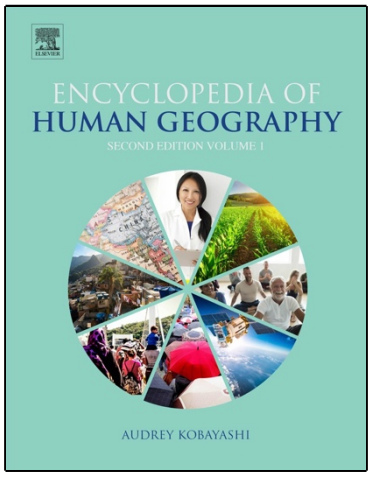

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Digital Geohumanities

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Glossary

Chorology From the Greek cῶro2, *khøros*, "place, space." The study of relations, distributions, and patterns of phenomena over various geographical scales.

Chronology From the Latin *chronologia*, and Greek cróno2, *chrónos*, "time" and -logía, *-logia*. The practice and science of arranging events, periods, ages, scales in temporal sequence, or occurrence in time.

Geographical information systems (GIS) A computer-based software application, that assembles, stores, manipulates, visualizes, and analyzes geographically referenced information and phenomena. In *neogeography* it involves the use of smartphone, social media, online, web, and public participation methods. GIS can range from proprietary software (e.g., ArcGIS) open-source (e.g., QGIS and GRASS) and neogeographical (e.g., Google Earth and Maps, Bing Maps, etc.).

Geocoding In GIS it is the process of linking, attaching, or transforming a feature, phenomena, event, etc., to an indice (latitude/longitude, decimal degrees, address, place name, etc.) marking a location on the earth's surface.

Hermeneutics Involves interpreting verbal and nonverbal texts, in addition to semiotics, presuppositions, and preunderstandings.

Quantitative revolution In geography, was paradigm shift that occurred in the 1950s and 1960s that introduced positivistic (a philosophical system founded by Auguste Comte that considered positive facts and phenomena, and excludes speculation upon ultimate causes or origins) methods. Employed computing, statistical, and scientific methods in an attempt to transform the practice of geography from a descriptive (*idiographic*) discipline to an empirical law-making (*nomothetic*) discipline. Produced a short-lived form of "Spatial Science" that produced no new scientific laws. The use of quantitative methods needs to be distinguished from this methodological and theoretical *cul-de-sac*.

Spatial and digital turns in the humanities during the 20th Century have influenced human geography applications in geographical information systems (GIS), landscape, text, and cultural interpretation and representation, in addition to historical and contemporary modeling, network and spatial analysis methods. By the late 1930s and 1940s, the humanities were engaging with computer-based methods. A concordance to the writings of Thomas Aquinas was created by the Jesuit priest Roberto Busa and English scholar Josephine Mills, in consortium with IBM. In the 1950s, the anthropologist Claude Lévi-Strauss outlined the "three humanisms" of Western history (the rediscovery of the Greco-Roman; the repurposing of the humanistic perspective; and the discovery of everyday experience); in the 21st Century, a fourth tropeddigital humanismdhas been coined by Milad Doueihi to describe a "type of society" in which multiple types of media and texts (books, maps, multimedia, social media, games, augmented reality, 3D printing, etc.) cannot be fixed in space or time. This type of humanism has emerged in the three waves of the digital revolution and has led to a dissolution of epistemological boundaries between science and technology studies, the arts, and humanities. The first wave (1980–2010) witnessed the digitization of historical, cultural, literary, and artistic collections facilitating online research methods and pedagogy, which dovetailed with its second wave (2002–12) that largely manifested (as the quantitative revolution did in geography) in humanities computing quantification exercises, coding, digital parsing, analysis, and visualization projects. Currently, as we approach the third decade of the 21st Century (2013–25) a third wave of this revolution is cresting, with ontological tides turning, as humanities and arts discourses and tropes are now beginning to shape coding and software applications, and methodological frameworks for computing and multimedia platforms. In the first two decades of the 21st Century, the digital humanities have produced bodies of work that include digital archives, quantitative analyses, tool-building projects, the visualizations of large data sets, 3D modeling of historical artifacts, social media and hashtag activism and analysis, and the virtualization of literary, dramatic, and cultural texts. The spatial turn in the humanities has produced works such as Paul Carter's, *The road to botany bay: An essay in spatial history* (1987). Concerning the colonization of Australia, Carter makes a clear epistemological distinction between the geographer's space and spatial history. Franco Moretti's distant reading and Bertrand Westphal's geocritical techniques plotted the cartesian coordinates of philosophical, aggregated, real, and fictional spaces in literature. Native American writer William Least Heat-Moon (a.k.a. William Lewis Trogdon) employed a discursive, stratigraphic literary heuristic to explore the "sense of place" of a Kansas county on the American plains in *PrairyErth: A Deep Map* (1991). As a result, the *Spatial Humanities* and *Deep Mapping* emerged as tropes as humanities scholars engaged geospatial theory and technology. The aims of these scholarly pursuits were to transform geospatial technology's framing of humans as entities or data points; understand the bilocality of texts in metaphorical and geographical space; and more closely consider scaled conceptions and narratives of place that are nuanced, nonreductionist, and deeply contingent.

