# Architecture and Maps, Databases and Archives: An Approach to Institutional History and the Built Environment in Nazi Germany

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## I.    Overview

How do art historical questions and evidence intersect with geographic concepts and digital mapping methods? This problem came into focus for us as a result of a 2007 two-week summer workshop on Holocaust Studies and Geography sponsored by the Center for Advanced Holocaust Studies.[1] From this initial meeting sprang a collaborative of nine international scholars who came together to explore the spatial problems of the Holocaust and how Historical Geographic Information Systems (GIS) methods might be useful for an analysis of the genocide. We focused on six case studies: the SS concentration camp system; arrests of Jews in Italy; killing of Jews on or near the Eastern Front; ghettoization in Budapest; the camp environment of Auschwitz; and the evacuation and forced march of Jewish inmates from Auschwitz in January 1945. The case studies were meant to address the Holocaust at different scales and in different geographic environments, from the interior of a building to the scale of the city, from the specific killing site to the great expanse of German-occupied Europe.[2] In addition, the varied topics related to specific areas

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1    Now the Jack, Joseph and Morton Mandel Center for Advanced Holocaust Studies, U.S. Holocaust Memorial Museum. Organized by Tim Cole, Alberto Giordano, and Knowles, the workshop investigated whether productive connections might or should be made between scholars of the Holocaust, who work specifically on spatial topics such as ghettos and the built environment, and geographers with specific interest in digital mapping techniques, particularly GIS. For a summary of the formation, goals, and results of this workshop, see our report Waitman Beorn, Tim Cole, Simone Gigliotti, Alberto Giordano, Anna Holian, Paul B. Jaskot, Anne Kelly Knowles, Marc Masurovsky, and Erik B. Steiner, "Geographies of the Holocaust," *Geographical Record 99*, no. 4 (October 2009), 563-74.

2    The first phase of this collaboration resulted in an anthology: Anne Kelly Knowles, Tim Cole, and Alberto Giordano, eds., *Geographies of the Holocaust* (Bloomington: Indiana University Press, 2014). The work was partially funded by National Science Foundation Award nos. 0820487 and 0820501. The summary of the project and methods in the current article derive from Chapter Two and Chapter Six of this volume. In the current article, we have focused on those aspects of our work possibly of most interest to art historians. For our broader investigation and analysis, see the full chapters in the anthology.

of disciplinary expertise and knowledge of the participants, including art history.

Jaskot and Knowles were responsible for two case studies: mapping the SS camp system and visualizing the spaces of the SS camp of Auschwitz-Birkenau. Although the two topics are clearly institutionally related, the case studies developed separately as explorations of very different kinds of evidence. The camp study predominantly analyzed a database of the camps with geographic locations provided by the U.S. Holocaust Memorial Museum, derived from the first volume of its *Encyclopedia of Camps and Ghettos, 1933-1945 (2009)*. Data for the Auschwitz project came mainly from a more traditional historical source, the archival remains of the records of the camp building office. Although we intended to keep the projects separate, while complementary, the analytic work that began with the construction of our databases and the visualization process resulted in a surprising confluence of spatial and historical questions that led to very different outcomes than expected. For art historians, our case studies model how visualizing built environments through GIS as well as other digital spatial formats can radically expand research questions and promote new art-historical areas of research. Here, we argue that GIS was not merely about applying technology as a "tool" but, more fruitfully, about relating geographical concepts and methods to art-historical research on the built environment. Our work attempts to demonstrate the specific potential for taking Holocaust Studies in new interdisciplinary directions, and suggests more generally a model for collaboration between historical geography and art history.

## II.    Secondary Literature

One would be hard pressed to find an area of Holocaust Studies as well researched as the SS and its notorious concentration camp system. The dualism of, on the one hand, the high level of rationality necessary to construct such a vast bureaucracy and, on the other, the brutal irrationality of mass murder and the exploitation of millions of victims across Europe has compelled scholars again and again to question and confront the nature of modern society. Important system-wide studies have detailed SS organizational goals and the destructive results for victims.[3]

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3    See, for example, the best overview of the camp system, Karin Orth, *Das System der nationalsozialistischen Konzentrationslager: Eine politische Organisationsgechichte* (Hamburg: Hamburger Edition, 1999). In addition, two complementary and recent encyclopedia projects have also attempted to give a larger picture of the vast institutional world of the SS: Wolfgang Benz and Barbara Distel, eds., *Der Ort des Terrors: Geschichte der nationalsozialistischen Konzentrationslager*, 9 vols. (Munich: Beck, 2005-2009); Geoffrey P. Megargee. ed., *Encyclopedia of Camps and Ghettos*, 1933-1945, vols. 1-2 (Bloomington: Indian University Press, in association with the United States Holocaust Memorial Museum, 2009, 2012). Five subsequent volumes are planned for the latter series.

