GENEALOGIES OF ATTENTION:

THE EMERGENCE OF US HEGEMONY, 1870 - 1929

by

Heather Pilatic

Department of Literature
Duke University

Date: ____________________

Approved:

______________________________________________
Barbara Herrnstein Smith, Supervisor

______________________________________________
Janice Radway

______________________________________________
Michael Hardt

______________________________________________
Robert Mitchell

______________________________________________
Ian Baucom

Dissertation submitted in partial fulfillment of
the requirements for the degree of Doctorate
of Philosophy in the Department of
Literature in the Graduate School
of Duke University

2008
ABSTRACT

GEOLOGICALS OF ATTENTION:

THE EMERGENCE OF US HEGEMONY, 1870 - 1929

by

Heather Pilatic

Department of Literature
Duke University

Date: __________________________
Approved:

___________________________
Barbara Herrnstein Smith, Supervisor

___________________________
Janice Radway

___________________________
Michael Hardt

___________________________
Robert Mitchell

___________________________
Ian Baucom

An abstract of a dissertation submitted in partial
the requirements for the degree of Doctorate
of Philosophy in the Department of
Literature in the Graduate School
of Duke University

2008
Abstract

This dissertation is at once a historical study of the emergence of U.S. hegemony through the lens of discourses and techniques of attention, and a sustained series of methodological reflections centering on how to write and think about historical dynamics of causality. Methodological emphasis is first on establishing a reconceptualization of the dynamics of scientific and commercial accumulation animating capitalist modernity. From there, this study maps the emergence of two intersecting truth technologies that I argue are central to the peculiar ways in which U.S. corporate capitalism has worked over the long twentieth century. These apparatuses of not-only scientific truth are the psychological problematic of attention as a model enabling the representation of, and intervention in, human cognition, and the Marginalist visualization of “the economy” as a welfare equilibrium.

Both technologies emerged in the final decades of the nineteenth century along with the trans-Atlantic proliferation of research universities, and subsequent re-organizations of the material bases, and representational strategies and practices, of authoritative truth-making. In the U.S., these developments effected a particular displacement and broad re-orientation of previously theological frameworks for understanding human cognition and the “Natural” order of society. I argue that one consequence of this displacement and re-orientation has been the formation of a governmental rationality of the U.S. “Market Republic” that takes the welfare equilibrium of a mass-market economy as its telos and idiom of rational order, while simultaneously rendering civic freedom a matter of choices made after paying the right
kind of (primarily economic or scientific) attention. As my examples indicate, this rationality is not necessarily state-based, but rather unfolds medially as a series of conceptual-discursive and socio-technical conventions in three primary institutional sites of attention-gathering and market-making: early mass-circulation print culture, systematic corporate management, and modern research universities. In all three sites, my focus is on communication technologies conceived as staging procedures for the socialization and accumulation of attention.

As mentioned above, my historical horizon of significance for these investigations is the emergence of U.S. hegemony between 1870 and 1929. By conceptualizing hegemony in terms of a nation’s intermediating position as a dominant global “center of (commercial and intellectual/scientific) calculation,” I keep in play a general conception of accumulation wherein knowledge, money, and indeed, human attention, are all forms of currency that have kept U.S. hegemony current throughout the long twentieth century (1870 - present). At stake in this alternative account of capitalist accumulation and scientific knowledge as tightly linked networks is not the by-now-standard conflation of scientific and class-based authority to “make things mean;” but rather, an insistently historical, constructivist, and indeed relativist conceptualization of how resources and power systematically concentrate and disperse in the very micro-processes by which people think “truth” with their eyes and hands -- by what they look at, interface with, are constituted in terms of, and so on. To accomplish this, the study proceeds by holding together Giovanni Arrighi’s macrosociological theory of world historical capitalism, Bruno Latour’s microsociological account of the power of “immutable mobiles” in (scientific) modernity, and Michel Foucault’s genealogical
conception of history as well as his theory of governmentality (the “conduct of conduct” through practices of freedom).
Contents

Abstract ........................................................................................................................................ iv
Acknowledgements .................................................................................................................... ix

Capitalist? Modernity:
Re-describing the “Truth” of Epochal History-writing .......... 1

Introduction: 1870 ...................................................................................................................... 1
Capitalist? Modernity .............................................................................................................. 8
“Immutable Mobiles” + the Rationalization of Sight .............................................................. 11
Irreversible Accumulation: the Systemic Capabilities of Capitalist Markets ...................... 20
Humans and the Making of Meaningful History ................................................................. 26
Genealogy, Governmentality, Accumulation ........................................................................... 32
Hegemony .................................................................................................................................. 38

Chapter I. Attention as a Form of Problematization + Model of Cognition .................................. 43

The American Republic in Time: Incorporation, Marginalist Economics + Exceptionalist Scientism .............................................................. 46
Functional Attention + the Experimental Subject ................................................................... 58
Sensory “Force”: a Bridge from Soul to Mind ......................................................................... 67
Unconscious Mental Processes ................................................................................................. 79
Chapter II. Neoclassical Economics’ Powers of Visualization ................................................. 84
  Rational Frameworks: Theology + Economism ................................................................. 84
  Manifold Marginalism: the Development, Applications + Implications of Diminishing Returns .......................................................... 93
  The Accounts .................................................................................................................. 96
  Equilibrium Analysis + the Re-modeling of Distribution .............................................. 104
  *Homo Economicus ........................................................................................................ 112

Chapter III. A New Model of Polity + Citizenship ......................................................... 117
  The “Market Republic”: Truth Techniques, Public Goods + the New Liberal Objectivity ............................................................. 125
  Technologies of Mass Mediation: “Ambushing” + Managing Functional Attention ........................................................................ 144
  Instituting Cultural Authority ....................................................................................... 164

Conclusions ..................................................................................................................... 183
  In Pursuit of the Historical Human/ities ....................................................................... 183

Bibliography ..................................................................................................................... 197

Biography ......................................................................................................................... 217
Acknowledgements

This dissertation has been completed mostly alone and with books. My debts are to the many people who have made it possible for me to be alone with books, trying for years now to sustain my own understanding. I am thankful too, for institutions — or rather, institutional hold-outs like the Literature Program. It is an exceptional place, and though I found less warm fuzzy than I would have liked there, my intellectual training was thrilling and I have always been truly glad of that. My committee members are each and all, exemplary scholars and kind human beings. Early on, Jan Radway inspired me with her teaching and turned me on to historical modes of investigation. Michael Hardt has been, all along, generous in his thinking and with his time. Ian Baucom, as a fifth reader, has done what I’d hoped he would — offered the kinds of readerly insights that are so smart that when I finally wrap my head around them a week later, I have a little epiphany and am moved along. Rob Mitchell has been, for me, the happiest surprise of this committee and process. His well-timed encouragements, substantive engagements, and willingness to read have been crucial sources of support at key moments throughout. My advisor, Barbara Herrnstein Smith, has been, at every turn, a truly great teacher and mentor: she is rigorous, clear, encouraging, and the kind of careful reader and thinker who calls forth one’s highest level of effort. My intellectual formation owes more to Barbara than to any other single source and this formation is the thing for which I am most enduringly grateful.
I don’t come from the sort of folks who get to go to college, let alone spend many of their best earning years alone with books. So it is, to my mind, a series of ongoing gifts from my family that have made it possible for me to undertake this project. If one can dedicate a thing like a dissertation, mine is for my family. For Grandma, who managed to make the prospect of spelling scissors exciting and, against too many odds to name, turned out some strong and saucy women. And for Mom, who stopped the madness of those early years long enough to make me know that homework mattered, who scrapped to line paper by hand when the right kind wasn’t on hand, and never let me doubt my own intelligence. Dad, who is, I suspect, baffled by my choice to do this kind of work, but supports me all the same and without hesitation (thank you). Michael, Janell, Andrea and Krystyna, have each been there, always and in all the ways that matter. Karen Fite is a mentor and friend who has been an ongoing source of sane love, and an often-stunning example of what compassion and courage look like in practice. And finally, whatever accomplishment is represented here belongs also to my partner Scott, who puts up with my shenanigans, and dreams big with me to boot.

Thank you, for seeing me through.
Capitalist? Modernity: 
Re-describing the “Truth” of Epochal History-writing

Introduction: 1870

Human attention emerges as its own problematic around 1870. Previous to this date, studies of consciousness, mind, physiological optics, and even, sometimes, “attention,” were certainly conducted and elaborated upon. These were, however, largely scattered speculations, lacking any systematic networks of positivity. “Attention,” as a word, concept, site of inquiry, human capacity—as an object of identifiable discursive density around which statements, social practices and spaces were subsequently articulated—this modern unity emerges with the first psychological laboratories in the last thirty years of the nineteenth century.¹ From there attention gathers resonance and force as a capacious and refractory model of human cognition through which are worked out questions of economic and aesthetic value, social harmony, moral character, gender, affective neuroscience, and the contours and mechanics of social space and power. This study attempts to gather these diverse implications of attention under the rubric of twentieth century American political culture. Beginning as it does in the 1870s, this century is long—necessarily so.  

