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*The New Topography of Expression: Aesthetics, 3D and the Future of Scholarly Communication **

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Canada

The New Topography of Expression: Aesthetics, 3D and the Future of Scholarly Communication

by

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One of the joys of being an academic is that you are given license to ignore a straightforward question and to reply by either posing or answering another. For the poser of the question, such a practice is, of course, understandably irritating. It breeds the same kind of irritation as those felt by religious initiates in front of a prophet who simply refuses to get to the point. But for the rest of us, I would like to suggest that the practice has value. It reminds us that there are other questions, questions that have an important bearing on the subject at hand. In this panel, my colleagues and I have been charged with answering a specific question: how can 3D – in the form of 3D objects and 3D environments – help researchers in the social sciences and humanities? The answer – at least in the abstract – is reasonably easy to surmise. 3D offers potential, as a source of signs – or formalisms – for interrogation, capable of representing patterns in data that others may not, and as a source of formalisms for narration, for representing dynamic patterns that others cannot.

What is less easy to surmise is how the potential will be transformed into the actual. When we ask how 3D can help us, it is important that we specify what we are assuming. We are assuming that knowledge construction and representation are dependent on an extant body of conventions and practices to sustain them. We are also assuming that novel forms of representation and practice offer the potential of added capacity. Properly deployed, they should enable scholars to perform better analyses, and be better teachers. We are finally assuming a process of scholarly interaction with the given medium, one that has led to the emergence of conventions and practices specific to the medium and specific to the scholar's discipline.

The problem is that our assumed conventions and practices, in fact, do not exist, or are only beginning to exist. My purpose here today is to suggest that if scholars mean to use 3D in a way that adds value to their teaching and research, they will have to pay a price. They will need to re-conceive the aesthetics and practices associated with their respective disciplines. They will need to devise, test and establish conventions governing representation, documentation and narration in 3D environments. They will need to collaborate with colleagues in computer science to develop the tools that will facilitate their expression. And they will need to establish new practices for content generation. To support this endeavour, they will need to expand their research focus from problem-oriented research to practice-oriented research. My purpose is also to paint a portrait of the expressive revolution – or topographic revolution – that I believe will attend scholars' appropriation of 3D objects and environments. More specifically, I propose to point to the sorts of questions – specifically two – that are likely to constrain its emergence and development, one relating to representation, the other to narration.

There is precedent in the history of Canadian letters for the research agenda I am describing, especially the one focusing on conventions of representation. In *Political Economy in the Modern State*, Harold Innis made a similar call. In his work, Innis' primary concern was the collapse of the West: why two world wars in the 20th century after the comparative peace of the 19th century? His analysis suggested the core problem was information management. In the 19th century, new technologies exponentially increased the quantity of information circulating in Europe. State actors lost the ability – and inclination – to attend to the long-term economic, social and cultural trends that defined and constrained their scope for action. Innis' prescription was the emergence of social sciences devoted to describing the spatial and temporal topology of these trends for policy makers, and devoted to using multiple methods of representation to express those descriptions. Economic historians, especially, should use "grappling irons with which to lay hold of areas on the fringe of economics, whether in religion or art, and with which, in turn, to enrich other subjects, as well as to rescue economics from … present-mindedness."[1]

Innis' purpose in referring to these two domains was to draw attention to their historic resort to multiple methods of expression to express complex ideas. In his unpublished "The History of Communication", he noted Italian artists' appropriation of visual information in the 15th and 16th centuries due to "the general inability to conceive abstract ideas."