Rarely, however, have geographic and spatial questions been central to scholarship on the SS and its organization of the camp system. More common are studies of space at the scale of individ- ual camps, none more so than Auschwitz-Birkenau.[4] For this specific site, the work of Debórah Dwork and Robert Jan van Pelt, and the research of Niels Gutschow, have also established important art-historical precedents for looking at the ideological and political landscapes and buildings of genocide at Auschwitz and in specific eastern occupied zones.[5] Complementary to this architectural history, geographers have studied the meaning of Holocaust landscapes as banal places that give mute witness to terrifying events, and as thresholds to modernity in its most brutal forms.[6]

## III.   Research Questions and the Problems with Sources

Every good mapping project needs spatial questions to guide the construction of the database and the selection of appropriate methods of spatial analysis and geovisualization. Our spatial ques- tions for each case study were quite distinct, in part because of their different scales of analysis. For the SS camp system, we wanted to ask "What were the spatial and temporal dynamics of such a vast institutional network of forced labor and oppression?" This problem clearly was spatial in its comparative incorporation of camps covering important zones of occupied Europe. Although it was not explicitly an art-historical question, visualizing the growth and eventual col- lapse of the camps is conceptually related to any mapping project that seeks to understand where, when, and how a social phenomenon developed. In art history, analogous questions could be how a religious landscape with distinctive architectural elements and social uses developed over time, or how art objects moved from their point of creation through a network of buyers and institu- tions.[7] For us, it was crucial to establish the location and time of construction of the SS camps

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4    The best analysis of the history of Auschwitz remains Sybille Steinbacher's *"Musterstadt" Auschwitz: German-isierungspolitik und Judenmord in Ostoberschlesien* (Munich: K.G. Saur, 2000).

5    Debórah Dwork and Robert Jan van Pelt, *Auschwitz: 1270 to the Present* (New York: W.W. Norton, 1996); Niels Gutschow, Ordnungswahn: *Architekten planen im "eingedeutschten Osten"* (Basel: Birkhäuser, 2001).

6    For exemplary work, see Andrew Charlesworth, "The Topography of Genocide," in *The Historiography of the Holocaust*, edited by Dan Stone (London: Palgrave, 2004), 216-52; and Paulo Giaccaria and Claudio Minca, "To-pographies/Topologies of the Camp: Auschwitz as a Spatial Threshold," *Political Geography* 30, no. 1 (2010), 3-12.

7    Paul B. Jaskot, Anne Kelly Knowles, Andrew Wasserman, Stephen Whiteman, and Benjamin Zweig, "A Research-Based Model for Digital Mapping and Art History: Notes from the Field," *ArtL@s Bulletin* 4:1 (2015), Article 5. Available online at http://docs.lib.purdue.edu/artlas/vol4/iss1/5/.

across Europe as part of the broader contextualization of both Auschwitz-Birkenau and the other case studies in the larger Holocaust Geographies project.

Related to the institutional and geographic question was a practical one: How could the Holocaust Museum's dataset of camp names, geographic locations, and other basic information be adapted to a GIS format so that we could visualize the system's development over space and time? The original dataset was developed to create black-and-white maps that showed the location of camps by region for the *Encyclopedia of Camps and Ghettos*. The historians who entered the data used what is called natural language – for example, words for days, months, and seasons. This preserved the level of specificity, as well as the ambiguity and uncertainty, of the historical information available to the researchers who wrote the *Encyclopedia* entries. The problem for us was that GIS is based on a mathematical and binary architecture. The GIS program we were using can only "read" certain formats, such as a particular numerical format for time. We not only had to translate verbal expressions of time into numerical statements; we also confronted the issue of how to represent vague or uncertain times for when camps opened or closed, such as "in early spring" or "by the end of 1943." We could have excluded all camps with imprecise opening or closing dates, but that would have eliminated too many camps to represent the SS universe accurately. It was clear from the outset that one of the biggest challenges would be how to strike the balance between temporal accuracy and comprehensiveness in representing the tremendous changes in the SS camp system from 1938 to 1945.