¹ Jonathan Crary lays out many of the terms of this emergence in Suspensions of Perception: Attention, Spectacle, and Modern Culture (Cambridge and London: MIT Press, 1999). In the first chapter, “Modernity and the Problem of Attention,” he states that it was “not until the 1870s” that one finds “attention consistently being attributed a central and formative role” in organizing the truth and structure of perception across “a wide range of institutional discourses and practices within the arts and human sciences.” (21 – 22)
In order to highlight shifts in American political culture as they have been shaped by discourses of attention, I think about the twentieth century in terms of three moments: 1870 – 1929, 1945-1950s, and post-1980. In the first moment, attention emerges amidst the remaking of American culture accomplished with the shift to corporate capitalism and the birth of twentieth-century consumer culture. Not incidentally, this is also the era during which the American research university system came into its own. The second moment is obviously a thinner slice. It primarily marks the disciplinary consolidation of literary-critical studies into the form that, for all its subsequent trials and tribulations, it still takes today—which is to say, a discipline defined by its rarefied textual objects, and by critical and pedagogical procedures of “close reading.” This period also includes the most triumphant and characteristic moments of post-war American hegemony and the new Cold War world order (represented domestically by the New Deal and high mass consumption, and internationally by the U.N., the Marshall Plan, Bretton Woods institutions and the bipolar allocation of power between the U.S. and the U.S.S.R.). The most recent moment is not yet closed and thus unavoidably speculative in character. To begin with, 1980 is the first year that “Attention Deficit Disorder” appears in its contemporary form as a disorder listed in the DSM III. The 1980s are also a decade of reversals in American political culture and the post-war geopolitical order largely presided over by American interests. This moment is characterized by “Reagonomics,” a dismantling of the welfare state, financialization of the global economy, and in general, a redistribution of wealth and income from those who have the least to those who have the most. The anti-statist, pro-capitalist policy reversals of these last two and half decades result in a global
exacerbation of class polarization of historic proportions and this polarization is registered and ramified in American political culture on a number of fronts (one thinks, for instance, of the “culture wars”). For the purposes of this study however, the 1980s are largely a prolegomenon for the 1990s, when the pharmacologically mediated disorders of attention and affect proliferate rapidly and in sync with a growing pharmaceuticals industry and the transformation of everyday and institutional life accomplished by the increased prevalence of screen technologies and the social spaces and modes of cognition that accompany them.

It is no accident that these sectors have been at the forefront of the most recent wave of high finance: pharmaceuticals has, since the 1980s, been far and away the leading industry sector in terms of profitability until it was displaced in 2003 by “mining, crude oil production” and “commercial banks.” Screen technologies is a phrase deliberately vague, but adequately indexed by information technology and the internet—two other leading sectors of financial profitability. My interest in pointing this out is not to say that pharmacologically mediated disorders of attention and affect are the new scene of expropriation or exploitation, or even the latest delinquent incarnation of the forms of cognitive/affective labor that characterize biopolitics in the late twentieth century. Indeed this last point seems an obvious implication of a near consensus—i.e. that labor around the turn of the twenty-first century is about what people do in front of screens and in service industries. The more salient aspect of this proposed connection between the cultural transformations problematized in terms of

---

attention and the ethereal realms of high finance is its bearing on a methodological point.

Genealogy is a historical methodology examining the emergence and extension of a technology in connection with the shifting discursive contexts and conventions that articulate that technology’s social relevance. As indicated briefly above, and to be explained more fully below, I highlight contexts and conventions that make capitalism go in the particular way that it has gone over this last long century. The social relevance of attention as a problematic certainly moves across a great variety of domains not pursued here; likewise capitalist accumulation in the twentieth century has operated in ways having nothing to do with discourses and techniques of attention. My cases matter for today’s world and matter in the way that they do because they investigate emergent properties of the system of accumulation now undergoing transition. (A different, but equally interesting genealogy of attention might have pursued the matter exclusively in the field of education, for instance). I take my account of the dynamics and historical precedents of the contemporary transition understood most broadly as “globalization” primarily from Giovanni Arrighi’s work. Arrighi’s longue durée perspective on world historical capitalism (from the thirteenth century forward) uncovers a recurrent cycle of financialization at the beginning and end of each long century (for instance, both the first and third moments sketched above are characterized by moments of high finance). Financialization, or high finance, is the increased profitability of financial deals that are largely unhinged from trade or

---

commodity production such that more and more capital is kept liquid (i.e. not put into trade and commodity production) in order to pursue financial speculation because the latter is more profitable.\(^4\) Periods of financial (as opposed to material) expansion are historically interesting because they signal moments of structural transformation and systemic flexibility during which new organizational tracks and procedures of socialization and accumulation are being laid down while the old ways of maintaining hegemonic order and insuring systematic accumulation are undergoing divestiture.

The historical recurrence of financialization is thus functionally indexical (i.e. not, to my mind, ontologically so, although it may be interpreted that way) because it points to a systemic re-organization and hegemonic transition. The originality and increased predominance of mathematically sophisticated financial instruments (esp. derivatives)\(^5\) in the contemporary transition (dating from around 1973) has not, as far as I can see, been fully dealt with in Arrighi-inspired accounts of financialization. These accounts remain wedded to what is basically a reflection theory of finance wherein financial capital is treated as a particularly fancy (if powerful) species of abstraction (this much is evident in the material/financial opposition).\(^6\) Never-the-less, I find a

---


\(^6\) The main problem with this conceptualization of finance is that it fails to apprehend either the newness or the conceptual agency of contemporary finance as a discipline and field of intellectual innovation that is, by now (beginning in the mid-1970s) independent from contemporary economics as either a disciplinary field of scholarly investigation, or a terrain for theorizing business “fundamentals.” According to Jan Toporowski and others, contemporary finance is a species of pre-Keynesian, neoclassical micro-economics working from an
functionally indexical understanding of financialization-as-signalling-transition useful here, and propose that it provides a historical and analytical rubric for contextualizing the most recent developments in discourses and techniques of attention. Although I do not take up disorders of attention and affect, or the “new attention economy”\(^7\) of screens at length in this study, these examples remain the most immediately available ones for contemporary readers and I think they can be speculatively glossed here in a way that gives better purchase on the rest of this study.

The question is, what do pharmacologically mediated disorders of attention and affect have to do with the increasing prevalence of screen technologies? There are many ways to read the link, and I think more than a few have merit. Two compact examples of axiomatization of the efficient (i.e. self-equilibrating) markets hypothesis. The theory of “no arbitrage,” for instance—that financial markets are such efficient markets of information that “buying low and selling high” in a way that beats the market is not done—this assumption is the fictional ground beneath derivative traders’ feet. See Jan Toporowski, *The End of Finance: Capital Market Inflation, Financial Derivatives and Pension Fund Capitalism*, (New York: Routledge Frontiers of Political Economy, 2000); Donald MacKenzie, “Long-Term Capital Management and the Sociology of Arbitrage,” *Economy and Society*, 32 (2003): 349-80.

Contemporary finance is dominated by derivative markets, and these are all a great series of mathematical elaborations on the initial (now famous and Nobel-winning) 1973 Merton-Black-Scholes equation (itself an analog of stochastic equations for calculating Brownian motion in particle physics). Despite the fact that derivatives are essentially futures, and thus a kind of trade-able contract linked ostensibly to some commodity, the rapid uptake of the Merton-Black-Scholes formula for pricing options (in conjunction with the 1973 founding of the Chicago Board of Exchange) made pricing and risk evaluation on the derivatives market into a reflexive field of mathematical innovation whereas previous pricing practices were based on broker experience and guesswork. On the emergence of this market see: Donald MacKenzie’s work; Bill Maurer, “Repressed futures: financial derivatives’ theological unconscious,” *Economy and Society*, volume 31, no. 1, February 2002: 15-36; and more popularly, Edward LiPuma and Benjamin Lee, *Financial Derivatives and the Globalization of Risk*, (Durham: Duke University Press, 2004).

might go as follows: Changed habits of interaction and particularly family dynamics having to do with more television-watching/screen-attending/gaming and less face-to-face interaction and affective attunement make for children and young adults whose neural pathways for socio-technical interaction are formed and pruned (adaptively) to interact differently; Or, sped-up lifestyles (one social temporality feature of the increased frequencies of communication) lead to increased reliance on industrialized food chains which in turn provide humans of all ages (especially developing fetuses) with too many excitotoxins and bio-accumulative heavy metals and not enough n-3 fatty acids, and one result is an increased prevalence of neurological disorders. There are, of course, yet more facets of this complex connection that one could turn to light. The kind of account I am giving, however, emphasizes attention as a model of cognition that critically capacitates and transforms capitalism in the long twentieth century. As such, the intermediating links for me are questions of order and profitability.

Contemporary disorders of attention and affect are diagnosed and treated as such for two inter-related sets of reasons: First, because pathological behaviors are, by definition, noncompliant with social and institutional imperatives and those predominantly screen-driven imperatives are increasingly coded in terms of attention

---


9 Well-known excitotoxins include aspartame, and glutamates like MSG and carrageenan. N-3 fatty acids are typically known as Omega-3s, but also include Omega-6s.
and appropriate affect; And second, because the psychopharmaceuticals industry has (like the rest of pharma) targeted \textsuperscript{10} “blockbuster” markets (i.e. greater than $1 billion),\textsuperscript{11} and the DSM III and IV have created an overlapping series of diagnostic categories\textsuperscript{12} that are, in turn, undergoing clinically-driven redefinition into terms of what kind of neurotransmitter-targeting molecules they respond to.\textsuperscript{13} In other words, because misfits stand out like misfits do, and pharma has been cherry-picking for thirty years, and diagnostics are re-defined by therapeutics, we have this emergent complex of extraordinarily profitable “dis/orderliness” that was initially a problematic of attention, 

\textsuperscript{10}By “targeted” here I mean both industry-wide market research (IMS Health is a market intelligence firm that sets the industry agenda by aggregating and publishing past and future market-sizes and growth-rates); and marketing in the traditional senses. Pharma aggressively courts doctors by researching their prescription habits through pharmacy records and then sending sales reps in, and by paying for continuing medical education curriculum-development, lecturers, and conferences. Another relevant practice is advertising: the FDA began allowing direct-to-consumer advertising of prescription drugs in 1997.