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Toward the Digital Geohumanities

The digital geohumanities is human geography's incorporation of the three waves of the digital revolution. As such, the field raises new questions about the perception, experience, and representation of the subjective impression of place and its affective dimension, as opposed to the geometrical, Cartesian, and statistical framings of abstract space. Its genealogy can be traced through developments in 20th-Century human geography and humanities computing. In 1947, the American geographer J. K. Wright minted the term *geosophy* to consider how people combine myth, stories, and experience to develop images and patterns of belief about the world and its various regions. Wright posited that the geographical imagination consisted of three processes: promotional (such as nationalistic representations), intuitive (nonscientific and anecdotal), and aesthetic imagining (the role of "art," in the art and science of geography). One of the early geographers to consider questions of computation, time, environment, and the human experience of place was the Swedish geographer Torsten Hägerstrand. By blending methods from the humanities and early efforts at geocoding, Hägerstrand applied critical geographical thought in the 1960s and 1970s to plot and parse people's daily life paths, visualized in space–time cube/prism diagrams. In the late 1960s to the 1980s, humanistic geographers responded to the statistical landscape representations of the quantitative revolution by attempting to refocus the discipline toward more human-centered *idealist* (reality is mentally constructed) and *phenomenological* (reality is the intention of our subjective perception) practices. Clarence Glacken's *Traces on the Rhodian Shore* (1967) detailed changing perceptions of the environment from classical Greco-Roman culture, through the Christian Middle Ages, to the Renaissance and the Age of Enlightenment shaped the course of Western history and culture. Glacken's work focused on the designed earth; the influence of environment on humans, and the influence of humans on environment. In *Humanistic Geography* (1976), Yi-Fu Tuan considered five elements constituting a *sense of place* to counter the revolution's statistical landscapes: the nature of geographical knowledge; the role of territory in human behavior; the creation of place identities; the role of knowledge as an influence on livelihood; and the influence of religion on human activity. Ideology, culture, affect, and as Tuan observed sense of time affect a location's sense of place. D.W. Meinig's *Geography as Art* (1983) discussed cross-disciplinary collaborations between practitioners in geography, art, and visual culture. With the cultural and spatial turns of the late 20th Century influencing humanities and social sciences disciplines, debates on subjects, such as decolonization and postmodernism, the crisis of representation, and identity politics, signaled a critique against the way human geography had been conceived and practiced, and called for engagement with critical, Marxist, and feminist theory, rather than relying solely on empirical descriptions of regions and landscapes. In particular, Allan Pred's *Lost words and lost worlds: modernity and the language of everyday life in late nineteenth-century Stockholm* (1990) charted a geolinguistic path out of the spatial science rabbit hole. Employing time-geographic montage, historical and linguistic methods, the work mapped the daily life path of a Swedish dock worker named Sörmlands-Nisse (Fig. 1). In conveying the phantasmagoric world of Stockholm through the prisms of language and literature, Pred argued that employing poetic forms in conjunction with Hägerstrand's mapping methods provided a means to integrate the landscape of the text and page with time/space cube mapping techniques. Pred's postmortem geography of Sörmlands-Nisse's time–space routine loops, cycles endlessly from the past to the present, and reveals in each oscillation the palimpsestic nature of Stockholm's historical geographies. Anne Buttimer and David Seamon's *The human experience of space and place* (1980) focused on the philosophical perspectives and phenomenological perceptions of place. In the 1990s, the subfields of media and cinematic geography emerged to explore the roles of filmic and broadcast media in shaping perceptions and representations place and its sociopolitical and affective dimensions. It was recognized that traditional disciplinary tropes such as place, space, distance, and scale took on new geographical meaning when focused through the frames of photography, film, television, video, gaming platforms, music, and parsed in broadcast and print news, as well as marketing materials that employed such tropes. *Geography and the Humanities Symposium* convened by the Association of American Geographers in 2007 parsed geohumanist thought and practice across four themes: geocreativity (creative places), geotexts (spatial literacy), geoimagery (visual geographies), and geohistories (spatial histories). The symposium text *GeoHumanities: Art, History, Text at the Edge of Place* (2011) reasserted modes of inquiry into human meanings of place and attempted to articulate ways to facilitate better-informed scholarly and political practices in geography. With the 21st-Century digital revolution underway, a few geographers recognized that no other technological innovation in the 20th Century had affected the practice of geography as introduction of the computer and the Internet. Subsequently, drawing on William Gibson's term *cyberspace,* geographical explorations of the *codescapes* produced by software and computer hardware investigated how emerging digital geographies effect and remediate spatial representation, and behavior in addition to augmenting and producing new geographies.