We also wanted to explore the diversity of SS camps geographically. One of the fundamental ideas in geographical studies is that spatial patterns of clustering and dispersion reflect meaningful variation in social phenomena. We wondered whether the deployment of male and female prisoners to particular kinds of labor, which Holocaust historians had documented for some camps, produced a geography of gender throughout the system. Could we map inmate gender as a way to find unstudied clusters of predominantly female or male labor? Similarly, could we see where certain German companies, such as Daimler-Benz and IG Farben, exploited camp prisoners as forced labor by mapping business firms associated with labor camps? Both kinds of information were recorded in *Encyclopedia* entries but were not systematically entered into the dataset. Adding such information to the camps dataset became another task en route to our GIS analysis.

The second case study of the geography of Auschwitz-Birkenau seemed simpler in comparison, and the data more art-historical in nature. Our initial questions, posed at the scale of the humanbody, were contingent on the built environment: What could an individual (inmate or SS

member) *see* at Auschwitz? Were visibility and invisibility – inherently spatial issues – factors for the SS in their planning of the camp and the experience of the victims? For example, were inmates more vulnerable to surveillance or violence in some parts of the camp because of their relative visibility to camp guards? Did areas that were more shielded from the surveillance of guards become havens for inmates or locations where they could secretly exchange their very limited possessions in the struggle for survival? These questions put the focus on finding methods to analyze the built environment of walls and open spaces that prevented or allowed for human sightlines. As a result, we first collected archival materials related to the plan and elevation of architecture in the camp and an accurate GIS base map that would serve as the stable digital reference for constructing a 3D digital Auschwitz-Birkenau. We immediately encountered the familiar scholarly problem of dealing with gaps in the archival information and how to render a built environment for exploration with *many* plans but not *all* plans. The degree of accuracy in the rendering of the buildings in the original drawings also posed a point of discussion. How accurate did our digital models have to be to provide acceptable answers to our questions? From the beginning, methodological choices for both projects derived from the particular spatial and historical questions we were investigating.

## IV.   Approaches and Process: Project Narrative

For the camp system, Knowles, an expert in historical GIS, took the lead, as the initial work involved developing geographical questions and the dataset provided by the Holocaust Museum. She and Middlebury College undergraduate Alexander Yule first grappled with the issues of time. Yule developed a set of rules for numerically expressing ambiguous dates for when a camp opened, was liberated, or closed. For example, "in the spring" became mid-April, expressed as 4/15. While this act of translation altered the historical information to some degree, we accepted the compromise as necessary to be able to map the system's development as fully as possible. Middlebury students Charlie Hofmann and Roz Vara standardized inmate gender as numbers that GIS could easily recognize and map (1 for all-male camp population, 2 for all-female, 3 for both or family populations). They also added new categories of information, called "fields" in GIS parlance, such as firm names for the businesses that used camp labor and the kinds of labor inmates were forced to do.

Augmenting the original database enabled more probing, exploratory mapping, a process that helps generate new historical and spatial questions. With this augmentation, we could pose historiographically informed queries that the original dataset would not have answered, and that

revealed much more than just the geographical distribution of camps in Europe.

GIS has the unique capability of returning maps as answers to spatial questions. Asking which camps used inmates in construction, for instance, yields a map of all camps where the dominant kind of labor was construction. GIS also makes it possible to visualize two or more categories of information simultaneously. So we could ask how many camps in the 1,100-plus system focused on construction, opened after June 15, 1942, and were involved in another kind of labor such as manufacturing armaments. This mapping revealed patterns of the camps' development over time, including distributions of male and female inmates, the uses of forced labor, and how the expansion and collapse of SS camps corresponded to the moving front of the war.

