Debating Digital Art History

Anna Bentkowska-Kafel

Abstract: This paper offers a few reflections on the origins, historiography and condition of the field often referred to as Digital Art History (DAH), with references, among others, to the activities of the Computers and the History of Art group (CHArt, est. 1985) and my personal experience, spanning over 20 years, first as a postgraduate student, then doctoral researcher and eventually Lecturer in DAH. The publications and teaching activities of scholars connected to CHArt are seen as indicative of the evolution of the field internationally. Personal experience, or a reality check, is limited to higher education in the UK. The key argument here concerns the questionable benefit of promoting DAH as a discrete discipline and detaching digital practices from the mainstream history of art and its institutions. When introduced in the late 1990s, the 'DAH' served to indicate a dramatic shift in the way art history could be practiced, taught, studied and communicated. The changes were brought about by widening access to computers and information technology. DAH was suggested—"perhaps a little ahead of time— as a new kind of intellectual fusion" (W. Vaughan). It is no longer necessary to argue for the wise use of computers. Digital technology has become part and parcel of teaching, learning and re-search. It is the History of Art and its more traditional research methods and critical per-spectives that are seen at risk of neglect. The theories of crisis, even 'death' of Art History have contributed to general anxiety over the discipline's future. However, a discipline has "the ability and power to control and judge its borders" (R. Nelson). The discipline of Art History is richer and stronger through the fusion of digital scholarship with, not separation, from more traditional methodologies and critical canons. The need to continue with the 'digital' distinction is questionable.

Keywords: art history, arts computing, digital art history, historiography

Digital Art History. A new or old field?[1]

HAIR – History of Art Information and Resources; HAGGIS – History of Art Group for Information Systems; and HACKS – History of Art, Computers, Knowledge, Slides, were among many names proposed in 1985 for a group, which eventually established itself inter-nationally under the name of Computers and the History of Art, or CHArt.[2] The

Figure 1: A cartoon drawing by an unknown hand, in CHArt Newsletter, 2 (1986): 21.
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acronym CHIMERA was also considered, in the same light-hearted spirit, but was rejected on the grounds of 'enough anxieties about our ontological status already'.[3] Thirty years on, does this anxiety not sound familiar to those engaged in art-historical computing?

After a few years of intense activity and debate, in 1989 CHArt published its first scholarly overview of the field. The book was titled, predictably, *Computers and the History of Art*.[4] A bibliographic record, located in what appears an early online library catalogue, reads 'No discipline assigned' (Fig. 2). It shows the bibliographer's inability to assign the title to any discipline known at the time. Why the bibliographer did not classify this book under the History of Art, which features in the title, gives food for thought.

The present new Journal and numerous recent and upcoming international events are indicative of the renewed interest in Digital Art History (DAH).[5] Four institutes held in the US in the summer of 2014 led to the belief that 'Digital Art History Takes Off'.[6] This has been a frustratingly long 'take-off'. The tendency is to discuss and define this field through its presumed novelty and in opposition to art-historical scholarship and its dissemination formats that do not rely on digital media. Digital Humanities (DH) has been engaged in a similar debate. The blurred relationship between DAH and DH has been noted on many occasions. For example, in the *Digital Art History* workshop organized by the Getty Research Institute and the University of Málaga in 2011.[7] The resulting publication, with additional material, includes the burning question, on this occasion

Figure 2: Computers and the History of Art (1989) and the book record at http://www.getcited.org/pub/102797848 (accessed 1.03.2013).
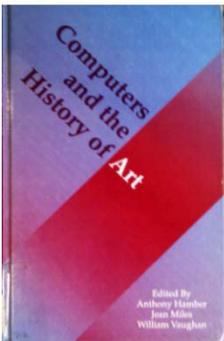
Computers and the history of art

Post a Comment

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raised by Johanna Drucker, *'Is There a "Digital" Art History?'* [8]

Why do we continue raising questions concerning the ontological status of DAH? Are we asking the wrong questions? Or, being engaged in this field in one way or another, are we simply asking for recognition? Those who are new to this debate, students in particular, may find this continued scrutiny of the place of digital technology in the art-historical practice and critical inquiry confusing and perhaps even pointless. These few personal reflections on the origins, historiography and condition of DAH are addressed to them.

Am I a Digital Humanist or a Digital Art Historian or, simply, an Art Historian?

The big question for this Journal—what is DAH?—has been recurring since the late 1990s. The desire to define the field anew has been the reason for convening the aforementioned recent international events. What it takes to become a digital art historian and pursue a career in this field is an interrelated question. In most disciplines the level of professionalism is normally determined by a degree or another recognized qual-

ification after a period of training. If one practices medicine without a diploma, one is a charlatan; if one paints without having studied fine art, one is a dilettante. Is it necessary to have a degree in DAH to be considered a professional digital art historian?