The Digital Geohumanities and GIS

Arguably, the template for the digital geohumanities was established by the introduction of geographical information systems (GIS) software into geography. Originally developed by the Canada Land Inventory in the early 1960s, GIS' layering method took flight with Ian McHarg's *Design With Nature* (1969). Geocomputing labs at the University of Edinburgh and Harvard University in the 1960s, 1970s, and 1980s facilitated the entrance of mainstream GIS platforms into academic, public, and private organizations. In geography, GIS was initially employed in the earth sciences, environmental studies, and urban planning, but by the 1990s and 2000s, it was employed in historical geography research and by historians for projects such as the *Great Britain Historical GIS* at Portsmouth University and the *China Historical GIS* at Harvard University. *Historical and Humanities GIS* developed during this period, and key texts include *Past Time, Past Place: GIS for History* (2002) that provided an overview of pioneering humanities

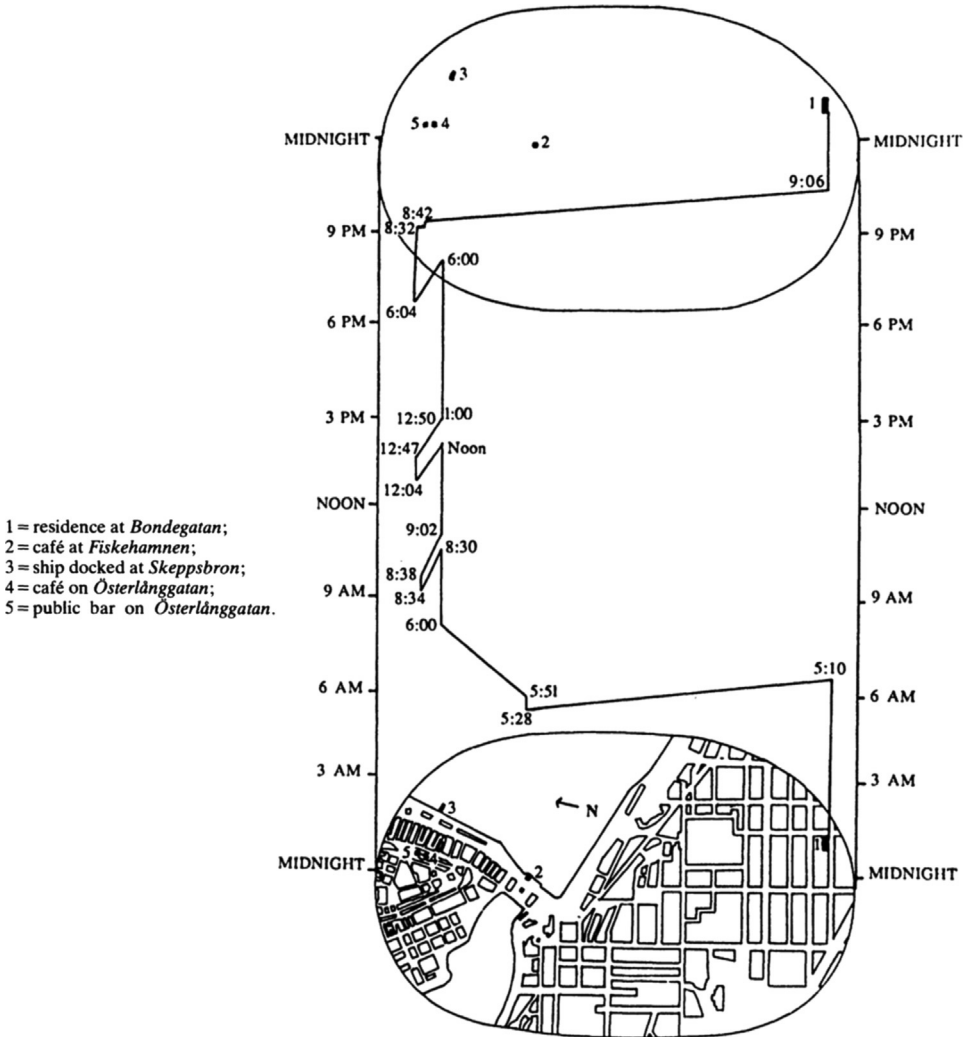

Figure 1 Allan Pred's 'Danse Macabre' The daily path of Sormlands-Nisse (Pred, 1990). From Gregory, D. (1991). Interventions in the historical geography of modernity: Social theory, spatiality and the politics of representation. Geografiska Annaler: Series B, Human Geography, 73(1), 17–44.

focused work conducted by geographers, as well as humanities scholars. *Historical GIS: Techniques, methodologies, and scholarship* (2003) established the first proper guide to historical applications of the technology. *History and GIS: Epistemologies, Considerations and Reflections* (2012) focused on historians' use of the technology, and *Mapping Time* (2014) drew on Hägerstrand's space–time cube methods to digitally reboot Minard's Map of Napoleon's failed 1812 Russian campaign. GIS' use in human geography was critiqued as it was recognized that underlying complexities in the human organization of