\textsuperscript{11}Pharma is presently undergoing a transition from this previous blockbuster-based model to a more targeted development cycle which would include the use of (genomic and proteomic, or protein targeting) molecular and nanotechnological micro-targeting techniques. The hope here would be to open a new and more efficient field of research. The current obstacle is that research and publication are set up (institutionally) to share only after phase III trials have been completed. The point of micro-targeting research is thus to increase innovation efficiencies pre-clinical trials.


but is increasingly addressed in a variety of brain-based, molecular idioms. Needless to say, this is a quick way of framing out a multi-factorial, structural situation that is in turn compounded by a dynamic series of feedback loops. The point of the short description just offered has been to apprehend this flux as a transition with emergently stabilizing properties that can be mapped indexically vis-à-vis profitability. It is difficult and risky to specify even the broadest parameters of what kind of capitalism (if it is to be identifiable as such), or regime of ordering is on the horizon; but it seems to be simultaneously biomedical and screen-based in its articulations, and attention has been among its nodal points of formulation.


The visual construction of something like a ‘market’ or an ‘economy’ is what begs explanation, and this end-product cannot be used to account for science.

There is not a history of engineers, then a history of capitalists, then one of scientists, then one of mathematicians, then one of economists. Rather, there is a single history of these centers of calculation.

- Bruno Latour, “Drawing Things Together”

The success of history belong to those who are capable of seizing these rules, to replace those who had used them, to disguise themselves so as to pervert them, invert their meaning, and redirect them against those who had initially imposed them; controlling this complex mechanism, they will make it function so as to overcome the rulers through their own rules.

This is because knowledge is not made for understanding; it is made for cutting.

- Michel Foucault, “Nietzsche, Genealogy, History”

This study proceeds by holding in conjunction three theories of modernity not typically considered together: Giovanni Arrighi’s macro-sociological theory of world capitalism, Bruno Latour’s micro-sociological account of the powers of modern science and technology in the West, and Michel Foucault’s theory of disciplinary power and society. Latour’s account of modern science and technology in terms of the inscription and mobilization of “immutable mobiles” remains, for readers in the literary humanities, the least well known of these three. For this reason, and because I find his
approach to offer a powerful corrective to and clarification of many theories of capitalism and social modernity at work today in the humanities, I will begin by explicating Latour’s alternative account of how modernity, capitalism and science and technology have advanced in the West since the seventeenth century. From there I will engage the interlocking questions of capitalism’s systemic properties as a totality (or “ultimate reality”) and its effects on subjectivity — often registered symptomatically as alienation or the reification of consciousness. In the chapters that follow, I attempt to recast this topic of subjectification in terms of a refractory model of cognition (attention) that informs key shifts in U.S. political culture from just after the end of the U.S. Civil War to 1929. Prior to any assessment of subjective or cognitive “ills” that characterize capitalist modernity, however, must come some specification of how that modernity has developed and how it works. In the pages that follow, I offer a re-description of the complex historical dynamics and causal mechanisms understood most broadly as capitalist modernity. These are offered as a series of reflections on historiographical method, but also because my object is simply illegible without such an effort at re-describing the “truth” of epochal history-writing.

“Immutable Mobiles” and the Rationalization of Sight

Bruno Latour is generally known either for Science in Action or We Have Never Been Modern. However, I find his clearest statement of an alternative method for conceptualizing the various powers of modernity in an earlier essay, first published as
“Visualization and Cognition: Thinking with Eyes and Hands,” and then collected in an updated form as “Drawing Things Together.” The rhetorical occasion and thrust of this article is clear in the earlier title. Latour is concerned to dispel a number of “grandiose” theories about the rise and effectiveness of modern scientific culture that posit some sort of Great Divide near the end of the seventeenth century whereupon primitive or medieval superstition was superseded by modern reason or rationality—whether this reason/rationality be the property of individual minds or of ‘social’ features of an economic infrastructure. In this vein, “Drawing Things Together” proceeds from the following assertion:

To arrive at parsimonious explanation it is best not to appeal to universal traits of nature. Hypotheses about changes in mind or human consciousness, in the structure of the brain, in social relations, in ‘mentalites,’ or in the economic infrastructure which are posited to explain the emergence of science or its present achievements are simply too grandiose, not to say hagiographic, in most cases and plainly racist in more than a few others.

Rather than positing a long march of “rationalization” (and regardless of how one deploys the term—i.e. with a valence of tragedy or of achievement), Latour wants to locate the mechanisms of reason and rationality in practices of visualization and cognition accomplished with eyes and hands – in the very mundane ways in which humans are convinced to accept and further articulate or circulate the “facts” presented on paper in graphs, diagrams, texts and images. These printed texts and evidentiary documents are “immutable mobiles” – fixed renderings (also called “inscriptions”) that

---


can be widely circulated through dispersed research sites, thereby providing a stable literary basis for a disciplinary network.

In networks of immutable mobiles, discipline works with the double sense developed by Foucault but with a notable extension and shift of focus. Foucault and Latour share a twinned attention to the material ways in which discursive objects enter the realm of the true, and to the fact that knowledge practices are simultaneously articulations of power concerned fundamentally with the disposition of bodies in time and space. Latour does not, however, limit this analysis to the human sciences and, in this sense, his extension is also a generalization. For instance, he does not limit his analysis to the institutional sites of the “disciplinary archipelago” described by Foucault in *Discipline and Punish* and elsewhere (although he does credit Foucault for having made very clear the role of institutions in arranging particularly effective situations for the display and circulation of immutable mobiles). For Latour, the creation and circulation of maps, engineering drawings, and descriptions and demonstrations of Boyle’s air pump are all sites of discipline aimed as conscripting others as faithful allies. By focusing on immutable mobiles, Latour reframes Foucault’s emphasis in *Discipline and Punish* on the political investment of bodies “in depth” to the more general “*staging* of a scenography in which attention is focused on one set of dramatized inscriptions.”

Latour is careful to qualify his emphasis on the rhetorical power of inscriptions (which work not simply by being staged, but by making the cost of dissent much
higher)\textsuperscript{18} with a repeated emphasis on mobilization. Explanations of how power and resources are accumulated in particular “centers of calculation” (whether scientific laboratory or imperial entrepôt) hinge specifically on how it is that innovations in inscription techniques capacitate the mustering of allies and resources on an ever-increasing scale.

Inscriptions are not interesting per se but only because they increase either the mobility or the immutability of traces.\textsuperscript{19}

It is not the inscription by itself that should carry the burden of explaining the power of science; it is the inscription as the fine edge and the final stage of a whole process of mobilization, that modifies the scale of the rhetoric. Without the displacement, the inscription is worthless; without the inscription the displacement is wasted.\textsuperscript{20}

Thus, the main problem to be solved if one wishes to accumulate facts, resources, allies, power, money, etc., is always twofold: first, rendering visually convincing inscriptions that can be moved without corruption, and second, mobilizing them. As examples, Latour offers linear perspective and the Dutch “distance point” method as historical innovations in pictorial representation that, taken separately, had limited (though substantial) effects on Western European cultures.\textsuperscript{21} It was not until the late sixteenth

\textsuperscript{18} While it is true that interpretations of any document or image vary, and that an audience always has – and often exercises – the prerogative of simply not paying attention, dismissal is not the same as dissent. Dismissal effectively disengages one from the circuits of power and knowledge being articulated; dissent is an engagement carrying a different sort of cost. As new disciplinary networks of immutable mobiles evolve, their procedures for mounting a counter-argument become more and more elaborate and costly (i.e. more highly trained, institutionally ensconced and often, materially expensive), requiring participation in and facility with a whole culture and semiotic system of expert and/or elite knowledge.

\textsuperscript{19} Ibid., 31.

\textsuperscript{20} Ibid., 41.

\textsuperscript{21} To make this presentation he relies on four well-known studies: William M. Ivin’s \textit{On the Rationalization of Sight}, (New York: Plenum Press, 1973), Samuel Y. Edgerton’s \textit{The
century, when graphical reproduction via the printing press achieved some freedom from the constraints of tradition that these innovations in inscription were put into conjunction with a mobilization device that took to global scale their abilities to rationalize time and space. By Latour’s formulation (via Eisenstein) what we see with the arrival of modern Dutch cartography and astronomy is a secondary mobilization cause (the graphical printing press) putting two efficient causes in pictorial innovation (linear perspective and Dutch “distant point”) into powerful relation. It is this complex of visualization and cognition techniques that sets into motion the “Scientific Revolution” and the emergence of global capitalism.

As suggested above, Latour’s argument consists most fundamentally in an alternative conceptualization of rationalization. Rather than understanding modern rationalization as a characteristic feature of historical capitalism that manifests by expressive causality, or as an institutionalized manifestation of “the reason of bureau- and technocrats,” he views it as a matter of the rationalization of sight achieved and continually renewed by the maintenance of metrological chains.22 In this context, the important thing about linear perspective is that it allows “optical consistency,” or what Latour terms a “regular avenue through space.”23 Linear perspective rationalizes human sight by virtue “of its recognition of internal invariances through all the transformations

---

22 Ibid., 57. Latour defines metrology as “the scientific organization of stable measurements and standards. Without it no measurement is stable enough to allow either the homogeneity of the inscriptions or their return.”
23 Ibid., 27.
produced by changes in spatial location.” Because images begin to conform to a rational Euclidean geometry, all depicted objects retain consistent relations both with respect to each other and with respect to the viewer, regardless of where they are moved and regardless of their thematic content. One of the consequential side effects of linear perspective is thus that it allows fictional, natural and sacred objects to be simultaneously depicted on the same scale, from the same perspective and even within the same image—all objects and settings equally subject to a universalizing pictorial language that comes to communicate more information with more speed than any verbal language in human history.