> The emblem book was devised by Andreas Alciati early in the sixteenth century. . . .Poetry one of the oldest arts was combined with engraving one of the newest. "Emblems reduce intellectual conceptions to sensible images and that which is sensible strikes the memory and is more easily imprinted on it than that which is intellectual" (Bain).[2]

In *The Bias of Communication,* Innis pointed to a similar practice in the domain of religion, noting the medieval church's use of 2D and 3D analogues to communicate the essence of its interpretation of scripture:

> Stone in architecture and scripture emphasized permanence and durability. In the thirteenth century "Tout ce que les théologiens, les encyclopédistes, les interprètes de la Bible on dit d'essentiel a été exprimé par la peinture sur verre ou par la sculpture...." In the Reformation print was used to overwhelm sculpture and architecture as interpreters of scripture.[3]

I suggest that humanities and social science scholars in the 21st century will heed Innis' call to devise new conventions of representation to complement the ones they employ in print. Indeed, historians such as John Lutz, David Staley and William Thomas, among others, have already called for their development.[4] More specifically, I suggest that research will centre on devising procedures to govern the generation and implementation of two- and three-dimensional analogues for virtual environments, analogues representing patterns embedded in quantitative data, analogues representing qualitative content and concepts expressed in print.

For analogues representing quantitative data, the key issue will be translation. How can one kind of formalism be translated into another, in such a way that it does not distort, does not obscure, but instead adds value through revelation of a significant pattern? Researchers in the field of historical G.I.S., which is devoted to using Geographic Information System software to correlate historic spatial and attribute data to explore historical questions, have already faced this problem. Scholars there have appropriated conventions such as the *Chloropleth* map and the *Area Cartogram* as a way to gain a

deeper understanding of significant questions, such as the rate and spatial distribution of infant mortality in the United Kingdom during the 19th century.[5]

For analogues representing qualitative content and concepts, the key issue will be information design. How can 3D objects and environments be used in conjunction with other forms of representation in such a way that they deepen audience understanding of the content and concepts that are being expressed? Here discussion will turn on design practices that facilitate audience interaction and even construction of 3D content, on design practices that facilitate audience perception of the concept at hand. The *3D Virtual Buildings Project* is one example of how audience construction of a 3D artefact might be used to communicate an important concept.[6]

A product of a partnership between the *National Research Council* and *Industry Canada*, its purpose is to provide students with the skills to generate models of historic settlements using 3D modeling software. Its more fundamental purpose, however, is to help participants realize an important concept: that historical models must be distinguished from the objects they purport to represent. Using photographs and fire insurance maps, students through the project tutorial are afforded the opportunity to reconstruct the building shown in Figure One, the building of James Hope, an Ottawa stationer in the 19th century. They are also afforded the opportunity to literally see a number of the problems that historians encounter while attempting to reconstruct the past. In this scenario, reference to a print tutorial, and construction of a 3D artefact, collectively provide students with the basis to recognize and express the proper relationship between model and historic object.

Figure One:

National Archives of Canada, PA 9257, C3776; NMC-0010731

Among the lessons that the project conveys is that evidence is subject to misinterpretation. A naïve reader of the map shown in Figure Two would conclude that the structure is 50 feet high. In fact, the map's cartographers followed a different convention, listing only the height of a structure's vertical walls. If a structure contained a sloped roof over and above the walls, that section's contribution to building height was ignored. Why is this important? Students learn that their interpretation of a document may not always match the original author's, or cartographer's intent. Stated another way, contemporary perception – or misperception – of a document can create a divide between a representation and the object it is supposed to map.

A second lesson is that evidence has gaps. In the case of the project's tutorial, the "gap" is an absence of data regarding the appearance of the wall shown in Figure Three for the Hope building. To complete the model, students must make an informed guess as to its probable appearance based on a