In 1990 the Department of the History of Art at Birkbeck College, University of London, introduced an MA in Computer Applications for the History of Art, later renamed MA DAH. Postgraduate students were taught by the art historian William Vaughan, photography expert Anthony Hamber and art imaging scientist Kirk Martinez, among others. These academics were engaged at the time (1989–92) in the European Esprit II project, best known under the acronym VASARI — Visual Art System for Archiving and Retrieval of Images. The project was a collaboration between Birkbeck, the National Gallery in London, Bramuer Ltd. UK, Telecom Paris, the Doerner Institute in Munich and other institutions. Benefiting from the funding of around US$2 million, the project developed a prototype scanner and a methodological basis for accurate color reproduction of paintings, for the purpose of recording and conservation.

Apart from the expertise of the teachers and their infectious enthusiasm for computing, Birkbeck's students benefited from a departmental Vasari computer lab. It was well-equipped with *networked* Mac and IBM computers, a Silicon Graphics workstation for imaging and 3D work, scanners and a wide range of software. The syllabus could be envied by many Art History departments even today. [9] The emphasis was on critical dis-

cussion of the value of using computational methods in art-historical investigations. Essay/exam questions included, for example: 'To what extent have imaging techniques for pictorial analysis yielded *concrete results* for the study of art history?'; 'Discuss the value of using statistical methods in the study of history of art, using *specific examples.*' [my emphasis] Of course, to be able to answer such questions, it was mandatory for the student to have a background in art history, as well as acquire practical computing skills, including basic coding. I arrived at Birkbeck with a master's degree in 'straightforward' 'old' History of Art and several years of curatorial museum experience. The reading list drew on a considerable body of specialist literature published in the 1980s, with a significant number of titles published by CHArt and the Getty Art History Information Program (AHIP). The course is no longer offered.

Having graduated from Birkbeck in 1994, with an MA in Computer Applications for the History of Art, I went on to do a PhD in digital iconology. I located a small body of some 50 Early-Modern paintings, drawings and prints representing nature in human form. I undertook to establish, mainly through sixteenth- and seventeenth-century cosmological texts, the purpose and meaning of such anthropomorphic representations for the contemporary beholder. I was curious to find out why a number of mediocre artists depicted landscape as a human figure; how many such works have survived, in what form and where. I wanted to describe, classify, date and attribute these double images to particular schools and propose an indexing

system independent of ambiguous subject classifications. I was also driven by a determination to prove a prominent critic of my chosen computational methods wrong. I owe him my gratitude. Every stage of my 'old-fashioned' research—pre-iconographical, iconographical and iconological—benefited from digital tools, computer graphics, pattern recognition and image processing in particular.[10]

In the course of my unconventional career I have had the opportunity to slowly, but steadily introduce classes in DAH. First, in 1995, to a BA (Hons) Art and Design History course at Southampton Institute, then to the graduate and postgraduate programs at Birkbeck and the Centre for Computing in the Humanities at King's College London. I renamed the King's module to Digital Arts and Culture, making it more approachable to students. In 2014–2015 it is being offered for the last time.

King's Digital Humanities has offered me a stimulating academic environment; a scholarly community of distinction with critical enthusiasm for arts computing. From 2000–2008 I also worked at the Courtauld Institute of Art on the British Academy's *Corpus of Romanesque Sculpture in Britain and Ireland.* Regrettably, there was no interest to embed this or any other large-scale computer-based projects, hosted by the Institute, in the teaching curricula, to enable students to learn from the then cutting-edge digitization practices. Project teams endeavored, in collaboration with external specialists, to produce digital images of medieval stain-glass and sculpture of the highest resolution possible, coded records of objects in XML, automated some of the

editorial processes, designed databases and managed large sets of data[11], while postgraduate students and academics continued to rely on the slide library and print reproductions in the Conway and Witt libraries renowned for the custom-made, red and green filing boxes. The situation at King's Centre for Computing in the Humanities (now the Department of Digital Humanities) was quite the opposite. Postgraduate teaching has always evolved around scholarly computer-based projects, which established the reputation of the Department. This has been a computer-friendly environment, but my art-historical specialism, with its emphasis on visual arts, rather than text, felt out of place.

It was the recognition of digital visualization as a scholarly method of Digital Humanities that provided a welcome context to my research, and extended teaching and training opportunities to include historical visualization and virtual museums.[12] Through experimentation with digital tools and processes my students and I have been able to better understand the complexity of human perception. The opportunity to experience and discuss, for example, the potential cognitive value of machine haptics in simulating touch and handling of museum objects that is normally not possible, made us more aware of the extent to which art-historical appreciation and museum education privilege the role of visual experience (Fig. 3).

Despite benefiting from affiliation to DH, I believe the place of DAH is within academic art institutions, ideally with access to teaching art collections.

Digital Art History. A history

Art History has been described by Robert Nelson as "a discipline that typically studies the histories of everything but itself, conveniently forgetting that it, too, has a history and is History."[13]

An early use of the phrase 'DAH' is in 1997 by Sally M. Promey and Miriam Stewart in "Digital Art History: a new field for collaboration", published in *American Art*.[14] The authors describe teaching and learning with digital images, and recognize "the larger implications of new electronic technologies for visual education and scholarship in the museum and the academy".[15] There is no mention of DAH other than in the title, but the authors offer a number of insightful observations concerning the subject.