With Dutch “distance point” method for drawing, the equivalences rendered by linear perspective are compounded by the eradication of a privileged site for the onlooker. Because the image is depicted as if painted on the retina of the viewer, the observer’s situational perspective is itself flattened into the image. “The tricks of the camera obscura transform large-scale three-dimensional objects into a small two-dimensional surface around which the onlooker may turn at will.” Most significant in establishing the scope of Latour’s argument is the fact that Svetlana Alpers’ study of seventeenth-century Dutch painting traces the shifting terrain of a whole visual culture—of how a culture both sees the world and makes it visible. Among other transformations in visual culture, she underscores a new obsession for defining the act of seeing in scientific situations. By the end of her study, Alpers has tracked the simultaneous transformation of art, theories of vision, science and even the organization

25 Ibid., 29-30.
of economic powers by following the effects of one innovation in pictorial inscription practices. By noting these simultaneous transformations in science, aesthetics and commercial activity, Latour suggests (although he does not fully explicate) that it is no accident that the Dutch republic’s period of wealth and imperial power coincide with its golden age of cartography and scientific innovation in the seventeenth century.

What Latour does specifically claim is this: Along with these innovations in visualization techniques – particularly as they are put into wider and wider circulation via the printing press – came a new way of not merely communicating what has been seen, but of accumulating time and space via “representations.” The previously singular, uncapturable natural world becomes representable, comparable, collectible, and navigable and newly conquerable through the creation of immutable mobiles with a level of accuracy and on a scale never before possible. As Eisenstein demonstrates, and Latour plays upon, the printing press becomes a real agent of change with the great leap forward in graphic printing that happens at the end of the sixteenth century with the new school of Dutch cartographers who only then finally “emancipated printed cartography from archaic conventions.” Although it is certainly true that religious and

---

26. “People before science and outside laboratories certainly use their eyes, but not in this way. They look at the spectacle of the world, but not at this new type of image designed to transport the objects of the world, to accumulate them in Holland, to label them with captions and legends, to combine them at will. Alpers makes understandable what Foucault (1966) only suggested: how the same eyes suddenly began to look at “representations.” “ Ibid., 30 – 31.

27. It should be noted that Latour leaves much implicit at this point in his argument. He seems to capture Eisenstein’s emphasis on graphic printing synecdochally with the phrase ‘aqua forte’ – meaning ‘aqua fortis’ an acid-based engraving technique used primarily for topography, shipping and military cartography. I am confused by the fact that the historical use span for ‘aqua fortis’ (also called aquatint) was around the end of the eighteenth century (esp. 1780 – 1830), which would antedate the period of Dutch empire (1610/20 – 1730/40) alluded to in the rest of Latour’s article.
scientific cultures were (differently) impacted at the end of the fifteenth century with
the invention of a moveable type printing press, it was graphic printing that removed the
road block to the comparative classification and study of images, especially maps.28 If
one wishes to understand how immutable mobiles can be said to “accumulate time and
space,” especially in connection with capitalist accumulation, then maps offer an
instructive case. Multiple maps were drawn and collected throughout the great age of
Western European “discovery,” but they were highly individualized, shot through with
variations, and neither reliably reproduced nor widely shared. These maps could not,
therefore, function as the basis of mercantile trade routes or the expansive regimes of
capitalist (as opposed to earlier, primarily territorialist) empire along which every kind
of commodity and object or depiction of scientific interest was transported. The
accurate and shared mapping of trade routes (including regional differences in value for
commodities) facilitated not only safe passage but an emerging consciousness of non-
local “markets” as things of value to be protected from the destabilizing effects of
warfare between territorial states (a point to which I’ll return below).

It is worth pointing out here that accuracy in Latour’s argument is not a feature
of “adequate” representation of an independent “objective reality,” but rather a

28 Even in the case of moveable type, the history of printing activity and typefounding
 corresponds to Latour’s focus on “centers of calculation” as well: fifteenth-century Venice was
the center of typographic and printing activity—a period roughly corresponding to the earliest
of Giovanni Arrighi’s “systemic cycles of accumulation” centered in the Italian city-states.
Likewise, from the mid-sixteenth until the end of the seventeenth century, the Dutch enjoyed a
virtual monopoly on typefounding (theirs was the Fell type, which was both more efficient to
print and more readable).
universalizing effect of repeated and widely circulated transcription without corruption—in other words, rhetorically effective representation that capacitates large-scale and long-term intervention. In every polemical or rhetorical situation, the main benefit of reliable accuracy across multiple locales is irreversible capture. Such reliable and combinable capture (of coastlines, currents and star locations) is the micro-mechanism of large-scale, long-term capitalization. By this light, if maps and money (particularly Marx’s “cash nexus”) are two relevant examples of immutable mobiles operating as apparatuses of capture and circulation, then financial markets are another. The main difference with financial markets (indeed, what makes them interesting to sociologists of globalization like Arrighi and Saskia Sassen) consists in the additional degree of mobility and exchangeability that they exist to facilitate. A student of contemporary and past financial markets and instruments, Sassen asserts that in order to understand how financialization works, we must cease thinking about it in terms of money and begin thinking about it as a process of liquefication for universal transactability. This sense of financial markets is fully in line with Marx’s analysis of the “cash nexus,” my point here (Latour’s point, really) is that these processes of capitalization that facilitate ideally universal transactability are no different in kind from processes of knowledge capture and codification that establish and rely upon the metrological chains (i.e. parameters of time and space) that facilitate scientific accumulation of discursive objects in the realm of the universally/scientifically true. Both are examples of the rationalizing power of immutable mobiles that achieve particular prominence when the right to write, calculate or transact centers in one location—as it began to with the rise of Dutch hegemony in the seventeenth century.
"Irreversible Accumulation: the Systemic Capabilities of Capitalist Markets"

The bustling markets and creative/intellectual critical mass of capital cities is nothing new with modernity in the West. What does arise in Western Europe in the seventeenth century, along with—or indeed, along—the circuits of rationalized and visualized communicability established by Latour’s networks of immutable mobiles is an increasingly interconnected market economy and a “new anarchic order” established between states to cultivate it. Amidst the general crisis of legitimacy experienced by rulers in the middle of the seventeenth century, a consensus was forged that, whatever their territorial and religious antagonisms, every ruler shared interest in maintaining authority over their subjects. From this consensus, and in order to stem the unprecedented bloodshed and waste of the Thirty Years War, a document and system of world rule emerged. Known as the 1648 Treaties (or Peace) of Westphalia, this series of agreements represent a turning point in world history primarily because they codify a new system of rule based upon international law and the balance of power between European nation-states. This system of nation-states replaced a previous idea of a suprastatal or papal authority (e.g., imperial Spain) with the notion that European states formed a single political system. Key provisions of this system of rule were the

---

29 The Thirty Years War, its antecedents and wake, are obviously a complex historical subject. In the interests of brevity, I’ve not taken up its religious themes, vital though they were. For instance, one historically significant innovation of the Treaty of Westphalia was its recognition of Calvinism as a religion. Likewise, an important strand of contention and social unrest leading up to and through the War consisted precisely in the fact that Protestant subjects were chafing under increasingly corrupt Catholic rulers. These lines of demarcation are, of course, a direct consequence of the many varieties of Protestant Reformation across Western Europe in the sixteenth and seventeenth centuries—which were in turn critically capacitated by the printing and circulation of the Bible, particularly in languages other than Latin.
principle that civilians were not party to disputes between sovereigns and the protection of non-combatant property and commercial activity from wartime seizure or disruption.

As Arrighi characterizes it, the Peace of Westphalia transacts a “reorganization of political space in the interest of capital accumulation [that] marks the birth not just of the modern inter-state system, but also of capitalism as a world system.” 30 Two phrases in Arrighi’s characterization bear directly on the species of composite historiography 31 at work in this study: “reorganization of political space” and “capitalism as a world system.” These phrases call up matters of definition and causality. Constitutionally, what are “political space” and a “capitalist world system”? Likewise, what implications, if any, are to be drawn about the way that history works from the fact that modernity in the West begins with the “reorganization of political space in the interest of capital accumulation”? And to return to an earlier phrase, in what senses does this historical reorganization constitute a “new anarchic order”? Indeed, what is the order of modernity and how do we make sense of its long and reverberating wake?

My short answer is that there isn’t one (an order), and that we work in pieces, failing most of the time. In this spirit, the best historiographical schema I’ve been able to patch together – the one that gives some critical purchase on my object – goes like this: Latour’s account of the powers of immutable mobiles describes the micro-sociology of how capitalization works through the rationalized staging and mobilization

---

30 Giovanni Arrighi, The Long Twentieth Century, 44.
31 Composite historiography in the sense mentioned at the outset of this section; i.e. that I proceed by holding in conjunction three distinct theories about the various powers of modernity.
of visualization techniques; Foucault’s theory of disciplinary subjectification provides something like a meso-sociology of socio-political power in modern disciplinary society; and Arrighi’s narrative of the cyclical and systemic movements of capitalism gives a macro-sociology of the geopolitical dimensions of modernity. In each sociology, what is at stake is scalable power-at-a-distance that is increasingly organized with the explicit objective of irreversible accumulation. Latour says as much in “Drawing Things Together.” Foucault describes disciplinary techniques in terms of their objective: to render bodies politically docile and economically useful. And Arrighi’s narrative begins with and builds upon the Dutch Republic’s establishment of endless accumulation as a means to political hegemony.  

Nevertheless, I am hesitant to proceed from a historiography that runs the risk of prematurely positing “the capitalist market” as a driving force or dialectical logic of history.