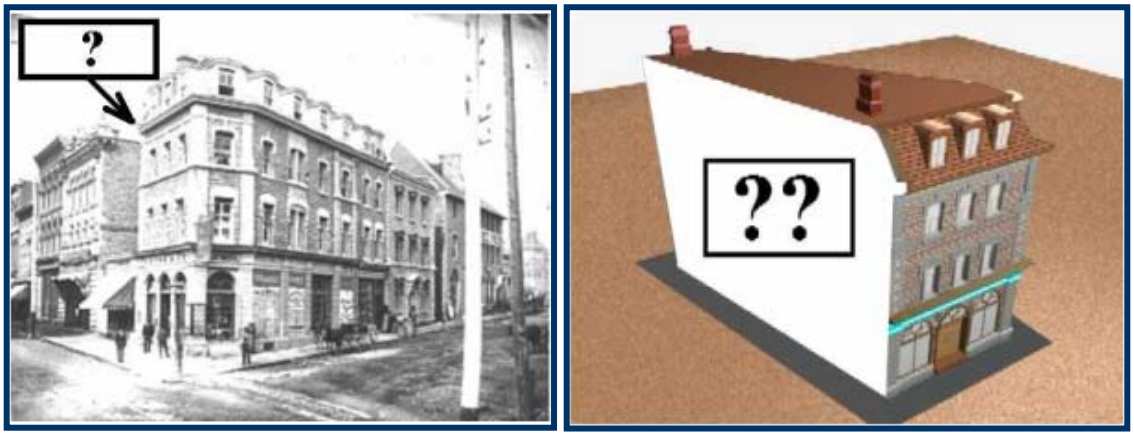
reading of the historic context, which in this case is the appearance of neighbouring structures. Why is this important? It enables students to realize that there is an element of uncertainty to the historian's

Figure Two:

National Archives of Canada, NMC-0010731
National Research Council of Canada

craft, uncertainty that can never be overcome. There will always be things that historians do not know. Consequently, there will always be a distinction between representation and referent.

Figure Three:



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Now, turning to the topic of conventions for narration, I suggest scholarly discussion in future will centre on two fundamental questions. One, what can scholars do in 3D environments that they cannot in print? And two, what can researchers do better – or more convincingly – in three-dimensional environments than in print? I suggest researchers' answers will ultimately turn on recognition of the following points: computers can represent information dynamically. Print platforms cannot. Computers can efficiently represent topographic change. Text cannot. Limiting the discussion to what realizations will mean for historians, I suggest their core challenge will be to determine how these

characteristics can be employed to support argumentation and instruction. Much of that discussion, I believe, will centre on time, the construction of time, and how its representation in 3D may be used to support analysis and argument. Again, there are precedents – this time in the history and computing literature – that suggest that such a discussion is already underway. Researchers interested in historical GIS are already considering how temporal topology might be represented in their software. Other historians have indicated an interest in using computer games to represent systems and narratives with multiple endings.[7]

In dealing with the challenge of time, it is likely that scholars early on will turn their attention to the use and representation of counterfactuals. Traditionally, most historians have viewed counterfactuals as the academic equivalent of junk food, pleasurable in and of themselves, but, for two reasons, hardly the substance upon which serious history is to be built. First, counterfactuals violate the Rankean dictum to describe history as it was. There is more than enough work to do describing the factual, without referencing ghostly might-have-beens in the domain of the counterfactual. Second, as Niall Ferguson suggests, counterfactuals have often been badly conceived, flights of fancy rather than rigorous thought experiments based on evidence, and minimal manipulation of the historical record.[8]

During the 1990s, however, some scholars, including Ferguson, Geoffrey Hawthorn, Philip Tetlock and Aaron Belkin began to change their mind. They and others now believe that counterfactuals do serve a useful purpose, as instruments to support the construction and rigorous interpretation of the past.[9] More specifically, in a recent issue of *History and Theory* Tim De May and Erik Weber suggest that counterfactuals can be used as a basis for weighing contrasting explanations for a historic event. The relative influence of cause A vs. cause B can be determined via deduction, thought experiments in which the behaviour of actors is governed by premises derived from the historical record, and their behaviour is assessed through immersion in counterfactual scenarios in which only one of two or more competing causes is present. In this line of reasoning, if a group's probable behaviour – determined via a reading of individual attitudes on the ground -- more closely tracks with the historical record in scenario A than scenario B, then there is a basis for suggesting that cause A was the dominating factor for the historical event under examination.[10]

