymore a real problem. Cf. Ulrich Kampffmeyer: *Das Archäologie Computer System "ARCOS". Ein rechnergestütztes Dokumentations- und Datenbanksystem*, *Computer in den Geisteswissenschaften*, see note 12, 185–192.

²⁰ Cf. Michel Pastoureau: *Figures et Couleurs. Études sur la symbolique et la sensibilité médiévales*, Paris 1986; idem: *Couleurs, Images, Symboles. Études d'histoire et d'anthropologie*, Paris 1988.

dress with the help of cluster analysis was given by Manfred Thaller.²¹ The basis of his research was the verbal description of a sample of panel paintings of Austrian provenance. Being confronted with his results the question arises if those results might even become more striking by the application of tools of digital image processing. This certainly demands data base systems or software respectively which offer more than the possibility of defining colours as 'red', 'green', 'blue', but are able to differ, group and compare (user defined) colours with regard to their intensity, shade and gradation by means of pixel values.²² The realization of this aim is certainly strongly connected with hardware pre-conditions like processing 24-bit images, with reflections about the scanning resolution and therefore with handling storage capacities, etc. The greater challenge, though, is the definkursivision of those objects for which colour comparison should be applied – either by cutting out segments corresponding to the objects or by automatic pattern-recognkursivision.

- 5) Another group of information, which hardly can be verbally described in a formalized way, are the spatial relations between depicted aspects – again bearing highly symbolic connotations. While it is rather difficult or impossible respectively to verbally describe, e.g., the position of persons and attributes without referring to their relation to others, digital image processing offers the opportunkursiviy to define positions and their relation by means of coordinates. Possible questions to be answered that way might be:
 - How is hierarchy represented within an image?
 - Which roles do size and proportions play?
 - What constitutes center and periphery of an image?
 - Can depicted spatial closeness or distance of persons be recognized as a sign of social closeness or distance?
 - Does social rank of persons correlate with their spatial position in the image?
 - Which connotations underly criteria like 'left and right', 'above and below', 'distance and neighbourhood'?
- 6) Although 'automatic pattern comparison' and 'automatic pattern recognkursivision' were mentioned several times in this paper, it does not seem to be the appropriate place and time to deal with them more detailed. We are more or less forced to be patient until further developments on the technical side become applicable for the historian.

In our reflections, certainly only a few aspects of the 'Indescribable' could be touched. Moreover, the results achieved by some of the presented routines naturally will not allow in any way to define or to describe the emotions and the feelings of people evoked by living with and being influenced by images. They might serve as tools, though, helping to create manifold meta-sources allowing to verify or falsify various assumptions about the 'how' and 'why' on which not only a history of mentality is to be based on.

²¹ Manfred Thaller: *Zur Formalisierbarkeit hermeneutischen Verstehens in der Historie, Mentalitäten und Lebensverhältnisse. Rudolf Vierhaus zum 60. Geburtstag*, Göttingen 1982, 441–453.

²² Cf. William Vaughan: *Paintings by Number: Art History and the Digital Image*, *Computers and the History of Art*, see note 10, 74–97.