Markets and the socioeconomic relations that surround and animate them are diverse sets of activities and interactions consisting of human and non-human agents alike. It is therefore not at all clear to me that markets have operated either with internal consistency or independent force as the structuring logic or animating dynamic of modernity. One thing made clear by Latour’s study of immutable mobiles is that, at the micro-level, the emergence of increasingly interconnected “centers of calculation” as a basis of modernity’s “new anarchic order” has instead been the contingent articulation of developments in techniques for the staging and mobilization of immutable mobiles.

---

32 “The Dutch had demonstrated on a world scale what the Venetians had already demonstrated on a regional scale, namely, that under favorable circumstances the systematic accumulation of pecuniary surpluses could be a far more effective technique of political aggrandizement than the acquisition of territories.” Arrighi, The Long Twentieth Century, 140-141.
To this analysis, however, we must add another layer of historical context and contingency. Markets in modernity have been deeply imbricated with forms of violence and military power that exceed (even as they rely upon) the semiotically-based powers of immutable mobiles.\textsuperscript{33}

Among the chief limitations of Latour’s micro-sociology is its inattention to power differentials that are structural in nature and/or historically rooted. He likewise does not talk about effects on subjectivity beyond rhetorical persuasion. These limitations are the result of a kind of methodological interdiction he proposes – i.e. to follow “science in action” at the local level. This kind of localized focus brings into sharper resolution some things while rendering illegible others. (Such is the perspectival price paid by any theory.) In order to understand why and how it has come to pass that certain “centers of calculation” enjoy and are inevitably dethroned from particularly powerful periods of accumulation and wealth at specific periods in history however, a delocalization of focus becomes necessary. Foucault and Arrighi both attend to the brute force of state-sponsored violence and military power, and to the historical importance of socio-political power as it has been wielded by and against social groups. Although my own project does not focus either on military power or on the socio-political powers of social groups, I am interested in American hegemony—in how the United States has advanced its interests by virtue of acting both as the premier

\textsuperscript{33} Seventeenth-century Dutch hegemony provides one example of this imbrication: “As a matter of fact, the Dutch were leaders not just of the accumulation of capital but also in the rationalization of military techniques. By rediscovering and bringing to perfection long-forgotten Roman military techniques, Maurice of Nassau, Prince of Orange, achieved for the Dutch army in the sixteenth century what scientific management would achieve for US industry two centuries later.” Ibid., 46.
(intellectual and commercial) “center of calculation” and as a military superpower. And because it is my contention that a particularly persuasive visualization of “the economy,” beginning with neoclassical models of mass commodity markets, has been critical to the discursive and practical exercise of that hegemony throughout the long twentieth century—because I find myself trying to account for a hegemonic power that is simultaneously state-based and economically driven, symbolically articulated and profoundly social in its reproductive and material effects, I need an account of the evolution and powers of increasingly interconnected markets that is especially robust. Above all, this account must not assume in advance that the macro-actor Capitalism exists because to do so begs the initial question.

It is on this last score — the presumed existence of Capitalism — that Latour offers the most powerful corrective to contemporary critical accounts of social modernity. As he puts it, “The visual construction of something like a ‘market’ or an ‘economy’ is what begs explanation.” Indeed, but then we are left with the question of whether or not the rationalization of sight — particularly as it was accomplished by various visual constructions of markets and economies (via tables and graphs, massive accumulations of statistics, double-entry accounting, econometric models, etc.) — and the drives and capacities for irreversible accumulation that are constituted by these visual constructions have some vital relation to one another that is historically significant. My sense is that we can say that capitalism exists as a world system from around the seventeenth century forward, and, in this systemic sense, it is a totality. And although I’m inclined to leave the question of “ultimate realities” to philosophers, I do
find it necessary in talking about complex historical dynamics to deal with the systematic rationalizing properties of capitalism as such both because it names the broad historical trend of increasing (if everywhere contingent) capabilities for accumulation- and action-at-a-distance, and because the language of complex systems affords a way out of the linear logic of “same-cause-yields-same-effects.” Systems are complex totalities in the sense that they exhibit properties of their own. These systemic properties act as constraining and disposing forces on the interacting units within them and are, in this sense, self-perpetuating. It is still the case, however, that systems undergo phase shifts or transformations, and that these are driven by unit-level processes of change. Whether and to what extent these unit-level processes introduce systemic transformation is an open question to be addressed on historical and empirical grounds. What matters is that a systemic analysis of complex historical dynamics incorporate and afford both transformational and reproductive capabilities so that, for instance, “the capitalist market” does not get reified into a transhistorical entity against which — or in alignment with which — one stakes an ideological position.

If we understand the socio-economic relations and world system of rule that characterize Western European modernity as “capitalist,” it seems to me that we are simply saying that modernity has operated by rationalization-for-capitalization — or, rather, that capitalist modernity reproduces its capabilities for political-aggrandizement-through-accumulation as so many increasingly interconnected “centers of calculation.” To my mind, what is more interesting than this “single history of centers of calculation,” or “ultimate reality of capitalism,” are the systemic transformations in its
organizational capacities and governmental rationalities — in other words, its discontinuities and deterritorializations. Not only do the predominant centers shift location, from Amsterdam to London to New York, but their unit-level processes of accumulation and socialization transform with systemic and irreducibly multivalent effects. And while it certainly seems to be the case that advances in visualization and mobilization techniques capacitate procedures of irreversible capture and circulation that are more efficient, the drivers of system-level shifts are necessarily also social and governmental in nature.

**Humans and the Making of Meaningful History**

In his work with Beverly Silver and others, Arrighi points to the “social origins of world hegemonies” as a privileged scene of historical development and potential systemic change. According to their analysis, each system-wide expansion in trade and production has been based upon a “historical compromise” or compact between dominant groups and whatever rising group is emerging (in the U.S. cycle, these rising groups are the working class and westernized elites in the third world). The potential for

---

34 On this point, Arrighi departs from previous world system theorists: “Unlike Braudel, however, we explicitly conceive of financial expansions as long periods of fundamental transformation of the agency and structure of world-scale processes of capital accumulation.” Ibid., 86. Arrighi and Silver elaborate further on this fact in *Chaos and Governance in the Modern World System*, in a section titled “Hegemonic Transitions as Systemic Change” (21–26). There they state, “in all instances, hegemony has also involved a fundamental reorganization of the system and a change in its properties.”

35 Arrighi and Silver, *Chaos and Governance in the Modern World System*, 151.
systemic disruption represented by these rising groups has historically been co-opted by offering privileges that encourage “buying into” the system and end up making these rising groups into the consenting middle strata, or class. Part of the social conflict that characterizes a turbulent period of systemic transition thus arises because this middle strata begins to lose previous privileges and initiates a “vicious” cycle of social unrest, thus breaking the “historical compromise.” Broadly speaking, I find this a useful heuristic—especially from the political perspective of strategic movement-building. As a historiographical method, however, it has its limits: History appears to be driven by a series of class struggles—indeed, social history appears as little more than a series of class formations. However complex the derivation, this humanist form of history relies upon and reinscribes a schema of historical development and a normative ideal of the political personality that are problematic in themselves and offer little real insight into how systemic transformation happens precisely because this form of history assumes a suprahistorical perspective as its horizon of development. In their defense, Arrighi, Silver and their collaborators are not doing social history, and I obviously do not find the liabilities I’m about to outline to be utterly disabling. But is it worth pausing to highlight certain limitations of their Marxist historiography and its Scottish Enlightenment lineage because these limits are simultaneously the points of contact between my own set of arguments about attention as a model of cognition, critical pedagogy, systemic change, and apprehending a history of the present.

What, then, is this humanist form of history that runs from the Scottish Enlightenment through Marx to Arrighi and beyond? If I can hold in reserve the
linkages and resonances with a Hegelian philosophy of history (which are really about dialectical movement and the ultimately philosophical moment of aufhebung), then we can say quickly that the form of history that locates the “social origins” of history in class struggle is a derivation of Anglo-American civic humanism.  Its salient features are a historical scheme of modes of production that connects the historicization of property production to the historicization of political personality (as man moves through successive phases of relationship with his environment, so change his social, political and imaginative capacities), and, relatedly, a humanist concept of the personality’s integrity as a normative control for this scheme of historical development. As Pocock points out, “it is of the highest significance” that the Scottish school of sociological historians (Adam Ferguson, Adam Smith and John Millar) deployed this normative control and that they did so “on the whole, pessimistically.”37 Using the language of corruption, they all posit that the personality suffers once a certain point of specialization or division of labor has been passed because a man is no longer able to participate fully in civic and social life. Civic participation is presented in these arguments as the condition of self-fulfillment, and is modeled on an assumption of the “conscious and autonomous” political personality. It is thus through the corruption or disintegration of the civic humanist’s ideal political personality that a political economist, moral philosopher, sociological historian or culture critic can decipher the

---

36 This is J.G.A. Pocock’s argument in “Civic Humanism and Its Role in Anglo-American Thought,” Politics, Language & Time: Essays on Political Thought and History, (Chicago: University of Chicago Press, 1989), 80 - 103. Civic humanism denotes a style of thought […] in which it is contended that the development of the individual towards self-fulfillment is possible only when the individual acts as a citizen, that is, as a conscious and autonomous participant in an autonomous decision-making political community, the polis or the republic.” Ibid., 85.

37 Ibid., 96.
corruption or disintegration of the republic in a historical mode of production and therein decipher the meaning of history.