space presented methodological issues in integrating empirical research questions with alternative theoretical frameworks. Indeed, for many GIScientists the concept of place had been off their intellectual radar screen, with many employing the terms place and space interchangeably. Scholars in the social sciences and humanities brought attention to GIS' blindness to the nuances of human contingency in terms of ethnicity, race, class, gender issues, and sexuality. GIS research was also critiqued for its preference for academic rather than community-enhancing projects, in addition to a lack of ethnic and gender diversity among its practitioners. *Qualitative GIS: A Mixed Methods Approach* (2009) showcased emerging projects blending quantitative and qualitative research that focused on human agency, gender and ethnic inequality, and social and environmental differentiation. Early forays included GIS studies on critical cartography; the daily urban life paths of Muslim immigrant women; public participation, community, and neighborhood revitalization projects; the historical and cultural geographies of the Holocaust; and Indigenous American oral mapping and storytelling. Currently, new types of online visual and interactive media are transforming GIS practices into a form of neogeography, which involves smartphone, web, and social media mapping. This mapping possesses the potential to transcend instrumental rationality of GIS developers and practitioners by cultivating more holistic approaches to the nonlinear relationships evolving between digital technologies, society, and place. Neogeography Platial models integrate social media and Big Data streams and are facilitating a shift from the classical GIS-layered perspective of the world to a digital-networked view, in which "urban acupuncture" can be performed on the living organism of a city to map and target its "neural" points, in order to analyze and reenergize the corpus of its communities and the contingencies of their places.