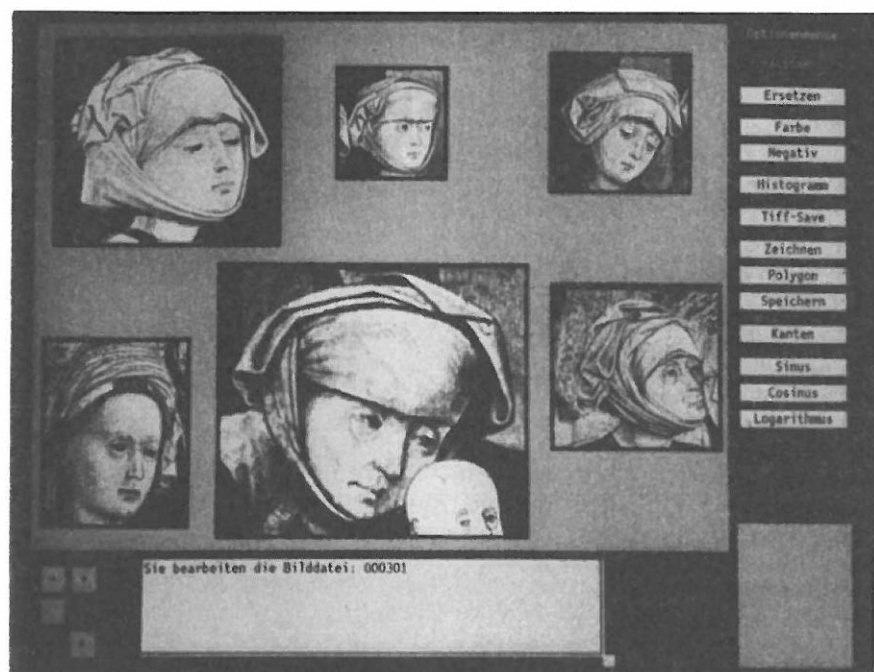


Figure 1: Visual comparison of female headgears by using user-defined archives

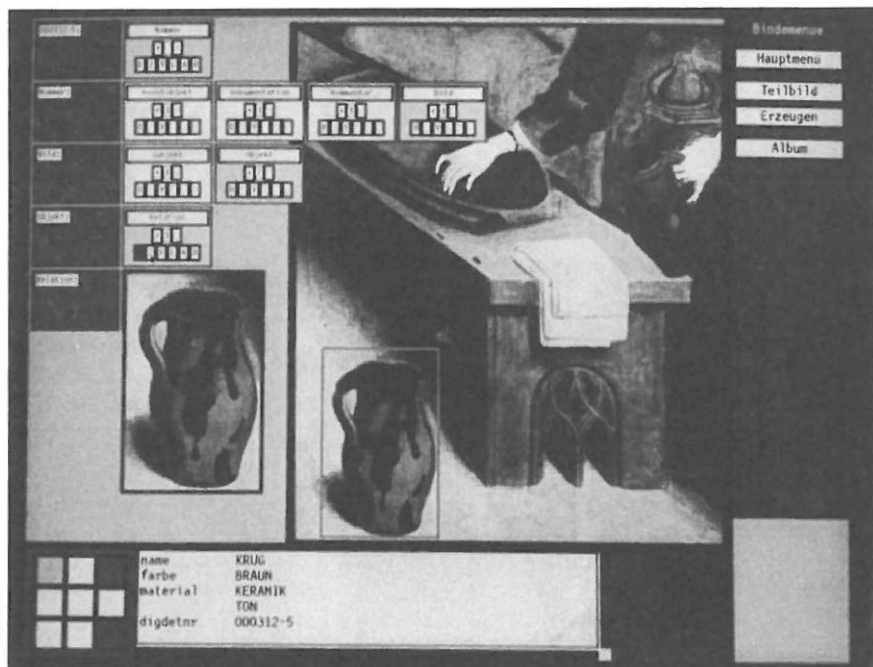


Figure 2: Connection between the digitized representation of a jug and its verbal description

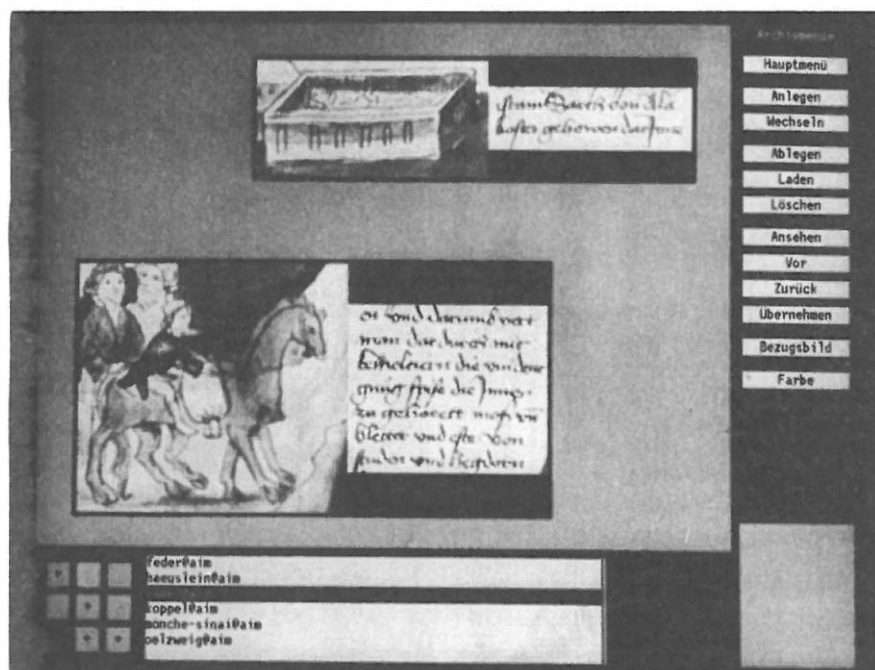


Figure 3: Combination of original text and corresponding illumination in digitized manuscripts