Since its initiation in 1985, CHArt "has set out to promote interaction between the rapidly developing new IT and the study and practice of Art. [Over the years] it has become increasingly clear that this interaction has led, not just to provision of new tools for carrying out of existing practices, but to the evolution of unprecedented activities and modes of thought. It was in recognition of this change that we decided, in 2001 to hold a conference entitled 'DAH' [*A Subject in Transition: Opportunities and Problems*], suggesting – perhaps a little ahead of time – a new kind of intellectual fusion."

explains William Vaughan.[16] The subject of the conference proved extremely controversial. Therefore, the following year CHArt convened, again at the British Academy, the conference *Digital Art History? Exploring Practice in a Network Society,* adding a question mark and the emphasis on the impact of the internet on art and AH.[17] CHArt's voice was international and far-ranging, but not unanimous in the understanding of DAH.

One may argue that the founding principles and methods of DAH were laid down decades ago. The vision and achievements of pioneers of arts computing deserve proper recognition. Some key concepts were developed well before the advent of personal computers and the internet, *in anticipation* of information communication technology as it is known today. "A worldwide museum information network for research, [...] lectures and simulated exhibitions (in audio/visual form) delivered electronically, upon request, to a classroom console or even to the home" was Everett Ellin's vision already in the mid-1960s.[18] Significant considerations and applications of computer technology—demonstrating its benefit to the study of art—go back to the 1980s. The second *Conference in Automatic Processing of Art History Data and Documents*, held in Pisa in 1984, set the international research agenda for years to come.[19] The need to learn programming languages seemed then inevitable and frightened most art historians, but not William Vaughan. In the 1980s he initiated the development of early pattern recognition software for matching and retrieval of images of paintings. Using the University of Cambridge (UK) mainframe computer, the architectural historian Tim Benton of the Open University created a database of Le Corbusier's architectural drawings and notes. He went on to enhance this resource with tools for scaling and comparing the drawings in a way not possible with paper originals.[20] The resource is not widely available, but the insights into the architect's creative

NON-INVASIVE 3D RECORDING

MUSEUM

Laser scanning of objects in the Potteries Museum, Stoke-on-Trent, UK, to create virtual 3D surrogates. Photos: L. Hewett

CLASSROOM

VIRTUAL ARTEFACTS

A screen grab of a 3D model of a carved ivory inlaid box, scanned and optimised for haptic display, created as a demonstration for Warwick Castle, UK.
Image: D. Prytherch, User-lab, City University, Birmingham

VIRTUAL LAB

VIRTUAL MUSEUM

Simulated handling of virtual artefacts through Machine Haptics.
Photo: A. Bentkowska-Kafel, 2010

Figure 3: Understanding touch and its value in art studies; a postgraduate class taught by Anna Bentkowska-Kafel, King's College. London and David Prytherch, Birmingham Institute of Art and Design, 2009–2015.

A postgraduate course in Digital Arts and Culture, Department of Digital Humanities, King's College London, UK © Anna Bentkowska-Kafel and David Prytherch

Figure 4: Visualization of Piet Mondrian's studio at 5 rue de Coulmiers, Paris. South wall view with and without easel.
(© Ryan Egel-Andrews, 2009)
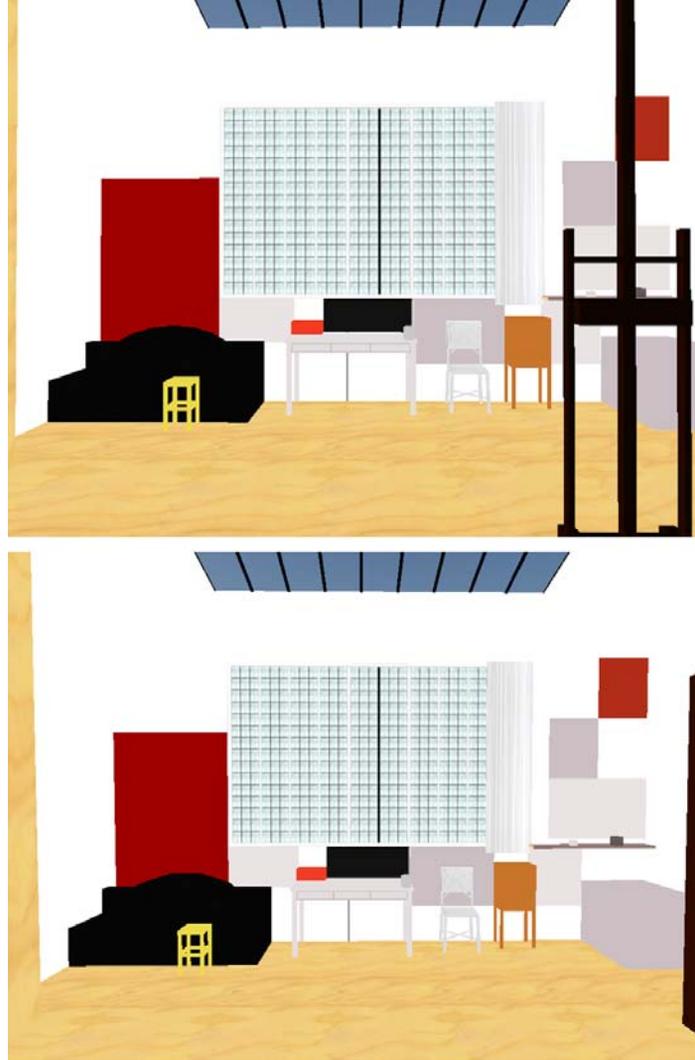
process it has enabled are evidenced in Benton's writings. The pioneering work of Marilyn Aronberg Lavin in the course of her research into "the narrative disposition of medieval and Renaissance mural decoration", since 1988, involved the creation of a database of some 280 fresco cycles and construction of a computer model of the Cappella Maggiore of San Francesco in Arezzo, decorated with Piero della Francesca's the *Legend of the True Cross*.[21] A later version of the 3D model is, remarkably, still available online.[22]