But one might still argue that this civic humanist ideal of the integrated, “conscious and autonomous” political personality, even as it conditions the meaning and direction of history as presented above, has no necessary relationship to historical materialism’s thesis that class conflict drives historical development. The relation as I see it subsists in Marx’s theory of human development and political consciousness as evidenced in his early conception of alienation and in later conceptions of ideology and commodity fetishism.38 This is not the place for a full presentation and evaluation of Marxist thought around the related set of topics that have come to be understood as a problematic of false consciousness; and at any rate my point is limited to tracing some historiographical liabilities that follow from the conceptual operations of a civic humanist ideal, or model of political personality in Marxist historiography. On this topic Pocock states directly that the Marxian concept of alienation is a derivation of the civic humanist model of citizenship:

[I]t was the civic humanist ideal which provided the point of departure for the concept of alienation. The undistracted, unspecialized man—hunter in the morning and critic in the afternoon—whom Marx and Lenin hoped to restore to his universality is in the long view an Aristotelian citizen, participant in all the value-oriented activities of society, and his history is in large part the history of civic humanism.39

38 See especially Economic and Philosophical Manuscripts (1844) and (with Freidrich Engels) The German Ideology.
Elsewhere, Pocock points to the historical co-emergence of Marxian political economy (via Ricardo) and the Scottish Enlightenment, as do others. For my purposes, however, the specific conceptual-discursive relationship between historical materialism and civic humanism can be understood to subsist both in the historical schema of modes of production, and in the assumption, from Marx forward, that full political self-consciousness, civic participation and historical progression depend upon a class-based recognition of the “truth” of history – which is to say, the totality and ultimate reality of capitalism (and the “material” conditions of one’s position in it). By coming to class consciousness and struggling in the name the rising class against the ruling class, the engine of historical progression is engaged so that the next mode of production may come. More to the point, history has been mastered and rendered meaningful in this schema by this postulate of its “social origins” in a struggle to re/institute the non-distracting conditions of possibility for the integration of a “conscious and autonomous” political personality.

The problem with this humanist form of history is that is simultaneously attributes too much and too little power to the capitalist system. Too much because a class-based theory of the system’s “social origins” reduces the transformational capabilities of this system to a game of political class-consciousness-raising and movement-building. And too little because using as a normative horizon the integration of a “conscious and autonomous” political personality fails to acknowledge that this model of citizenship is itself a modern subjectification-effect that is renewed

---

40 To be fair, this invitation to political class-consciousness and action was the stated goal of Marx’s historical materialism.
and reworked with each invocation of it as a political horizon of truth. In these twinned senses, the historiographical liabilities of a humanist form of history consist not so much in the making-meaningful a narrative of history (that’s what humans do), as in its inability to apprehend the social and governmental sources of systemic trans/formations that are continuously unfolding with multivalent effects and in a diversity of sites. Hegemonic cycles and systems of accumulation are not made or broken on the “historical compromise” of a co-opted rising class alone – or even primarily. If we try – despite profound difficulties with these words, “social” and “origins” – to isolate the mechanisms and circuits by which the “social origins” (meaning, presumably, the human parts) of a capitalist system of accumulation are secured, refused and/or transformed, what we find are scenes of subjection and subjectification, ritualized in “meticulous procedures that impose rights and obligations.” In trying to make historical sense of these rituals and procedures as forms of social and governmental

---

41 Even if one retains a class-formation analytic, the historical record indicates that (at least in the case of the U.S.) transformative political movements have been transacted on the basis of cross-class, rather than single-class movements. As Martin J. Sklar notes, “[C]lass conflicts and changing class relations, corresponding with developing modes of production, generate conditions and pressures for changes of profound effect, but emergent cross-class alignments transact them.” See “Periodization and Historiography,” in The United States as a Developing Country: Studies in U.S. History in the Progressive Era and the 1920s (Cambridge: Cambridge University Press, 1992), 19. For a similar analysis of the antebellum era, see Eric Foner, Free Soil, Free Labor, Free Men: The Ideology of the Republican Party before the Civil War (New York: Oxford University Press, [1970], 1995).


organization, without reducing them in advance to a morality tale, I find Foucault’s
genealogical method and theory of governmentality indispensable.

**Genealogy, Governmentality, History**

Chief among the advantages conferred by what I earlier termed Foucault’s
“meso-sociology” of socio-political power in disciplinary society is an alternative
conception of power as dispersed, local and provisional – this disciplinary form of
power is found circulating in apparently non-political spaces and operating via
seemingly non-violent discourses and techniques of subjectification. It seems to me
that Foucault’s reconceptualization of power is sufficiently well-known that I needn’t
explicate it here. But I would highlight the difference this symmetrical conception of
socio-political power makes in thinking about history and capitalism: As an analytic,
Foucauldian power works by multiplying the relevant scenes of historical emergence
and historiographical investigation.

Genealogy, or in Nietzsche’s language, “effective history,” steps away from the
task of assigning meaning to history in order to relativize the moral and epistemological
frameworks on which such assessments rely and in so doing, makes more mobile and
adept the critical faculties by which we might grasp complex historical dynamics such

---

44 Michel Foucault, *The Order of Things: An Archeology of the Human Sciences*, (New
as the transformation and endurance of capitalist systems of accumulation.\textsuperscript{45} Rather than lumbering under the dramatic and sometimes apocalyptic posture of a grand unified theory of Capitalism or philosophy of history, genealogy works with more nimble mid-range concepts like techniques, strategies and tactics that make no assumptions or claims about the “truth” of history.

“Effective” history differs from traditional history in being without constants. Nothing in man—not even his body—is sufficiently stable to serve as the basis for self-recognition or for understanding men.\textsuperscript{46}

In contrast the humanist form of history outlined above, genealogy configures human history as a “the endlessly repeated play of dominations” through which “humanity installs each of its violences in a system of rules” which in themselves bear no essential meaning.\textsuperscript{47} This Nietzschean rejection of the notion that power and knowledge are separate concerns and spheres of human activity highlights the struggle endemic to every ritual of socialization and knowledge, however enlightened any ritual may seem. Knowledge is thus recast along Latourian lines as an agonistic encounter (“Knowledge is not made for understanding; it is made for cutting.”)\textsuperscript{48} Consequently the work of genealogy is to investigate and make visible these various systems of subjection on the correlating proposition that there exist transformational and cutting powers of immanent

\textsuperscript{45} For Foucault’s presentation of genealogy as he takes it from Nietzsche see: Michel Foucault, “Nietzsche, Genealogy, History.” In \textit{Language, Counter-Memory, Practice: Selected Essays and Interviews}, edited by D.F. Bouchard, (Ithaca: Cornell University Press, 1977).

\textsuperscript{46} Ibid., 153.

\textsuperscript{47} Ibid., 150 - 151.

\textsuperscript{48} “Knowledge is simply the outcome of the interplay, the encounter, the junction, the struggle and the compromise between the instincts. Something is produced because the instincts meet, fight one another, and at the end of their battles, finally reach a compromise. That something is knowledge.” Michel Foucault, “Truth and Juridical Forms,” in \textit{Power: The Essential Works of Michel Foucault}, ed. James D. Faubion, (New York: The New Press, 2000), 8.
critique – that the very act of critical apprehension of a system of rules is simultaneously the generation of a capacity for detachment and different relation. In undertaking my own critical investigation of attention as a model of cognition that has been central to the trans/formation of the American system of accumulation, I rephrase these systems and scenes of subjection, their rules and rituals, as “procedures of socialization and accumulation.” At times I also speak of “techniques and discourses of attention.” At play in both instances is both a disciplinary conception of power, and a way of thinking about different historical configurations of power that Foucault came to theorize under the heading of “governmentality.” In its broadest sense, governmentality is the “conduct of conduct” through practices of freedom. Foucault coined the term in the late seventies in the context of thinking about the emergence of neoliberalism, and one of the things accomplished by his essays and lectures on the topic has been to promote a rethinking of liberalism as a governmental rationality rather than a simple ideology or political philosophy rooted in individual rights, and the protection of property rights and market activity. In chapters two and three I’ll return to this complex question of liberalism as it intersects with the historical emergence of “the economy.”

For now I would highlight two aspects to Foucault’s theory of governmentality that

---

49 In a 1978 interview, Foucault phrases this power of critique in a language of experience. “But my problem is not to satisfy professional historians; my problem is to construct myself, and to invite others to share an experience of what we are, not only our past but also our present, an experience of modernity in such a way that we might come out of it transformed.” “The experience through which we grasp the intelligibility of certain mechanisms (for example, imprisonment, punishment, and so on) and the ways in which we are enabled to detach ourselves from them by perceiving them differently will be, at best, one and the same thing. That is really the heart of what I do.” “Interview with Michel Foucault,” in Power, 242 ÷ 244.

augment the critical intelligibility of the present as I see it: First, the phrase “governmental rationality” names a relative and instrumental conception of rationality so that we might speak of multiple rationalities traversing and holding together systems of rules of subjection or “procedures of socialization and accumulation;” and second, although governmentality is a dispositional rather than sovereign form of power,\(^{51}\) it is simultaneously a process that happens to the state (versus, for instance, disciplinary power, which happens to the human body). Foucault speaks of the “governmentalization of the state,” by which he means the elaboration of practices and rationalities of government which take as their object the processes of life and labor found at the level of populations.\(^{52}\)

If there is any unity to the techniques and discourses of attention that I trace over the long twentieth century (beyond their ongoing proliferation as a form of problematization), it consists in their complex articulations to a transcendent form of power that is neither sovereign nor disciplinary, but rather the governmentality of a U.S. “Market Republic.” According to Foucault’s conceptualization, governmental rationalities are distinguished by their reliance on social apparatuses (a.k.a., “dispositifs,” or “diagrams”) of security. These apparatuses are made up of institutions, architectural arrangements, regulations, laws, administrative measures, scientific statements, philosophical propositions, morality, philanthropy, etc. They are sprawling ensembles that operate none-the-less with a unity of purpose: That is, securing the extension in time of government, in this case, of the U.S. “Market

\(^{51}\) That is, governmentality is concerned with the disposition of people and things in space whereas sovereign power is about perpetuating one’s rule over a given territory and its subjects.  
\(^{52}\) Foucault, “Governmentality,” 101.
Republic” (e.g. governmental rationalities of an administered market ranging from the
generation of “effective demand” through mass marketing to discourses of welfare,
international development, and more recently economic growth and intellectual
property law). This “Market Republic” thesis relies upon apprehending the rise of
twentieth-century mass markets and the model of consumerist citizenship that attends
them as something other than the corruption of a civic humanist ideal of political
personality and the republican political culture that goes with it; thus my concern with
the liabilities and analytical preoccupations that attend conventional Marxist
historiography.