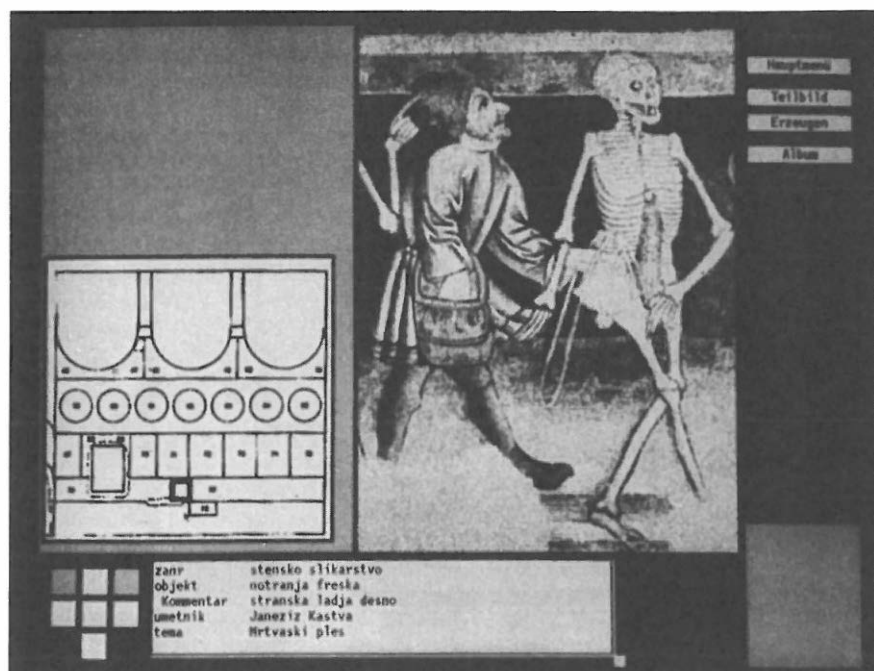


Figure 4: Possibility to show the position of an image as part of a "whole"

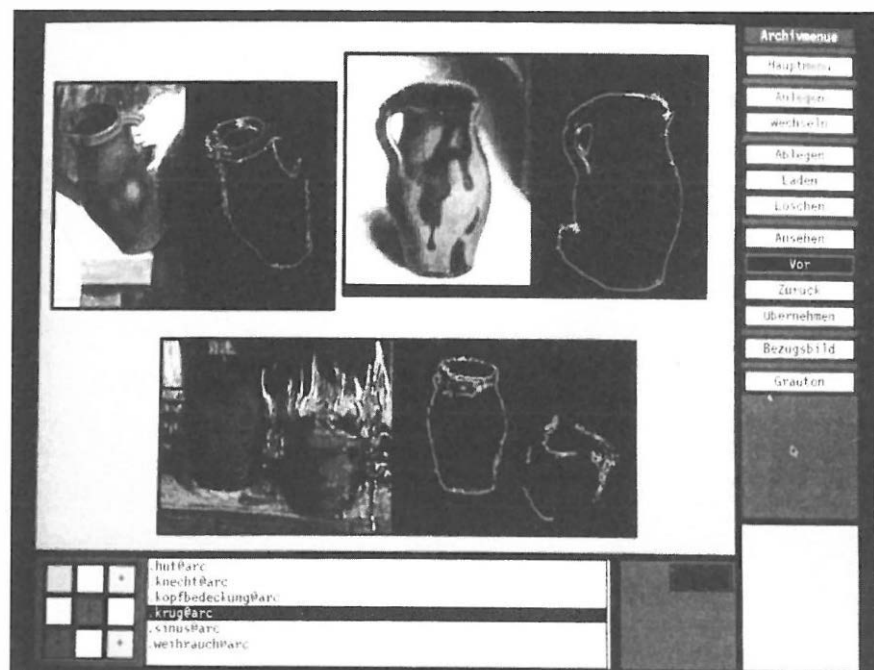


Figure 5: Reduction of image information to produce the outlines of objects

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Introduction

Manfred Thaller

This book is the product of a workshop held at the International University Institute in Firenze on November 15th, 1991. The intention of that workshop has been to bring together people from as many different approaches to "image processing" as possible. The reason for this "collecting" approach to the subject was a feeling, that while image processing in many ways has been the "hottest" topic in Humanities computing in recent years, it may be the least well defined. It seems also much harder to say in this area, what is specifically important to historians, than to other people. In that situation it was felt, that a forum would be helpful, which could sort out what of the various approaches can be useful in historical research.