At the same time, Knowles and Jaskot were cognizant of the problems raised by reducing the rich qualitative information in the *Encyclopedia* to the quantitative codes or short, searchable text required to use GIS as an exploratory mapping tool. The *Encyclopedia* entries were written as narratives, had various authors, and differed considerably in their coverage and level of detail. These qualities are perfectly acceptable in standard historical writing, but every variation and nuance can become a point of decision in a GIS methodology that asks for unambiguous information in each field. Deciding on a general typology of labor to represent the main purpose of labor at each work camp involved extensive discussions between Jaskot, Knowles, and the student research assistants. Far from being a rote, mechanical process, deciding how to convert narrative textual information into machine-readable and mappable information brought the seminar into the computer lab. Generalization and codification of information changes the original source, but it can also deepen one's engagement with the source material and become an essential part of self-awareness in the research process. And it makes it possible to ask questions of a universe of information – such as the dataset of more than 1,100 SS camps – that conventional modes of text-based research cannot answer. This approach does not replace narrative analysis; it offers another, complementary method.

While we worked on the macro scale of spatial analysis of the camp system, we were simultaneously developing a database for the built environment of Auschwitz. In the case of Auschwitz, given that the spaces of this camp and its development over time were relatively fixed and well studied, the temporal scale seemed less crucial than the creation of a database that would contain all the buildings at the site, so that we could determine visibility/invisibility. This led us to look at evidence of building plans and elevations, with Jaskot taking the lead as the architectural historian on the team. Jaskot dug into the camp's extensive archival records from the SS Zentralbauleitung (Central Building Administration), which had been captured by Soviet forces at the

end of the war and are now preserved in the Russian State Military Archives (the U.S. Holocaust Memorial Museum holds a microfilm copy, which was the version used for this project). While we knew of these archives from other scholars' work, we were nevertheless taken aback by the huge quantity of materials, which include hundreds if not thousands of building plans. As with many digital humanities projects, the quantity of evidence posed a daunting task for humanistic interpretation that demanded a digital approach. The urban scale and complexity of the building site became apparent through the archival research. Jaskot began to manage this information by building simple lists of information in a Microsoft Word document that gave the name of the building, its location in the camp, and its function, all carefully organized according to the source of the documentation, which we wanted to preserve for the machine-readable metadata. He also noted start and end dates of buildings (when a building was planned, when construction began, when it was completed) wherever this information appeared on a plan or in related memoranda and other reports from SS architects.