The Digital Geohumanities and Big Data

Big Data is a term employed in the sciences to refer to extraordinarily large data sets that once required supercomputers to process. Now due to the digital revolution, data sets can be visualized and analyzed on desktop and laptop computers using proprietary and open-source softwares. Although the current availability of data sets is often quite large, what Big Data really implies is the ability to search, aggregate, and cross-reference large data sets. Humanities approaches to Big Data can be illustrated by the visualization of a publicly available data set of ships' logs compiled by Matthew Fontaine Maury, a 19th-Century oceanographer (Fig. 2). It has been argued that insights from Big Data can also be found at very small and modest scales, and that the size of the data sample should fit the research question being asked. Despite claims about Big Data heralding the end of theory, apophenia (seeing patterns and connections where none exist), and mistaking correlations for causation, remains a persistent problem in dealing with this new and unprecedent flow of information. The *Digging into Data Challenge* (2009) a joint British–American–Canadian initiative, and similar schemes, has enabled a host of new Big Data projects building on existing digitized collections to enable research inquiries. Multinational collaborative projects include *The Trans-Atlantic Slave Trade Database*, the *Danish Sound Toll Records*, and the Stanford Literary Lab's *Mapping the Republic of Letters*, a spatial analysis of 19th- and 20th-Century intellectual correspondence networks drawing on metadata concerning the date of letters, authors, places of origin, and recipients. One example of a digital geohumanities Big Data analysis juxtaposes 2014 Bloomsday social media (Twitter, Flickr, YouTube) posts in Dublin, Ireland, with digital Oydessean and Dantean mappings of James Joyce's *Ulysses* (1922) overlaid on a 1904 edition of Thom's Directory Map of Dublin (Fig. 3). This instance of digital "urban acupuncture" maps and targets the Joycean dimensions of mythological and poetic Dublin through a small sample of captured social media message and image postings using the tag name "Bloomsday." The digital transformation of the geohumanities seeks to use a plethora of software tools (including GIS and beyond) to visualize the interrelations and perspective of multiple human and ecological agents, represent complexities of time/space, the concurrence of multiple spatial ontologies, the use of language and landscape as epistemological structures to interpret, as well contribute to placemaking, creating counterfactual and speculative, human, historical, and natural landscapes (past, present, and speculative future.)