To solve this task, the present volume has been produced: in many ways, it reflects the discussions which actually have been going on less, than the two companion volumes on the workshops at Glasgow and Tromsø do. This is intentional. On the one hand, the participants at the workshop in Firenze did strongly feel the need to have projects represented in the volume, which were not actually present at the workshop. On the other, the discussions for quite some time were engaged in clarifying what the *methodological* issues were. That is: what actually are the topics for scholarly discussion beyond the description of individual projects, when it comes to the processing of images in historical research?

The situation in the area is made difficult, because some of the underlying assumptions are connected with vigorous research groups, who use fora of scholarly debate, which are only slightly overlapping; so, what is tacitly assumed to hold true in one group of research projects may be considered so obviously wrong in another one, that it scarcely *deserves* explicit refutation.

We hope, that we have been successful in bringing some of these hidden differences in opinion out into the open. We consider this extremely important, because only that clarification allows for a fair evaluation of projects which may have started from different sets of assumption. So important, indeed, that we would like to catalogue here some of the basic differences of opinion which exist between image processing projects. The reader will rediscover them in many of the contributions; as editor I think however, that summarizing them at the beginning may make the contributions — which, of course, have been striving for impartiality — more easily recognizable as parts of one coherent debate.

Three basic differences in opinion seem to exist today:

(1) Is image processing a genuine and independent field of computer based research in the Humanities, or is it an auxiliary tool? Many projects assume tacitly — and some do so quite outspokenly — that images on the computer act as illustrations to more conventional applications. To retrieval systems, as illustrations in catalogues and the like. Projects of this type tend to point out, that with currently easily available equipment and currently clearly understood data processing technologies, the analysis of images, which can quite easily be handled as illustrations today, is still costly and of uncertain promise. Which is the reason why they assume, that such analytical approaches, if at all, should be undertaken

as side effects of projects only, which focus upon the relatively simple administration of images. Their opponents think, in a nutshell, that while experiments may be needed, their overall outcome is so promising, that even the more simple techniques of today should be implemented only, if they can later be made useful for the advanced techniques now only partially feasible.

(2) Connected to this is another conflict, which might be the most constant one in Humanities data processing during the last decades, is particularly decisive, however, when it comes to image processing. Shall we concentrate on levels of sophistication, which are available for many on today's equipment or shall we try to make use of the most sophisticated tools today, trusting that they will become available to an increasingly large number of projects in the future? This specific battle has been fought since the earliest years of Humanities computing, and this editor has found himself on both sides at different stages. A "right" answer does not exist: the debate in image processing is probably one of the best occasions to understand mutually, that both positions are full of merit. It is pointless to take permanently restrictions into consideration, which obviously will cease to exist a few years from now. It discredits all of us, if computing in history always promises results only on next years equipment and does not deliver here and now. Maybe, that is indeed one of the more important tasks of the *Association for History and Computing*: to provide a link between both worlds, lending vision to those of us burdened down by the next funding deadline and disciplining the loftier projects by the question of when something will be affordable for all of us.

(3) The third major underlying difference is inherently connected to the previous ones. An image as such is beautiful, but not very useful, before it is connected to a description. Shall such descriptions be arbitrary, formulated in the traditionally clouded language of a historian, perfectly unsuitable for any sophisticated technique of retrieval, maybe not even unambiguously understandable to a fellow historian? Or shall they follow a predefined catalogue of narrow criteria, using a carefully controlled vocabulary, for both of which it is somewhat unclear how they will remain relevant for future research questions which have not been asked so far? — All the contributors to this volume have been much to polite to phrase their opinions in this way: scarcely any of them does not have a strong one with regard to this problem.

More questions than answers. "Image processing", whether applied to images proper or to digitalized manuscripts, seems indeed to be an area, where many methodological questions remain open. Besides that, interestingly, it seems to be one of the most consequential ones: a project like the digitalization of the *Archivo General de Indias* will continue to influence the conditions of historical work for decades in the next century. There are not only many open questions, it is worthwhile and necessary to discuss them.

While everybody seems to have encountered image processing in one form or the other already, precise knowledge about it seems to be relatively scarce. The volume starts, therefore, with a general introduction into the field by J. v.d. Berg, H. Brandhorst and P. v. Huisstede. While most of the following contributions have been written to be as self supporting as possible, this introduction attempts to give all readers, particularly those

with only a vague notion of the techniques concerned, a common ground upon which the more specialized discussions may build.