With this research coming in, our co-author Chester Harvey began to build the Auschwitz-Birkenau historical GIS. The building-specific information that Jaskot was collecting would become what are called the "attributes" of the buildings dataset. Locating the buildings in the historical landscape for GIS mapping and analysis required several steps. Harvey began by georectifying the main SS plan for the site (completed in spring 1943) with an aerial reconnaissance photo from 1945 and recent high-resolution aerial imagery made available by the Warsaw city government's central GIS office. The process of georectifying takes a digital scan or photograph of a historical plan and "fits" it to a base map that can be related to actual geographic coordinates. Georectification is sometimes called "warping" or "rubber-sheeting" because it inevitably distorts the original image to some degree as one digitally pins one spot after another on the original image to the same locations on the more accurate map or image that is being used as the base map. The goal is to achieve the best fit possible, with the least distortion, between the original image and the base map, in order to give the image real geographical location. The process has several advantages. Georectifying historical images such as maps, plans, and aerial photos makes it possible to layer them together for comparison or to see change over time at a given location, using transparency to toggle between layers. Once a visual source is georectified, one can also digitally trace and extract spatial evidence from it to combine with other evidence in a new map. In our study, the scale and surveying process used by the SS for its plans were accurate enough to avoid much distortion in georectification. If we were going to start querying what could be seen by whom and when, accuracy in both plan and elevation were essential.
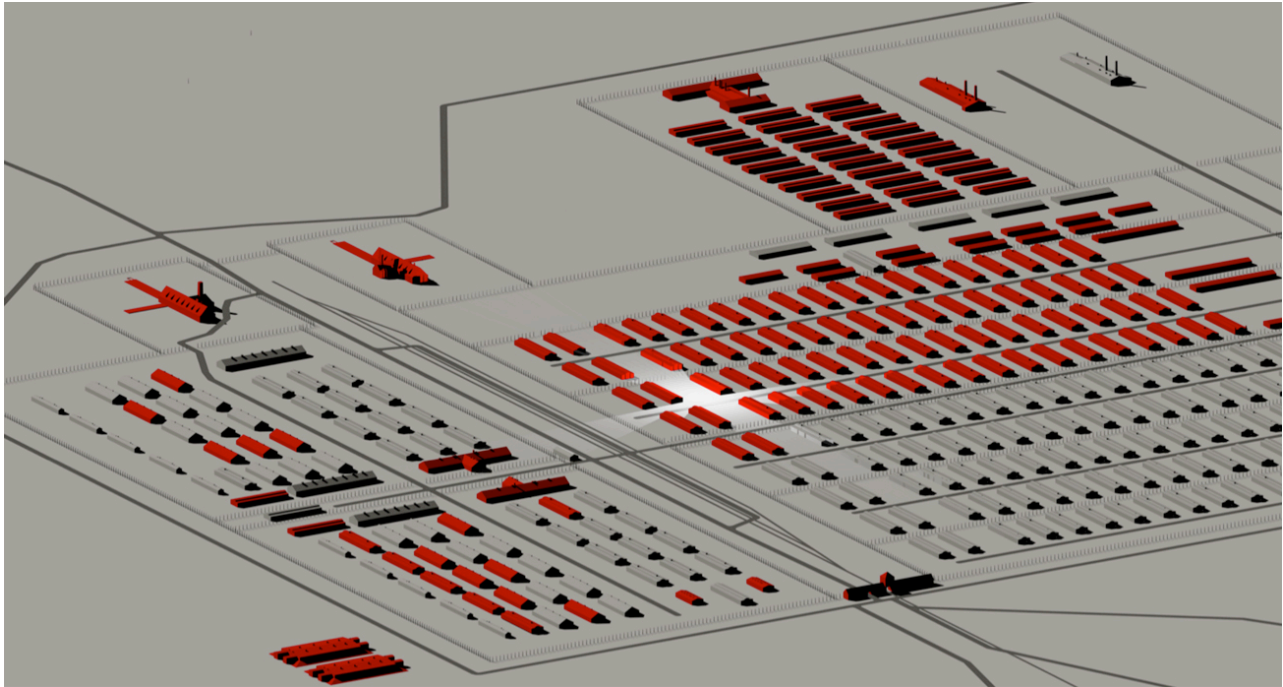
Plan of Auschwitz-Birkenau, with red shading indicating buildings under construction or significant repair from May 1943 to May 1944. Reconstruction and map (as of state of research 2010) by Chester Harvey

In addition, to constructing the two-dimensional foundation of our case study, Harvey began to construct digital 3D versions of the structures indicated on the architectural plans using Google SketchUp. SketchUp is a free, fairly easy-to-use rendering program that can export image files that can be used in other software, which makes it a popular choice among cartographers and landscape scholars. It allowed us to render the accuracy of the historical drawings into a stable digital environment. We were aware that such an "accurate" reconstruction did not match the messiness of experience, where structures (particularly vernacular and utilitarian ones) can deviate an inch here or there. Given the detail of the plans, however, we felt that it was a useful method for establishing a baseline exploration for our initial questions of visibility and invisibility.

Thus the general process was that Jaskot sent the information he had summarized or extracted from the bureaucratic record to Knowles and Harvey for their thoughts about how best to visualize the data. Harvey devised methods to capture the material both as 2D plans and as quasi-3D models. He also created a short, simple animation of the known construction dates for Auschwitz-Birkenau, a sort of map-movie that included the beginning of construction and the end date when each building was turned over to the SS administration, when known. As the project developed, Jaskot and Knowles focused much of their time on discussing Harvey's visualizations of the material and how they related to our spatial and historical questions. We also worked with another Middlebury student, Benjamin Perry Blackshear, to explore new questions that

emerged in the course of those discussions. Blackshear's expertise in cartography helped us to visualize the functional differentiation of camp structures, which confirmed Jaskot's sense of Auschwitz-Birkenau as an urban space. Both students' mapping proved revelatory for Jaskot and Knowles.