Now for most historians, I think, the De May-Weber method for differentiating cause via counterfactual scenarios should enjoy some appeal. Their method of scenario generation, however, should not. Deduction is a useful thing. It is also a dangerous thing, especially if one's premises turn out to be wrong. The danger in this method is that it assumes group behaviour can be inferred from agent motivation. One can point to an array of social scientists and historians, however, who insist that the link between the one and the other cannot be easily assumed. The problem in relating the local to the social in fact has proven so intractable that a crisis has been proclaimed in the social sciences. Peter L. Berger has issued a *DisInvitation to Sociology.*[11]

This impasse points to two questions. Why historians would rely on deduction in the first place? And what if any alternative is available for the purpose of scenario generation? With respect to the first question, I suggest the resort to deduction in part derives from historians' reliance on print technology. Print, for all its virtues, is a static thing. It is a poor instrument for modeling the interaction of hundreds, if not thousands of agents, and determining the subsequent outcome. The labour required to employ it effectively precludes its consideration. Historians, therefore, to the extent that they have appealed to counterfactuals to weigh contrasting explanations, have had little choice other than to proceed via deduction. But that was then. What about now? I suggest there is a better, more convincing route available to historians for counterfactual generation, and that is through computer-based simulation. It has the capacity to model agent interaction. It further has the capacity to display unexpected outcomes

that are the product of agent interaction. And via current work in the science of artificial societies, or A-Life, it provides a basis for weighing competing causal claims in history.

By way of example, archaeologists have long debated the causes underlying the sudden disappearance of the Anasazi from the Long Valley in New Mexico around 1300. Since the 1920s, some have cited environmental problems extant in the 13th century, others internecine warfare and other causes. Researchers could point to reams of data documenting environmental conditions, settlement patterns and demographic trends. But nothing in the data provided an obvious basis for preferring one explanation over the other. In 1994, two social scientists and one archaeologist, Joshua Epstein, Robert Axtell and George Gumerman, decided to model the history of the Anasazi as a way of gaining traction on the problem. Creating a simulation that matched the historic environment, and equipped the cyber Anasazi with rules for farming, moving and mating, and accompanying rules defining family-size, life-spans, and nutritional needs, the three set the animation in motion to ascertain what patterns would emerge. The result? A pattern of settlement that closely matched the trajectory revealed in the data.[12] According to the criterion supplied by De May and Weber, scholars now have a basis for weighing the environment as the more significant factor.

If the scenario I am painting here is correct, that researchers in history and computing will turn to counterfactuals, then one further prediction follows. The same researchers will be faced with the aesthetic challenge of integrating the counterfactual into the 3D narrative. The force of counterfactual argumentation rests on comparison. We view one time-line, then another, and in so doing we come to some conclusion about the time-line we call history. This process suggests that historians will need to consider the possibility of simultaneously representing two or more time-lines in their narratives, to facilitate user comparison and interaction while following the argument at hand. There is precedent for such an idea in the history of narrative. The literary critic Gary Saul Morson notes that Russian novelists such as Dostoevsky and Tolstoy frequently engaged in a similar practice that Morson refers to as *sideshadowing*. He notes that: "In *sideshadowing*, two or more alternative presents, the actual and the possible, are made simultaneously visible."