When we talk about the nature and significance of DAH, we recognize the rise in the status of this field. Some of the earlier concerns over Art History "not being at the helm of the sweeping visualization revolution" have been resolved, although not entirely satisfactorily.[23]

However, defining the nature of DAH, in all its cognitive and methodological complexity, proves more difficult. It is relatively straightforward to look at the applications of digital technology—past and current—to art practice, art scholarship, conservation and education. They give us a good picture how the field has evolved over the years, and help to foresee its possible future directions. Whether applied DAH has led to establishing a theoretical basis that could set the field firmly *within* or *apart* from mainstream AH is an open question. There is no area of DAH that cognitively would be distinct from AH. Evolving digital analytical methods facilitate the discovery of new knowledge and review of earlier scholarship. It is particularly satisfying when this discovery comes from students, as in the case of Ryan Egel-Andrews's original, visualization-

based research into Piet Mondrian's experiments with architectural space. It challenges earlier assumptions about the artist's lack of interest in the third dimension.[24] Three-dimensional computer model of the artist studio supported the reading of Mondrian's writings and interpretation of Neoplastic principles. A photo-realistic recreation of architectural space was not the aim of this visualization.

Digital Art History has been mainly promoted through applications of digital technology. Little effort has been made to conceptualize this practice; to connect projects and evaluate patterns in emerging methodologies and critical perspectives. Digital Art History has not established its own canon of critical texts. When asked to identify the most significant written works about New Media art 1970–2000, Lev Manovich proposed a list of ten titles.[25] Literature on applied DAH is abounding, but I would find it difficult to identify critical texts that have made a lasting impact.

Reconnecting Digital Art History to Art History

In the introduction to his popular anthology of critical texts in *Art History and its Methods* (1st ed. 1995), Eric Fernie refutes the apparent 'death' of Art History.[26] He addresses a need to present a history of the methods, "which art historians have found appropriate or productive in studying the objects and ideas which constitute their discipline [believing that] undergraduates might welcome a discussion of the range of approaches available to them for the study of their subject [...]".[27] When referring to the present, Fernie notes 'Versatility and Potential'. There is no mention of the computer. No text concerning its use or impact on key concepts is included in the anthology. While the addition of digital practice and more recent texts would be welcome in future editions (similarly to the anthology edited by Donald Preziosi[28]), my identification of the lack of theoretical writings concerned explicitly with DAH is not a criticism.

In his keynote address to the first CHArt conference dedicated to DAH, held in 2001, Eric Fernie was not only provocative, but also right to question the very concept of DAH as a subject separate from the traditional History of Art.[29] DAH scholarship has investigated intrinsically 'mainstream' art-historical questions, such as the narrative schemes in Italian Renaissance wall decoration, and artistic principles of Mondrian's Neoplasticism. Digital iconology needs Panofsky. The study of digital aesthetics would be poorer without Kant or Goodman. A phenomenological critique of virtual historical environments may only benefit from the writings of Wilhelm Dilthey. Walter Benjamin's *The Work of Art in the Age of Mechanical Reproduction* [1936] is probably one of the most frequently cited texts in discussions of digital culture. Critical perspectives of DAH are well served by a much broader canon.

Art History has always been inter-disciplinary and always aware of broader theoretical contexts. Serious art-historical arguments not only require, but neces-sitate erudite knowledge of—variably—history of ideas, philosophy, history, literature, religion and beliefs, etc. Earlier attempts at defining DAH have been only partly successful, because they sought the differences rather than affinities with established methodologies and conven-tions. It is impossible to address art-historical questions—whether philosoph-ical, social, political, formal and aesthe-tical—without drawing on the history of human thought and artistic practice. Digital research into art and cultural heritage, which has not been informed by a professional art-historical knowledge and rigorous scholarly methodology, often demonstrates inferior or uncertain cognitive value of the findings. Examples include historical visualization that does not show the difference between known facts and hypotheses.