Yet it is still the case that I rely on Arrighi’s periodization of capitalist world
history to frame my argument. This is first of all because his model of the historical
dynamics of epochal history is presented as just that, a model.53 It makes no ontological
claims about the ultimate truth of capitalism; indeed, it is not clear to me that one needs
to do ontology in order to advance a periodization argument.54 Arrighi and his
collaborators get around this quagmire of epochal history-writing in three main ways:
by focusing mainly on the “organizational foundations” of governance, by looking for

53 “Our only claim is to have introduced an analytical construct capable of shedding new
light on system-level structural change in the modern world, both past and present.” Arrighi and
Silver, Chaos and Governance in the Modern World System, 36.
54 Although our theoretical frameworks (i.e. definitions of capitalism) differ, my own sense
of what is involved in periodization aligns with Richard Schneirov’s formulation in a recent
article on periodization and the Gilded Age, “[P]eriodization does not depend on synthesizing
all the work in the field of history into a single comprehensive narrative. Rather it involves
creating a theoretically based framework in narrative form delimited by time boundaries.”
Richard Schneirov, “Thoughts on Periodizing the Gilded Age: Capital Accumulation, Society,
and Politics, 1873-1898,” Journal of the Gilded Age and Progressive Era 5:3 (July 2006), 190.
Schneirov works with a classically Marxian definition of capitalism that hinges principally on
the predominance of a wage-labor social relation and a corresponding M-C-M1 (“capital
accumulationist”) rather than a C-M-C (“simple commodity”) mode of production wherein the
means of production are concentrated in the hands of capitalists.
these sources of governance not only in state apparatuses, but also in a variable terrain of power and accumulation they term “spaces-of-flows,” and finally, by highlighting the fact that their model describes a pattern of recurrence and evolution (world historical capitalism is “as much a matter of historical contingency as systemic necessity.”)

As a consequence, their research program is entirely compatible with Foucault’s theory of governmentality: They focus on governance as a problematic of order without taking it for granted, and they look for its organizational mechanisms and procedures in an array of not-necessarily state-based places (military and scientific management techniques, legal frameworks, discourses, business capabilities, regulation schemas, technological advances, geographical accidents, and more). Likewise, Arrighi’s analytics of hegemony and accumulation regimes can be retro-fitted to a genealogical conception of human history via Latour’s micro-sociology of “immutable mobiles” as I presented it above.

Beyond being satisfied by these dimensions of epistemological compatibility, I find Arrighi’s conception and empirical presentation of accumulation regimes tremendously useful as a way of thinking about structural change. His analysis of U.S. hegemony over the long twentieth-century as a “Free Enterprise” regime of accumulation specifies what is unique in American-style corporate capitalism without reducing all of its complex features to either the relative predominance of corporate power over state power, or the rise of mass consumer culture. As a schema, accumulation regimes make good on the historicizing promise and materialist

55 Ibid., 34.
orientation of modes of production without assuming in advance a civic humanist ideal of political personality or the producerist aesthetics and republican political culture that were folded into it in early modernity. In this sense, Arrighi’s *longue durée* perspective affords a crucial relativization of historical capitalism by discerning accumulation rather than production as the unity of a capitalist system.

**Hegemony**

In addition to his focus on the organizational foundations of governance-for-accumulation, I take from Arrighi’s work both a broader historical narrative of systemic tendencies and hegemonic shifts, and a set of analytical distinctions. The first set of distinctions he borrows from Fernand Braudel, and this is a layer cake image of collective life. The bottom layer is *material life*, or everyday life, the middle layer is *market economy*, or the horizontally communicating networks of supply and demand typically termed “markets” or “the economy,” and the upper-most level is the terrain of world capitalism proper, the *anti-market*. Arrighi notes that the three layers are inextricably connected, and that most analyses of capitalism and/or macro-economics focus on the middle layer. His work focuses on the top layer—which is what makes him a world systems thinker. The advantage of separating these layers consists for me in two upshots. First, it allows me to articulate my analyses of the discourses of attention

---

(which circulate at the level of everyday life) to a broader thesis about world capitalism and American hegemony without necessarily needing to carry forward the liabilities outlined earlier as features of civic humanist historiography and Marxist critical theory (especially an analytical preoccupation with alienation and reification). Rather, Arrighi’s macrosociological research program allows him to step away from those liabilities and preoccupations and work instead on the question of how capitalist modernity has been reproduced geopolitically over the very long haul. As I think Arrighi is correct to point out, the crucial question in terms of geopolitical dispositions of power and resources is not linked to the transitions from feudalism to an historical Capitalism (which will presumably transition into some post-capitalist order), and the confused anti-economic/-market narrative of the fall that typically accompanies such a theory of historical Capitalism. Instead, the question is in some ways more basic, and simply does not fit teleological thinking: how is it that power and resources accumulate and disperse on a global scale? And then the corollary: how do we understand globalization? In what senses is it new or significant and is it of a piece with the upward redistribution of wealth, income and life chances that we have witnessed over the last quarter century? These sorts of questions about world capitalism are operative, if backgrounded, contexts for the set of interrogations pursued in this study — although, of course, I don’t find them answerable here in terms of the formulations just given.

The second major advantage of Arrighi’s world systems approach is the historically comparative frame it offers. This frame distinguishes among regimes of accumulation such that British free trade imperialism differs crucially from an
American free enterprise system. Indeed the primary reason that the United States is able to take advantage of the shift that begins in the 1870s as the British empire is shifting from an imperial accumulation regime to an unsustainable and ungovernable protectionist regime of expenditure, grows out of the modern American corporate from with its internalization of transaction costs.\textsuperscript{57} By virtue of the bureaucratically elongated corporate from that is its \textit{differencia specifica}, the U.S. is able to supersede the chaotic conditions of a crumbling British empire, and from there generates its own set of problems (esp. distribution problems associated with mass consumption and the training of a professional managerial class). Of course, the situation is immensely more complex, but this and other distinctions between the British and American versions of what might otherwise be conflated as ‘modernization’ or ‘industrial capitalism’ together go a long way towards indicating what is specifically American about American political culture and geopolitical hegemony in the long twentieth century.

In addition to clarifying some of the broad, historical transformations in world capitalism, Arrighi’s research develops the concept of hegemony in a way that affords a point of purchase on how systems of accumulation change through the very (micro- and macro-) processes through which they exercise hegemonic governance. As I adopt it from Arrighi, hegemony consists in the following aspects: 1) power entailed in the functions of governance and leadership exercised by a hegemonic state over a system of nation-states; 2) additional power that accrues to the hegemonic state by virtue of its ability to place contested issues on a “universal plane”; and, most importantly for my purposes, 3) \textit{systemic transformation} – each hegemonic cycle transforms the system in

\textsuperscript{57} Ibid., 239.
fundamental ways. “Attention” names a scene of articulation for the American
transformation in techniques of governance over the long twentieth century: this model
of human cognition that emerges with experimentally defined attention at the end of the
nineteenth century critically capacitates the American century’s most characteristic and
innovative procedures of socialization and accumulation (e.g. systematic management,
the American university and other cultural institutions, high mass consumption, and
more recently “knowledge work,” and the internet). Here, then, is my wager: capitalism
as a world system has been transformed in fundamental ways by this model of cognition
and its powers of representation and intervention—this is the world historical difference
made by attention. My analysis and assembly will either bear this claim out or it will
not. For now I would echo Arrighi’s remark that in every system there “will be
differences, the more we succeed in specifying these differences, the less indeterminate
our speculations about the future will be.”58

Attention seems to me to be a difference with systemic difference-making
capabilities. This horizon of significance is not meant to indicate that Arrighi’s macro-
sociological periodization of world history offers an epistemological grounding
anymore than it is to imply that an independent sort of evidential authority accrues to
the diverse discourses of attention that this study cribs from just about every discipline I
find myself capable of reading. Resolutely mediated thinking, cross-referencing
assembly until densities become apparent, vital and connected—these are my
methodological declarations.

58 Arrighi and Silver, Chaos and Governance in the Modern World System, 35.
CHAPTER I: 
Attention as a Form of Problematization + Model of Cognition

Whatever its nature, [attention] is plainly the essential condition of the formation and development of mind.

–Henry Maudsley (1883)

The work of this study is to demonstrate that attention emerges as a predominant problematic\(^1\) of value and social order in the last thirty years of the nineteenth century because it proves uniquely capable of organizing the procedures of socialization and accumulation that are specific to the long American century. Such an argument entails what is to my mind a resonant point of difference: it assumes and asserts that the matrix for our times is set largely around the turn of the twentieth century. At first glance, this point is not one of difference at all, rather it aligns with more and more contemporary treatments of literary modernism and most post-war critiques of modern consumer culture.\(^2\) I would, however, hope to qualify these

---

\(^1\)To be clear about what I mean by this phrase; “A ‘problematic’ is a social, ideological, or theoretical framework within which complexes of problems are structured and single problems acquire density, meaning and significance.” From John Fekete’s *The Critical Twilight: Explorations in the Ideology of Anglo-American Literary Theory from Eliot to McLuhan*, (London: Routledge, 1977), 217-218.