> This is a simultaneity not *in time* but *of times*: we do not see contradictory actualities, but one possibility that was actualized and, at the same moment, another that could have been but was not. . . .*Sideshadowing* therefore counters our tendency to view current events as the inevitable products of the past. Instead, it invites us to inquire into the other possible presents that might have been and to imagine a quite different course of events.[13]

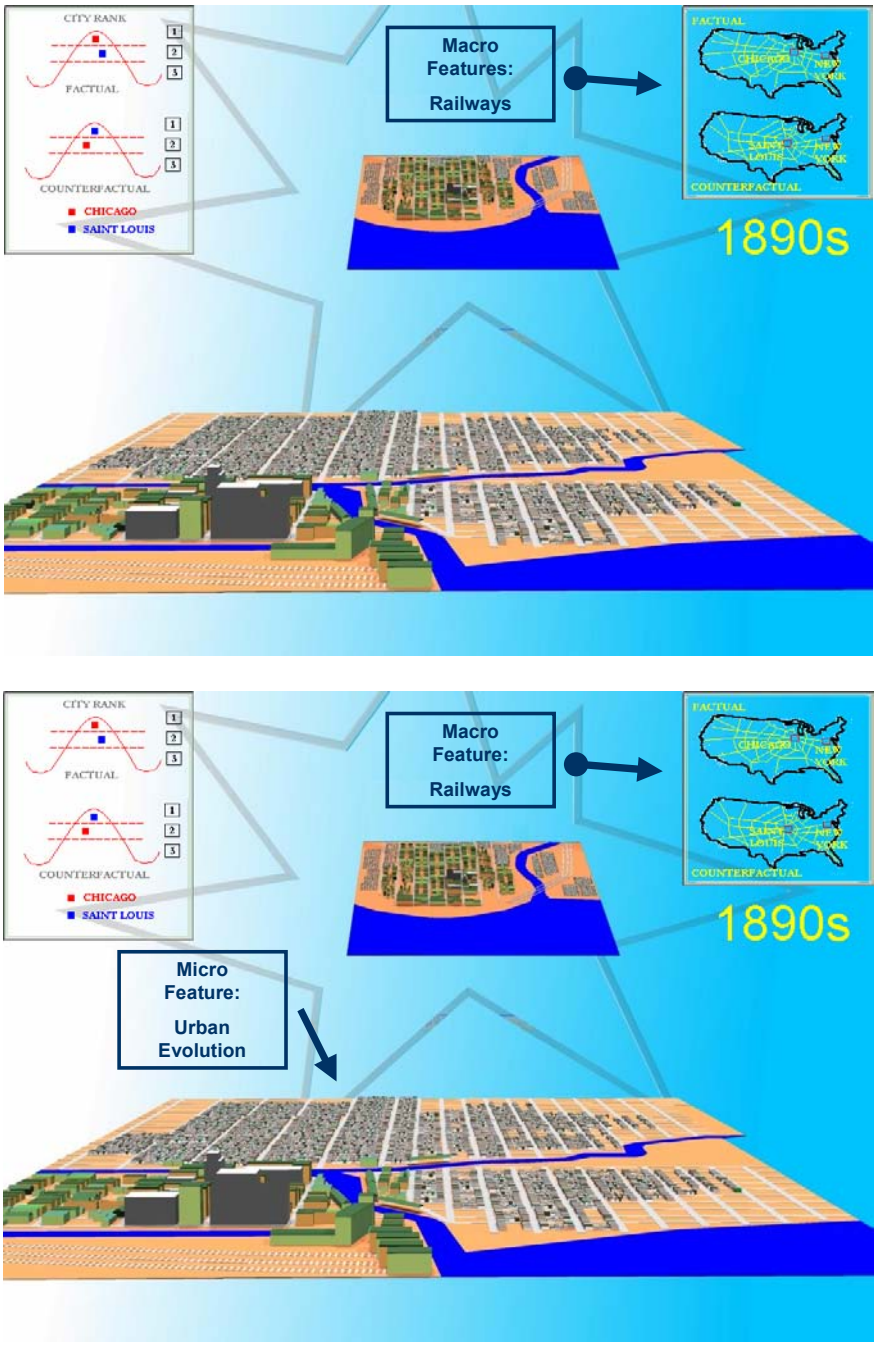
One domain in which *sideshadowing* might find application is urban history. Consider Chicago's emergence as a "gateway" city in American history in the 19th century, as a transfer point for manufactured wholesale goods, services and capital from the east, and as a repository for agricultural produce and raw materials from the west. As William Cronon notes in his landmark *Nature's Metropolis*, there was nothing pre-destined or "natural" about Chicago's emergence as the metropole of the West. His narrative suggests that, under different conditions, St. Louis might have retained its status as entrepôt to America's western territories. What was key was the railway. Chicago built more of them. Chicago was more successful in attracting capital to build more of them, and in so doing Chicago supplanted St. Louis as merchant to the mid-west. For Cronon, individual choice mattered.