Digital Art History is not a discrete discipline, but an umbrella name for methods that involve digital tools, techniques and processes of analysis and interpretation, ranging from basic statistics to complex applications of Artificial Intelligence (computer vision, pattern recognition, automation, etc.). These tools and techniques are not unique to Art History; they are uni-methods. The Zurich Declaration on Digital Art History (2014) reads like re-commendations for digital scholarship in general.[30] Its eight points—on methodology, authority data, archives and collections, big data, digital work-space, open access, legal matters and sustainability—describe the conditions that are necessary to practice many other disciplines.

Like 'New Media' and 'Digital Humanities', 'DAH' is a temporary name that has served its purpose. By continu-ing to emphasize the 'digital', rather than

Figure 5: Students of Digital Arts and Culture at Michael Takeo Magruder's *De/Coding the Apocalypse* exhibition, Somerset House, King's College London. (Photo: A. Bentkowska-Kafel, 2014)

'art' and 'history', we are contributing to further ontological disruption of the discipline. We should instead stress the significance of earlier thought and methods.

Hans Belting believed that "Both the artist and the art historian have lost faith in a rational, teleological process of artistic history, a process to be carried out by the one and described by the other".[31] The twentieth-century rift between art-historical scholarship and art practice (about which Belting argued so eloquently, if controversially) is alleviated when an art form is also a means of scholarly inquiry. The *De/Coding the Apocalypse* exhibition (Somerset House, 2014) may serve as an example of art, which has the power of reconnecting artistic practice with scholarly enquiry and learning.[32] This particular collaboration was between the computer artist, Michael Takeo Magruder, programming and digital technology specialists, and theology scholars. Visiting the exhibition has inspired the students of Digital Arts and Culture to decode the Book of Revelation of St John the Divine and interpret it for their own time.

According to critics, the crisis of academic art history is partly due to changing education needs and students' loss of interest in historical art; the tendency to ignore historical sources; increasing neglect of fieldwork and archival research; "denigration of critical thinking as practiced in the pre-digital age".[33] It is therefore counter-productive to continue to differentiate between DAH and AH. The emphasis should be on erudite historical knowledge, including earlier digital scholarship and its

historiography. Art, rather than application of digital technology, should be seen as the incentive for acquiring this knowledge. DAH should drop the 'Digital' label which soon will become irrelevant anyway. The embrace of digital technology in the best possible manner and in *intellectual fusion*, not in opposition to critical and methodological traditions of the discipline, is a way of demonstrating that there is no 'crisis', no 'lagging behind', that continues to plague the reputation of the academic history of art and is discouraging new students.

Students are interested in history when it is presented as relevant and in a way they find appealing. The classroom-based model of teaching, with the typical projection of images of art, away from art being the subject of study, is now an inferior mode of teaching and learning. Although not without logistical problems, a class at the *De/Coding Apocalypse* exhibition, led by the artist, is a perfect scenario. Students responded with equal enthusiasm, and eagerness to learn, when they visited the National Gallery, London to study Hans Holbein the Younger's so-called *Ambassadors* (1533), in the vicinity of other works of the artist and best examples of Western painting.

"What would be a digital modern equivalent to the Holbein image?"—is a question that in the early days of my teaching career I would not have asked of postgraduate students. Today such a question inspires international students of the Google and Wikipedia generation to learn about the making, meaning and provenance of Holbein's masterpiece; the art, music, science, religion and politics of the time. The students typically re-

present different cultural backgrounds and very different levels of general knowledge; some are unfamiliar with European Renaissance. In the case under discussion, the inspiration to learn history *and* digital technology came primarily from the sixteenth-century work of art. The digital collage that resulted from student collaboration was based on a thorough study of sources, surprisingly also books in print. The collage employed a variety of media, including an original musical composition. It was creative and funny, but also thoughtful and critical of the past and present. The students also learned about copyright restrictions that are preventing a public showing of their coursework. The future of the History of Art is in training of the observant eye and knowledgeable, critical mind, using digital tools when useful. CHArt's early idea of HACKS requires only one revision—History of Art, Computers, Knowledge, *seriously.*

Notes

[1] Acknowledgements: I wish to thank the Editors of the *International Journal for Digital Art History*, Harald Klinke and Liska Surkemper, for the invitation to share these comments with the readers of the first issue of their Journal. I am grateful to the Editors and Trish Cashen, Neil Grindley, Hubertus Kohle and Jeremy Pilcher for reading the manuscript and for their excellent critical comments. The paper is partly based on my unpublished talk, *Mapping Digital Art History*. The missing chapter, presented to the Digital Art History Laboratory at the Getty Research Institute, CA, held 5–8 March 2013.

[2] *See* Computers and the History of Art (CHArt), www.chart.ac.uk. All URLs active on 15 April 2015, unless stated otherwise.

[3] Dave Guppy, Will Vaughan and Charles Ford, eds., *Computers and the History of Art Newsletter*, 1

(1985): 26.