The contributions that follow have been written to introduce specific areas, where handling of images is useful and can be integrated into a larger context. All authors have been asked in this part to clearly state their own opinion, to produce clearcut statements about their methodological position in the discussions described above. Originally, four contributions were planned: the first one, discussing whether the more advanced techniques of image processing can change the way in which images are analysed and handled by art historians, could unfortunately not be included in this volume due to printing deadlines: we hope to present it as part of follow up volumes or in one of the next issues of *History and Computing*.

The paper of M. Thaller argues that scanning and presenting corpora of manuscripts on a work station can (a) save the originals, (b) introduce new methods for palaeographic training into university teaching, (c) provide tools for reading damaged manuscripts, the comparison of hand writing and general palaeographic studies. He further proposes to build upon that a new understanding of editorial work. A fairly long technical discussion of the mechanisms needed to link images and transcriptions of manuscripts in a wider context follows.

F. Colson and W. Hall discuss the role of images in teaching systems in university education. They do so by a detailed description of the mechanism by which images are integrated into Microcosm / HiDES teaching packages. Their considerations include the treatment of moving images; furthermore they enquire about relationships between image and text in typical stages in the dialogue between a teaching package and a user.

W. Hall and F. Colson argue in the final contribution to this part the general case of open systems, exemplifying their argument with a discussion of the various degrees in which control about the choices a user has is ascertained in the ways in which navigation is supported in a hyper-text oriented system containing images. In a nutshell the difference between "open" and closed systems can be understood as the following: in an "open system" the user can dynamically develop further the behaviour of an image-based or image-related system. On the contrary in static "editions" the editor has absolute control, the user none.

Following these general description of approaches, in the third part, several international projects are presented, which describe in detail the decisions taken in implementing "real" image processing based applications, some of them of almost frightening magnitude. The contributors of this part were asked to provide a different kind of introduction to the subject than those to the previous two: all of them should discuss a relatively small topic, which, however, should be discussed with much greater detail than the relatively broad overviews of the first two parts.

All the contributions growing out of the workshop came from projects, which had among their aims the immediate applicability of the tools developed within the next 12 - 24 months. As a result they are focusing on corpora not much beyond 20.000 (color) and 100.000 (b/w) images, which are supposed to be stored in resolutions manageable within ≤ 5 MB / image (color) and ≤ 0.5 MB / image (b/w). The participants of the workshop felt strongly, that this view should be augmented by a description of the rationale behind

the creation of a large scale project for the systematic conversion of a complete archive. The resulting paper, by P. González, describes the considerations which lead to the design of the *Archivo General de Indias* project and the experiences gained during the completed stages. That description is enhanced by a discussion of the strategies selected to make the raw bitmaps accessible via suitable descriptions / transcriptions / keywords. A critical appraisal, which decisions would be made differently after the developments in hardware technology in recent years, augments the value of the description.

The participants of the workshop felt furthermore strongly, that their view described above should be augmented by a description of the techniques used for the handling of images in extremely high resolution. A. Hamber's contribution, dealing with the *Vasari project*, gives a very thorough introduction into the technical problems encountered in handling images of extremely high quality and also explains the economic rationale behind an approach to start on purpose with the highest quality of images available today on prototypical hardware.

As these huge projects both were related to institutions which traditionally collect source material for historical studies, it seemed wise to include also a view on the role images would play in the data archives which traditionally have been of much importance in the considerations of the AHC. E.S. Ore discusses what implications this type of machine readable material should have for the infrastructure of institutions specifically dedicated to Humanities computing.

Image systems which deal with the archiving of pictorial material and manuscript systems have so far generally fairly "shallow" descriptions. At least in art history, moreover, they rely quite frequently on pre-defined terminologies. G. Jaritz and B. Schuh describe how far and why historical research needs a different approach to grasp as much of the internal structure and the content of an image as possible.

Last not least R. Rowland, who acted as host of the workshop at Firenze, describes the considerations which currently prepare the creation of another largescale archival database, to contain large amounts of material from the archives of the inquisition in Portugal. His contribution tries to explore the way in which the more recent developments of image processing can be embedded in the general services required for an archival system.

This series of workshop reports shall attempt to provide a broader basis for thorough discussions of current methodological questions. Their main virtue shall be, that it is produced sufficiently quick to become available, before developments in this field of extremely quick development make them obsolete. We hope we have reached that goal: the editor has to apologize, however, that due to the necessity to bring this volume out in time, proofreading has by necessity be not as intensive as it should have been. To which another shortcoming is added: none of the persons engaged in the final production of this volume is a native speaker of English; so while we hope to have kept to the standards of what might be described as "International" or "Continental" English, the native speakers among the readers can only be asked for their tolerance.

Göttingen, August 1992