But it also must be said that Cronon is also equivocal on this point. In other sections he suggests that environment mattered, that Chicago's proximity to the Great Lakes and to New York is ultimately

what mattered. We are left with the implication that even if St. Louis merchants had acted earlier to protect their position, Chicago ultimately would still have won.[14] Chicago history, then, presents scholars with an opportunity to weigh competing causes in the manner described here.

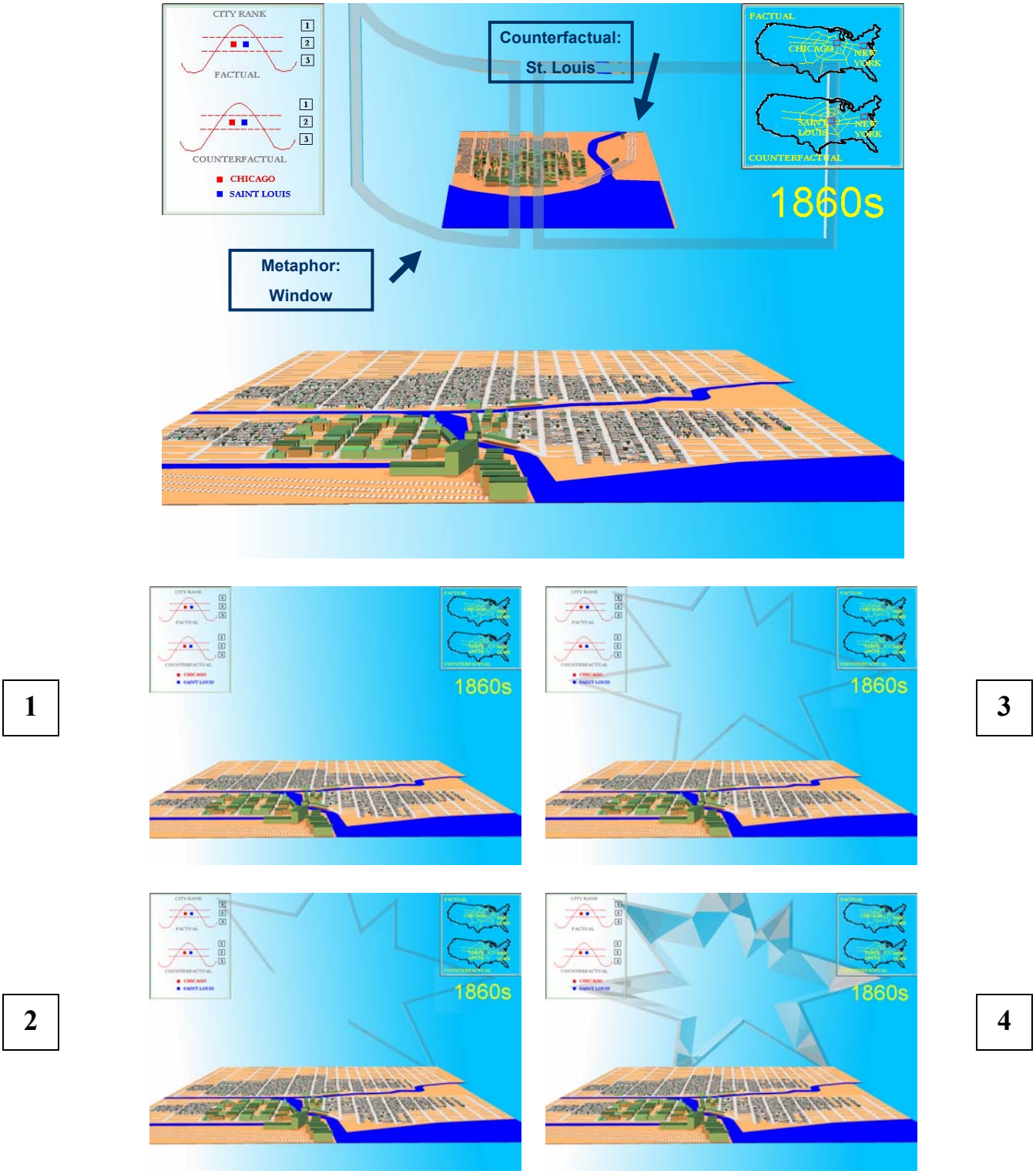
It also presents an opportunity to systematically consider how *sideshadowing* might be implemented. Factors that scholars will have to consider will include how macro-scale features – such as the railway networks shown in Figure Four – can be simultaneously represented with micro-level features, such the evolution of the city on the ground.