Conclusion

Digital geohumanities theory and practice is an emerging form of *geosophy*, and the ethos of this new subfield is illustrated by a hermeneutic reading of three recent texts, which collectively constitute disciplinary reassemblage of geography and history, split apart by Kantian thought in the 18th Century. Gunnar Olsson's *Abysmal: A Critique of Cartographic Reason* (2007) poses the question but what is mapping at a distance if not an interface between poetry and painting? Or a satellite picture, but a constellation of unintelligible signs waiting to be transformed into meaningful symbols? Conversely, *The Landscape of History: How Historians Map the Past* (2002) considers history as a type of mapping that links the ancient practice of mapmaking within the archetypal triptych of perceived time (past, present, and future). By integrating the indices of place in time in such a manner, the digital geohumanities is reassembling of geographical and historical modes of inquiry into the human meanings of place. In doing so, new ways to create better-informed scholarly, political, mapping, and visualization practices are emerging. Emphasizing that division between idiographic and nomothetic disciplines is a fiction that blocks the production of such knowledge systems, the digital geohumanities aims to rescue geography from its largely relegated role as a passive stage of natural history, upon which human action is performed and events occur. In this emerging subfield, texts are viewed as performative documents, cleaved from human agency, rather than merely representations of such phenomena. Consequently, information is dynamic and fluid rather than an indolent pool of accumulated records. Second, challenges in reconciling various interpretations of specific corpora are juxtaposed with issues created by reducing large-scale canons to simple, general patterns. Last, the digital geohumanities impact research by not just creating new

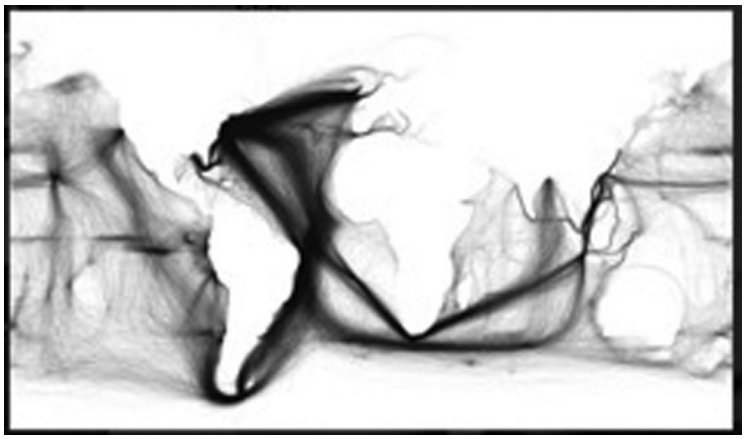

Figure 2 All voyages from the ICOADS US Maury collection. Ships tracks in black, plotted on a white background, show the outlines of the continents and the predominant tracks on the trade winds. Source: Ben Schmidt, Reading digital sources: a case study in ship's logs (2012) (http://sappingattention.blogspot.com/2012/11/reading-digital-sources-case-study-in.html#more).