[4] Anthony Hamber, Jean Miles and William Vaughan, eds., *Computers and the History of Art* (London and New York: Mansell Pub., 1989).

[5] For example, *Digital Art History*, Mellon Research Initiative, convened by Jim Coddington at the Institute of Fine Arts, New York University, 30 November – 1 December 2012; http://www.nyu.edu/gsas/dept/fineart/research/mellon/mellon-digital.htm; *Digital Art History Laboratory* held at the Getty Research Institute, CA, 5–8 March 2013; *Digital Art History: Challenges and Prospects*, International Conference, held at the Swiss Institute for Art Research (SIK-ISEA), Zürich, 26–27 June 2014; http://www.gta.arch.ethz.ch/events/digital-art-history-challenges-and-prospects.

[6] Anne Collins Goodyear and Paul B. Jaskot, "Digital Art History takes off", *CAA News,* College Art Association, 7 October 2014, http://www.collegeart.org/news/2014/10/07/digital-art-history-takes-off/

[7] *Digital Art History: Challenges, Tools & Practical Solutions*, University of Málaga and the Getty Research Institute (GRI), Malaga, 19–22 September 2011, http:/digitalarthistory.weebly.com/

[8] *Visual Resources. An International Journal of Documentation*, Special Issue on Digital Art History edited by Murtha Baca *et al.*, 29.1 (2013). J. Drucker's opening article, 'Is There a "Digital" Art History?', 5–13.

[9] Anthony Hamber, "Computer Applications in the History of Art. A Perspective from Birkbeck College, University of London", in *La Revue Informatique et Statistique dans les Sciences Humaines*, Université de Liège, 29.1–4 (1992): 86–89.

[10] Anna Bentkowska, "Computer-aided Iconological Analysis of Anthropomorphic Landscapes in Western Art, c. 1560-1660" (doctoral thesis; multimedia CD-ROM, Nottingham Trent University, 1998); "Ikonologia cyfrowa – nowe oblicze starej metody" [English summary: 'Digital Iconology. A New Approach to the Old Method'], in *Ars Longa*, published in memory of Professor Jan Białostocki, ed. Teresa Hrankowska (Warsaw: Arx Regia, 1999), 387–409.

[11] Anna Bentkowska-Kafel, "Electronic Corpora of Artefacts: The Example of the Corpus of Romanesque Sculpture in Britain and Ireland", in *The Virtual Representation of the Past*, eds. Mark Greengrass and Lorna Hughes (Farnham: Ashgate, 2008), 179–190.

[12] Martyn Jessop, "*Visualization as a Scholarly*

Activity", Literary and Linguistic Computing, 23, no. 3 (2008): 281–93. Anna Bentkowska-Kafel, "'*I bought a piece of Roman furniture on the Internet. It's quite good but low on polygons'*—Digital Visualization of Cultural Heritage and its Scholarly Value in Art History," *Visual Resources. An International Journal of Documentation*, Special Issue on Digital Art History ed. Murtha Baca *et al.*, 29, no. 1 (2013): 38–46.

[13] Robert S. Nelson, "The Map of Art History", *The Art Bulletin*, 79, no. 1 (1997): 28.

[14] Sally M. Promey and Miriam Stewart, "Digital Art History: a new field for collaboration", *American Art,* 11, no. 2 (1997): 36–41.

[15] Ibid, 36.

[16] William Vaughan, "Introduction. Digital Art History?", in *Digital Art History – A Subject in Transition,* ed. Anna Bentkowska-Kafel, Trish Cashen and Hazel Gardiner (Bristol and Portland: Intellect, 2005), 1.

[17] The programmes for both conferences are available at http://www.chart.ac.uk/chart01pro gramme.html and http://www.chart.ac.uk/cfp2002 .html respectively. Selected papers have been published in two volumes of proceedings online and in book format, op. cit., note 15 above.

[18] Everett Ellin*,* "*Museums and the computer. An Appraisal of new potentials," Computers and the Humanities* 4 (*1969): 25–30.*

[19] Laura Corti and Marilyn Schmitt, eds., *International Conference in Automatic Processing of Art History Data and Documents*, held at the Scuola Superiore de Pisa, 24–27 Sept 1984, Scuola Superiore de Pisa and the Getty Trust AHIP, Santa Monica (1984). The Conference was first held in 1978.

[20] Tim Benton*,* "Le Corbusier and his drawings: an integrated database and drawing package". Abstract of paper presented to *Digital Environments: Design, Heritage and Architecture*, Fifteenth Annual Conference of Computers and the History of Art, 24–25 September 1999, University of Glasgow, available at http://www.chart.ac.uk/chart99/ben ton.html

[21] I wish to thank Marilyn Aronberg Lavin for clarifying the nature and scope of her collaborative computing work; the citation is to email communication of 14 Jan 2013; see her "Piero della Francesca: Legend of the True Cross: 3-D Walkthrough, Realtime, Interactive Computer Model," *1492. Rivista della Fondazione Piero della Francesca* 1 (2009): 59–72, revised in http://www.

archimuse.com/mw2009/

[22] http:/projects.ias.edu/pierotruecross

[23] Barbara Maria Stafford in: Kathleen Cohen, James Elkins, Marilyn Aronberg Lavin et al., "Digital Culture and the Practices of Art and Art History." *Art Bulletin* 79, no. 2 (1997): 214.