Figure Four:



A second concern will be the generation of appropriate metaphors to indicate a bifurcation in history, the emergence of two separate time-lines. Metaphors such as the window and the tear shown in Figure Five, are two obvious possibilities.

Figure Five:



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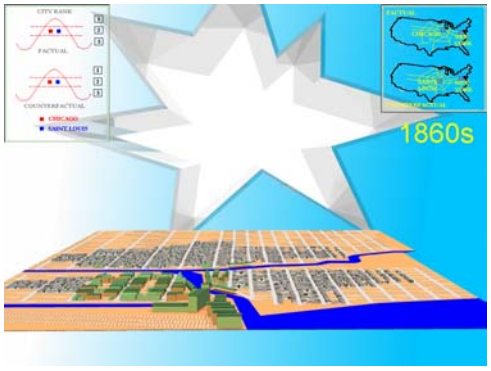
1860s

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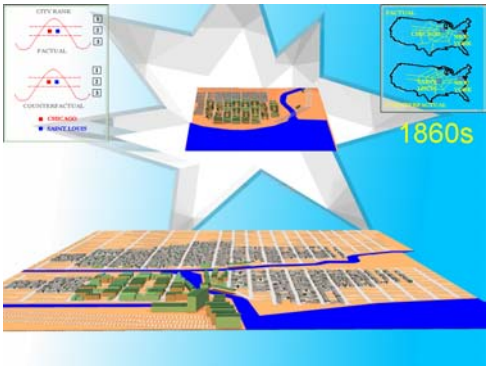
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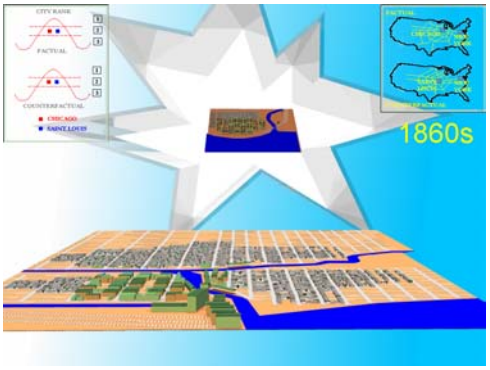
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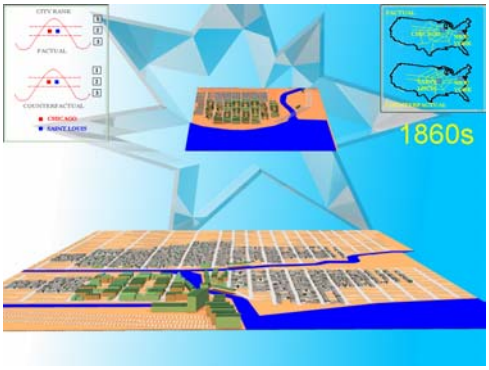
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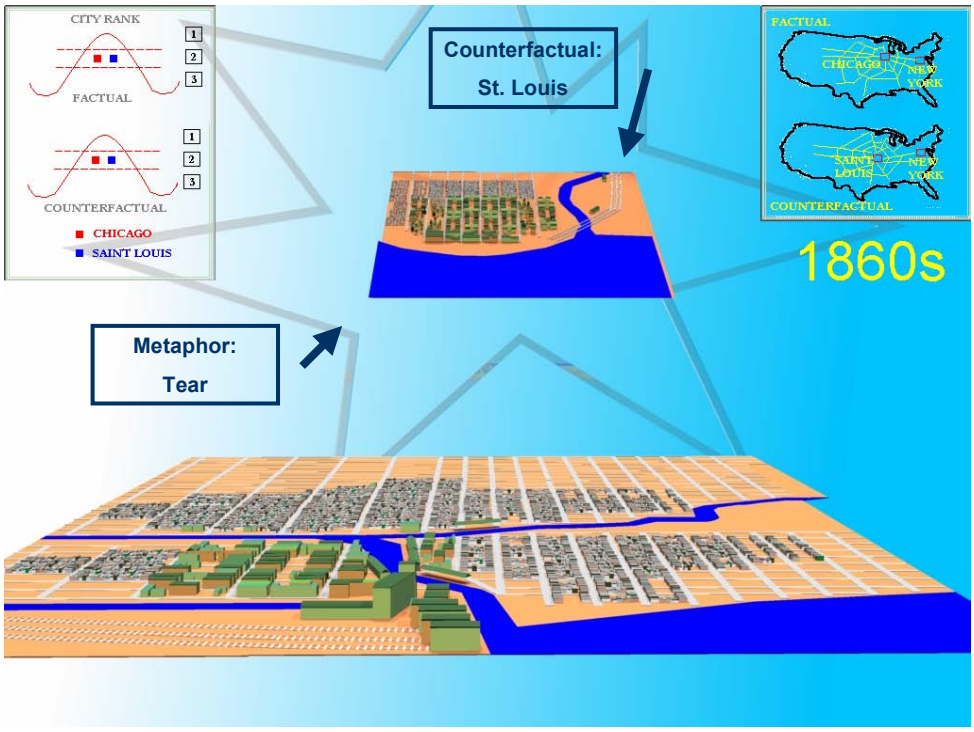
CITY RANK
1
2
3
FACTUAL
1
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COUNTERFACTUAL
CHICAGO
SAINT LOUIS
Counterfactual:
St. Louis
FACTUAL
CHICAGO
NEW YORK
SAINT LOUIS
NEW YORK
COUNTERFACTUAL
1860s
Metaphor:
Tear

In conclusion, then, new media – particularly 3D media – promises to be nothing if not disruptive for scholars in the humanities and social sciences. Communication environments evolve, and it is likely that scholars are going to have to come to terms with strange new conventions such as chloropleths, or to invent new ones such as the 3D sideshadow. My purpose today has been to suggest that such an effort is necessary. If we concede Harold Innis' point, and I do, that new communication technology offers potential, for discovery of knowledge, and for construction and re-construction of the same, then it is vital that scholars devise the building blocks that will support the exercise of both endeavours. New media offers rich opportunities for scholars in the humanities and social sciences. They ought to take every opportunity to seize them.

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[2] Harold Innis, "History of Communication". *Harold Innis Papers*. University of Toronto Archives, B72-003, Box 17. pp. 35-36, 38.
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[8] See Niall Ferguson, "Virtual History: Towards a 'chaotic' theory of the past." In *Virtual History*. Ed. Niall Ferguson. (London: Macmillan, 1997): 1-90.
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