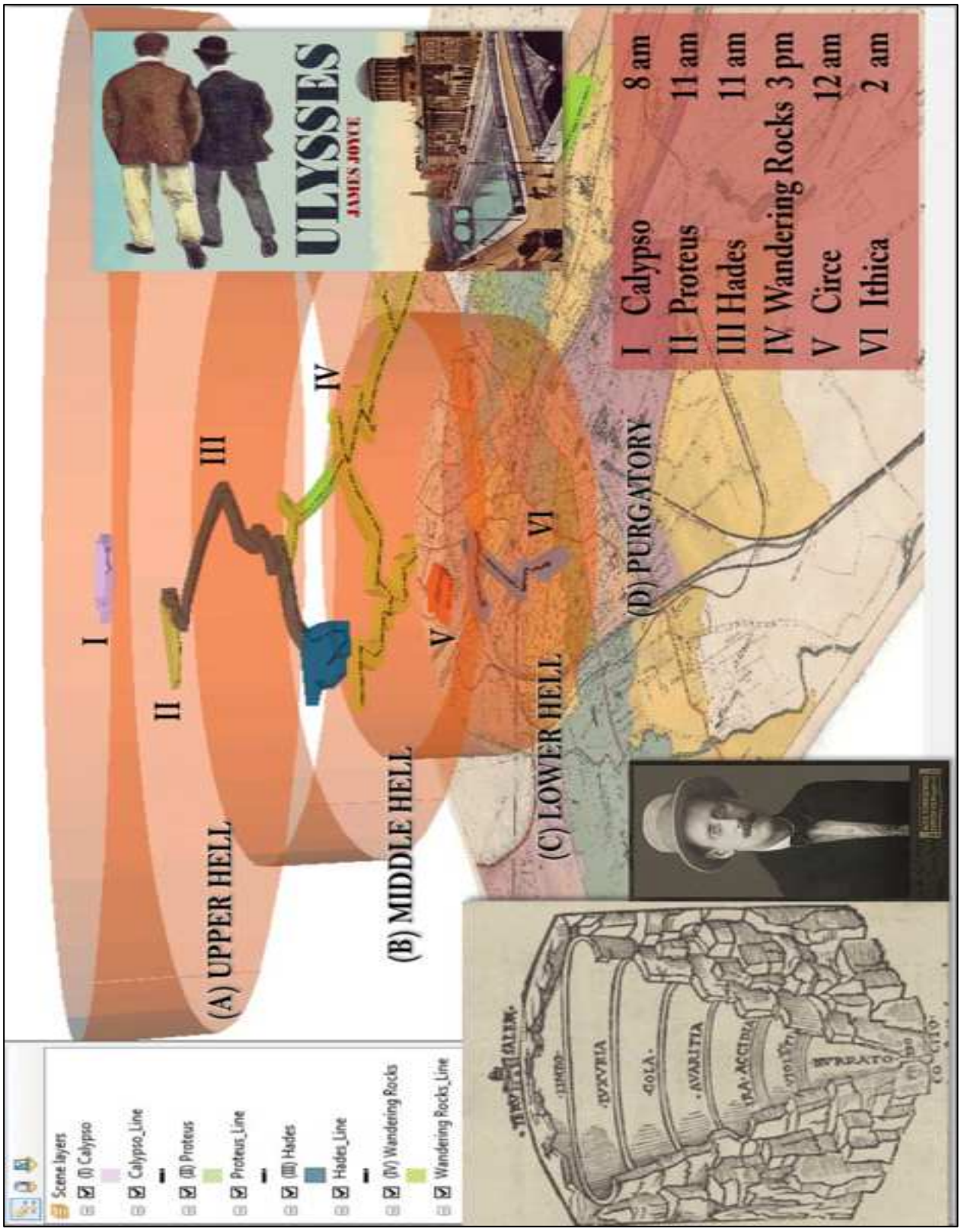

Figure 3a Top Image: Dantean Mapping of Dublin, in James Joyce's Ulysses (1922)