[24] Ryan Egel-Andrews, "Paradata in Art-historical Research. A Visualization of Piet Mondrian's Studio at 5 rue de Coulmiers", in *Paradata and Transparency in Virtual Heritage*, ed. Anna Bentkowska-Kafel and Hugh Denard (Farnham: Ashgate, 2012): 109–124. Abstract at https://visualizationparadata. wordpress.com/10-2/

[25] Lev Manovich, "Ten Key Texts on Digital Art: 1970–2000," *Leonardo* 35, no. 5 (2002): 567–569 and 571–575, also available at http://manovich.net/ index.php/projects/key-texts-on-new-media-art

[26] *Art History and its Methods, a critical anthology,* Selection and commentary by Eric Fernie (London: Phaidon, 1995).

[27] Ibidem, 8.

[28] Donald Preziosi, ed., *The Art of Art History: A Critical Anthology* (Oxford University Press, 1998).

[29] Eric Fernie's keynote address has not been published. See, Anna Bentkowska-Kafel, Editorial, *Digital Art History – A Subject in Transition: Opportunities and Problems*, CHArt Conference Proceedings Online, 4 (2001), http://www.chart.ac. uk/chart2001/papers/noframes/editorial.html

[30] Zürich Declaration on Digital Art History (2014), http://www.gta.arch.ethz.ch/events/digital-art-history-challenges-and-prospects

[31] Hans Belting, *The End of the History of Art?* [1984], trans. Christopher S. Wood (Chicago and London: The University of Chicago Press, 1987): ix.

[32] Argula Rublack, "Exploring theology with digital art." A student review of the De/Coding the Apocalypse exhibition, based on postgraduate coursework, *Cassone. The Internatioal Online Magazine of Art and Art Books,* April 2015, http://www. cassone-art.com/magazine/article/2015/04/explor ing-theology-with-digital-art/?psrc=photography-and-media

[33] Patricia Mainardi, "The Crisis in Art History. Introduction." *Visual Resources: An International Journal of Documentation* 27, no. 4 (2011): 303. Maxwell L. Anderson, "The Crisis in Art History: Ten Problems, Ten Solutions." ibidem, 337. Similar findings in Diane M. Zorich, *Transitioning to a Digital World. Art History, Its Research Centers, and Digital Scholarship,* A Report to the Samuel H. Kress Foundation and the Roy Rosenzweig Center

for History and New Media, George Mason University (2012), available at http://www.kress foundation.org/uploadedFiles/Sponsored_Research /Research/Zorich_TransitioningDigitalWorld.pdf

Bibliography

Anderson, Maxwell L. "The Crisis in Art History: Ten Problems, Ten Solutions." *Visual Resources. An International Journal of Documentation* 27, no. 4 (2011): 336–343.

Aronberg Lavin, Marilyn. "Piero della Francesca: Legend of the True Cross: 3-D Walkthrough, Realtime, Interactive Computer Model", in *1492. Rivista della Fondazione Piero della Francesca*, 1 (2009): 59–72, revised in http://www.archimuse.com/mw2009/

Belting, Hans. *The End of the History of Art?* [1984] Translated by Christopher S. Wood. Chicago and London: The University of Chicago Press, 1987.

Bentkowska, Anna. "Computer-aided Iconological Analysis of Anthropomorphic Landscapes in Western Art, c. 1560-1660." Doctoral thesis; multimedia CD-ROM, Nottingham Trent University, 1998.

Bentkowska, Anna. "Ikonologia cyfrowa – nowe oblicze starej metody" [English summary: 'Digital Iconology. A New Approach to the Old Method']. In *Ars Longa*, published in memory of Professor Jan Białostocki, edited by Teresa Hrankowska, 387–409. Warsaw: Arx Regia, 1999.

Bentkowska-Kafel, Anna. "Electronic Corpora of Artefacts: The Example of the Corpus of Romanesque Sculpture in Britain and Ireland.", In *The Virtual Representation of the Past*, edited by Mark Greengrass and Lorna Hughes, 179–190. Farnham: Ashgate 2008.

Bentkowska-Kafel, Anna. *"I bought a piece of Roman furniture on the Internet. It's quite good but low on polygons'*—Digital Visualization of Cultural Heritage and its Scholarly Value in Art History." *Visual Resources. An International Journal of Documentation*, Special Issue on Digital Art History edited by Murtha Baca *et al.*, 29, no. 1 (2013): 38–46.

Cohen, Kathleen, James Elkins, Marilyn Aronberg Lavin, Barbara Maria Stafford et al., "Digital Culture and the Practices of Art and Art History." *Art Bulletin* 79, no. 2 (1997): 214.