## V.    Lessons Learned and Outcomes

In both case studies, the back-and-forth process of collaboration was a new experience for Jaskot as the art historian on the team, given that the discipline of art history tends to favor sole-authored scholarship. For Knowles, working closely with an art historian changed her sense of camp landscapes from a fairly static, uniform environment to one full of change, questions, and human agency. Jaskot's historical knowledge guided countless interpretive decisions, while the Middlebury contingent's technical knowledge enabled the team to choose and adapt suitable GIS methods to answer our historical questions. Iterative exploratory mapping of the camp system as well as the changing visualizations of the Auschwitz archival information continued to modify and sometimes radically change the research question *during* the collaborative process.

This raised difficulties but also brought out surprising results. In comparison to more solitary art-historical research, the shifting ground of evidence and analysis that comes from collaboration required some getting used to. So, too, did the problem of agreeing on a shared vocabulary between disciplines. One might think that architectural history and historical geography already employ overlapping methodologies and terminologies, given that they are both disciplines interested in spatial, temporal, and physical analysis of the human and natural world.[8] And yet such basic concepts as scale, the built environment, or even what constituted the subject of spatial analysis (let alone historically specific problems like the shifting definition of what constituted a "camp" and how to capture that in a database) proved at times elusive, particularly in the early years of the project.

Remaining open to this dialogical method of historical research, digital visualization, and geographic analysis led us to surprising outcomes that we believe contribute to a new spatial understanding of the camp system and its built environment. Most importantly:

- From an art-historical perspective, perhaps the most significant moment in the process came when Harvey showed us his animation of the construction of buildings at Aus-

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[8] In this regard, it is worth noting that also at times their disciplinary interests overlap in clear shared bibliography, such as the impact on each field of Henri Lefebvre, *The Production of Space,* trans. by Donald Nicholson-Smith (Oxford: Blackwell, 1991).

chwitz-Birkenau. The visualization brought forth the temporal scale of a changing environment, one significantly less stable than the literature on Auschwitz would have us believe. As a result, the research question shifted away from visibility/invisibility; instead, we began to probe how focusing on the role of construction at Auschwitz-Birkenau might lead to new discoveries.

- More generally, forced-labor construction became central to our understanding of the ambitions of the SS, including the daily use during certain periods of time of more than 10,000 forced laborers at Auschwitz to build its empire. Mapping this activity fore- grounded victims in new ways that we are now pursuing in new research.

- Working digitally with scans of archival documents also yielded new insights. Color-coding buildings by functions in one corner of the camp helped Jaskot see that a sauna constructed for guards and officers had a direct line of sight to one of the crematoria. How did perpetrators emerging from the sauna take in what they saw in the near distance? This question told us that we needed to consider perpetrators' experiences of the camps as well as victims' experiences.

- Further to our surprise, when the Auschwitz discovery prompted us to go back to the camps database to probe where construction was a dominant forced-labor activity, we saw patterns that looked very different than expected. Our maps indicated that, after 1943 and the expansion of the forced-labor sub-camp system, construction became a much more dominant part of the SS institution. While this was only one of many exploratory maps and conclusions drawn from the camp system historical GIS, it became an import- ant conceptual connection between the two studies.

In essence, what began as complementary projects became interlinked through visualizing the systematic use of labor for building. Construction was a structural and experiential component of this part of Holocaust history to a much greater degree than scholars have previously assumed.


## VI.   Conclusion and Next Steps

 Attending to both art-historical questions and geographical concepts foregrounds the use of digital mapping as a critical and analytical component of scholarship. Through work on both of these case studies, we have established a successful intellectual relationship that has sustained our commitment to working together further into the future. Knowles has begun developing a large dataset of ghettos, again building on data provided by the U.S. Holocaust Memorial Museum, while Jaskot has been researching the broad context of the construction industry in interwar

Germany. We are studying online testimonies in the vast USC Shoah Foundation Visual History Archive (http://vhaonline.usc.edu/login.aspx), looking particularly for survivor stories that focus on forced labor experiences in camps and ghettos. This expansion parallels concurrent work of the larger Holocaust Geography Collaborative team, which is exploring digital methods to mine survivor testimonies for spatial and temporal information, including combining GIS with the text-based computational analysis of corpus linguistics. Allowing art history to contribute to the whole, which compels us to meld our individual agendas in pursuit of common questions, dialectically empowers fields like art history by indicating how our intellectual traditions and interests contribute to a more comprehensive analysis of human society in the past and the present.