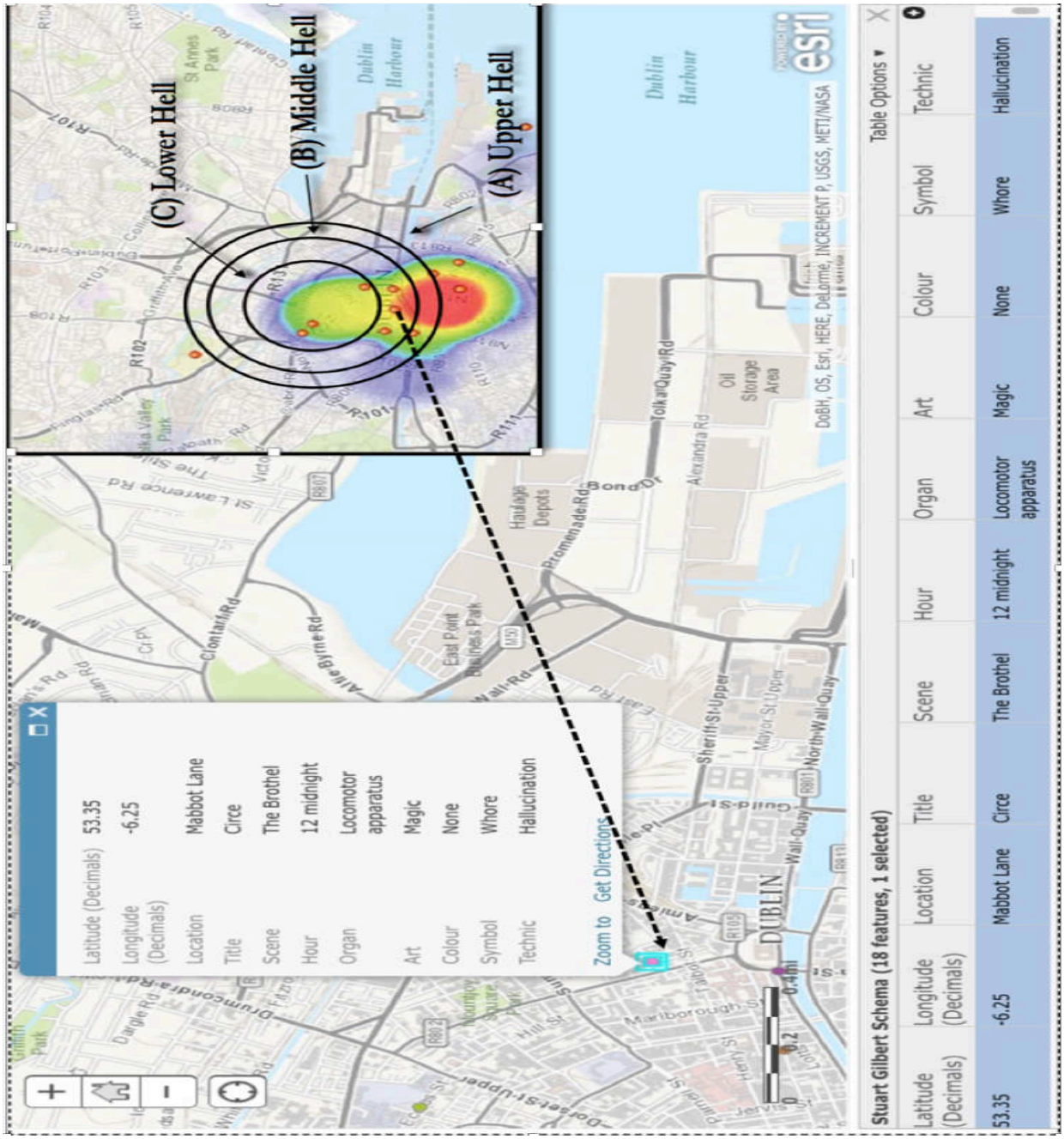

Figure 3B Neogeography of Bloomsday Day Social Media Posts in Correlation with Joyce's Dantean Dublin. (C. Travis, 2015, 2018)

objects of study, and the means to do so, but because they are an emerging field that transgresses epistemological and ontological boundaries, they are subtly shifting the foundations of how scholarly and pedagogical pursuits in human geography are conceptualized and performed. Digital geohumanities engagements with nonrepresentational, posthuman, counterfactual, affective, medical, and animal–human relation geographies beckon as well. In conclusion, the practices of human geography complement approaches in the digital geohumanities by providing a triangulation of discursive, cartographic/postcartographic, and visual narrative styles, and primary, textual, and archival data explorations, both calibrated by qualitative and quantitative methods, models, and theories but enhanced by the digital conduits, platforms, and tools emerging in the early 20th Century. In a wider sense, the digital geohumanities is perhaps anticipated in a third text, Donna J. Haraway's *Simians, Cyborgs and Women: The Reinvention of Nature* (1991) an observation on new and emerging landscapes in which the human condition and nature are becoming very hard to distinguish from the digital platforms, tools, and media used to observe, communicate, interpret, represent, and negotiate this relationship. The confluence of humanities, geography, and digital technology discourses present a common ground in this emerging subfield to address anthropogenic global climate change, which without argument is the most significant challenge to the geographies and environments of our shared and global human condition.

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