Collins Goodyear, Anne and Paul B. Jaskot, "Digital Art History takes off", *CAA News,* College Art Association, 7 October 2014, http://www.collegeart.org/news/2014/10/07/digital-art-history-takes-off/

Corti, Laura and Marilyn Schmitt, eds. *International Conference in Automatic Processing of Art History Data and Documents*, held at the Scuola Superiore de Pisa, 24–27 Sept 1984. Scuola Superiore de Pisa and the Getty Trust AHIP, Santa Monica, 1984.

Drucker, Johanna. "Is There a 'Digital' Art History?", *Visual Resources. An International Journal of Documentation*, Special Issue on Digital Art History. Murtha Baca *et al.* eds., 29.1 (2013): 5–13.

Egel-Andrews, Ryan. "Paradata in Art-historical Research. A Visualization of Piet Mondrian's Studio at 5 rue de Coulmiers." In *Paradata and Transparency in Virtual Heritage*, edited by Anna Bentkowska-Kafel and Hugh Denard, 109–124. Farnham: Ashgate, 2012.

Ellin, Everett, *"Museums and the computer. An Appraisal of new potentials." Computers and the Humanities* 4 (*1969*): 25–30.

Fernie, Eric, ed. *Art History and its Methods, a critical anthology.* London: Phaidon, 1995.

Guppy, Dave, Will Vaughan and Charles Ford, eds., *Computers and the History of Art Newsletter,* 1 (1985): 26.

Hamber, Anthony, Jean Miles and William Vaughan, eds. *Computers and the History of Art.* London and New York: Mansell Pub., 1989.

Hamber, Anthony. "Computer Applications in the History of Art. A Perspective from Birkbeck College, University of London." *La Revue Informatique et Statistique dans les Sciences Humaines*, Université de Liège, 29.1–4 (1992): 86–89.

Jessop**,** Martyn. *"Visualization as a Scholarly Activity." Literary and Linguistic Computing,* 23, no. 3 (2008): 281–93.

Mainardi, Patricia. "The Crisis in Art History. Introduction." *Visual Resources. An International Journal of Documentation* 27, no. 4 (2011): 303–305.

Manovich, Lev. "Ten Key Texts on Digital Art: 1970–2000." *Leonardo* 35, no. 5 (2002): 567–569 and 571–575, also

available at http://manovich.net/index.php/projects/key-texts-on-new-media-art

Nelson, Robert S. "The Map of Art History." *The Art Bulletin*, 79, no. 1 (1997): 28.

Preziosi, Donald, ed. *The Art of Art History: A Critical Anthology.* Oxford University Press, 1998.

Promey, Sally M. and Miriam Stewart. "Digital Art History: a new field for collaboration." *American Art,* 11, no. 2 (1997): 36–41.

Rublack, Argula. "Exploring theology with digital art." Review of Michael Takeo Magruder's exhibition, De/Coding the Apocalypse. *Cassone. The Internatioal Online Magazine of Art and Art Books,* April 2015, http://www.cassone-art.com/magazine/article/2015/04/exploring-theology-with-digital-art/?psrc=photography-and-media

Vaughan, William. "Introduction. Digital Art History?" In *Digital Art History – A Subject in Transition,* edited by Anna Bentkowska-Kafel, Trish Cashen and Hazel Gardiner, 1–2. Bristol and Portland: Intellect, 2005.

Zorich, Diane M. *Transitioning to a Digital World. Art History, Its Research Centers, and Digital Scholarship,* A Report to the Samuel H. Kress Foundation and the Roy Rosenzweig Center for History and New Media, George Mason University (2012), available at http://www.kressfoundation.org/uploadedFiles/Sponsored_Research/Research/Zorich_TransitioningDigitalWorld.pdf

Zürich Declaration on Digital Art History (2014), http://www.gta.arch.ethz.ch/events/digital-art-history-challenges-and-prospects

Selected Websites (accessed 15 April 2015)

Computers and the History of Art (CHArt), www.chart.ac.uk

Digital Art History Challenges, Tools & Practical Solutions, University of Málaga and the Getty Research Institute (GRI), Malaga, 19–22 September 2011, http://digitalarthistory.weebly.com/

Digital Art History, Mellon Research Initiative convened by Jim Coddington at the Institute of Fine Arts, New York University, 30 November – 1 December 2012; http://www.nyu.edu/gsas/dept/fineart/research/mellon/mellon-digital.htm

Digital Art History Laboratory held at the Getty Research Institute, CA, 5–8 March 2013, http://digitalarthistory.weebly.com/agenda.html

Digital Art History: Challenges and Prospects, International Conference, held at the Swiss Institute for Art Research (SIK-ISEA), Zürich, 26–27 June 2014; http://www.gta.arch.ethz.ch/events/digital-art-history-challenges-and-prospects

Piero della Francesca: Legend of the True Cross. San Francesco, Arezzo, Italy: 3D Computer Model, http://projects.ias.edu/pierotruecross

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