\(^2\) There is some disagreement as to how far back consumer culture can be dated (the range seems to be anywhere from early modernity to post-WWII America). My operating assumption in this study is that the post-1880 chronological scheme identified by Richard Wrightman Fox and T.J. Jackson Lears’ *Culture of Consumption: Critical Essays in American History* (New York: Pantheon Books, 1983) collection is essentially correct. Other studies working in the same historical timeline are: Daniel Horowitz, *The Morality of Spending: Attitudes toward the*
treatments and critiques by drawing out specific elements of the formation of twentieth-century American culture as they connect to those aspects of the U.S. regime of accumulation that differ from the prior British regime of accumulation. This qualification entails a challenge to the prevalent and often unexamined assumption that a coherently capitalist socioeconomic order proceeds in a kind of singular, ideological dispensation from the political, cultural and socioeconomic settlements achieved in seventeenth- and eighteenth-century Britain under the terms set by moral philosophy and/or natural philosophy. While it is certainly the case that many of those terms obtain yet today in various epistemological, political and socioeconomic arrangements, my point is that they were significantly revised in the decades leading up to the turn of the twentieth century in ways that are specifically American. We can trace these revisions, and their enduring legacy, by following discourses and techniques of attention.

Despite, or perhaps because of its wide circulation throughout the twentieth century as a common-sense way of talking about human experience, the topic of attention is a slippery one. William James formulated an early and oft-cited definition in *Principles of Psychology*:

---

Everyone knows what attention is. It is the taking possession by the mind in clear and vivid form, of one out of what seem several simultaneously possible objects or trains of thought...It implies withdrawal from some things in order to deal effectively with others.\textsuperscript{3}

*Principles of Psychology* stands as one of the major, if not the major, work of early psychology, and it devotes an entire chapter to attention. I mark it here as but one example of attention’s early centrality to turn-of-the-century psychological discourse. To give the reader some sense of attention’s range as I deal with it throughout the course of this study, I can begin by saying that is not so much a theory of the subject as a problematic of value and social order that works itself out on the terrain of an increasingly corporealized human subject. By the time we get to the end of the twentieth century, that corporeality is so medialized and molecularized as to be nearly unrecognizable as “human”—but that is the post-1980 subject of attention, which is not under immediate consideration. Around the turn of the twentieth century we have an experimental subject of psychological laboratories, a consumer subject of the mass market, “social” subjects of various automatic and unconscious behaviors, and a manager/managed subject of an efficiently administered corporate workplace. Every one of these is problematized in terms of attention. In order to frame these discourses in terms of the broader shift in procedures of socialization and accumulation that are specific to an emerging American regime, I’ll begin by schematically outlining a few of the relevant features of that regime.

The American Republic in Time:
Incorporation, Marginalist Economics + Exceptionalist Scientism

Arrighi terms the U.S. regime of accumulation a “Free Enterprise System” and notes that its most salient organizational aspect and innovation, the formation of which assured that America and not Germany was next in line as a hegemonic successor, was the vertically integrated corporation. As a legal form, structure of accumulation and organizer of social space, the corporation institutionalizes a series of profound changes in material life and I’ll return to some of these at more length later. For present purposes, what corporations bring to the table is an organizational innovation that solves some problems and generates others: by internalizing transaction costs via vertical integration, the corporate model supersedes certain market instabilities in a manner that makes longer term planning possible, and an elongated management infrastructure necessary. From this institutional articulation of the processes of primary production to those of final consumption follows a reorganization of distribution. As a joint-stock venture, corporations also separate ownership from management such that corporate “management” acquires new independence and responsibility as a series of related strategies, technologies and practices that eventually take on the authority and

---


consistency of a science. These last two problems, distribution and management, will become important in thinking about the relevance of discourses of attention in American political culture around the turn of the twentieth century.

A second, and in some ways more important innovation of US corporate capitalism arrives later in the twentieth century when capital and the state fuse more thoroughly than ever before under the accumulation-regulation apparatus broadly understood as “Fordist-Keynesianism” because it is the post-war world order of this fusion that accounts for the transition from scattered to concentrated capitalist power that we see under US hegemony in the second half of the twentieth century. I would point out, however, that the terms of “Fordist-Keynesianism” are forged well in advance of their implementation from around 1929 on. In particular, the economic ideas of “utility” and “effective demand” were given new importance and, in fact, effectively reconceptualized as operative terms capacitating an administered mass market in the decades leading up to the end of the twentieth century. The sites of this reconceptualization range from financial journalism to neoclassical economic theory. In many ways these late nineteenth-century articles, lectures and books resemble the

---


7“Fordism” here means “mass production—based on systems of specialized machines, operating within the organizational domains of vertically integrated, bureaucratically managed, giant corporation.” “Keynesianism” is the “mode of regulation that enabled the emergent Fordist regime to fully realize its potential” by making “investments in fixed capital that create the potential for regular increases in productivity and mass consumption.” Arrighi, The Long Twentieth Century, 2. Although Arrighi cites the formation of the closed nation states enabled by the Westphalia system more generally as the condition for an increased concentration of capitalist power, he does specify that particular to US hegemony is a “fusion” of the previously distinct logics of (statist) territorialism and capitalism.
discourses of moral philosophy that set the terms of British free trade imperialism and the liberal political theory that is associated with it in the late seventeenth and early eighteenth centuries. In addition to very real differences of historical context however, there is a difference of problem or theoretical object. Both moral philosophers and marginalist economic theorists were discussing an emerging socioeconomic order and attempting to formulate a theory of social harmony from within the terms of that emerging order. Their problems are different, however, precisely because the socioeconomic orders that they are dealing with are different. Moral philosophers generated a substance\textsuperscript{8} labor theory of value that dealt with the problem of production as an aspect of an emerging civil society. Marginalist economists, on the other hand, generated an equally confused and ideological field\textsuperscript{9} theory of value taking “marginal utility” and “effective demand” (i.e. a problem of profitable distribution\textsuperscript{10} of ‘overproduction’, or the generation and management of consumer demand) as their key terms under conditions of an emerging mass market of consumption. The difference

\textsuperscript{8} The idea of substance vs. field theories of value in economic thought comes from Philip Mirowski’s More Heat than Light: Economics as Social Physics Physics as Nature’s Economics, (Cambridge: Cambridge University Press, 1989), 399. “Classical political economy, neo-Ricardian theory, and Marxian economists are generally based upon what we have called a substance theory of value, itself patterned on earlier substance conceptions of motion. The chief characteristics of the substance theory of value are stipulations such as: the conservation of value in exchange (i.e., the trade of equivalents); a productive/unproductive distinction; production defined as the locus of the augmentation of value”.

\textsuperscript{9} “Neoclassical theory is predicated upon what we have called a field theory of value, patterned on the formalism of the field developed after the rise of the energy concept.” We will return to unfold some of the implications of Mirowski’s thesis later. For the time being, the relevant characteristic of neoclassical economics’ field theory of value is its “locus of value in the field and not in the commodities; [and] some justification of value by means of the tautology that: “Things are valuable because people think they are.” Ibid., 399.

\textsuperscript{10} As Dorothy Ross notes in Origins of American Social Science, 1870 – 1929, distribution was “the core problem of the age.” (178) For a business-centered account of the centrality of distribution as a problem defining the final decades of the nineteenth century, see James Beniger’s Control Revolution.
consists in the discursive object, or putative driver of the two socioeconomic theories: production, or labor, versus distribution, or consumption. Of course, the matter is certainly more complex than this, and will be treated more fully in chapter three, but for the moment, what matters is that in both instances, the terms of an as-yet unstable socioeconomic order were being discussed and the terms differ crucially in their essential dimensions.

Under the terms of their late-nineteenth-century conceptualizations, “utility” and “effective demand” were neither (as John Guillory posits in passing)\(^\text{11}\) a “simple” return to the “ideological agenda of classical political economy (newly armed, of course, with a “scientific” methodology),” nor a neophyte microeconomic version of Keynes’ macroeconomic theory of “aggregate demand” as put forward in his *General Theory of Employment, Interest and Money* (1936).\(^\text{12}\) Rather, they were pivotal for America’s late-nineteenth-century formation as a nation-state with its own economic, political, cultural and scientific identity. In fact, the particular species of mathematically formalized and university-based, “‘scientific’ methodology” that informs early American neoclassical economics (beginning with the “Marginalist Revolution” of 1870-1890) as well as other professionalizing social sciences at the turn of the twentieth century has a specific role

---


\(^\text{12}\) A tremendously influential text, Keynes’ *General Theory* puts forward an aggregate demand identity wherein a nation’s demand is equal to the total demands of its households for consumer goods and services, plus corporate demand for investment goods, plus government agencies’ demand for goods and services, plus the net demands of foreign consumers, corporations and governments. This equation and its terms continue to operate as a rubric for macroeconomic accounting of national income.
to play in differentiating the concept of “utility” from its apparent precursors in British classical political economy.

As a means of exfoliating this line of argumentation, I propose an addendum to Arrighi’s understanding of the key elements and characteristic thrusts of the U.S. free enterprise regime of accumulation. In addition to the “Keynesian-Fordist” regulatory apparatus and corporate organizational form (with all that it implies), an institution that also acts as a driver of twentieth-century accumulation is the American research university. Although the bulk of what might be relevant at the level of world capitalism does not surface until after the tighter institutional coupling of universities to various markets of financial speculation and accumulation circa 1980 (especially via biotech industry sectors and the increasingly significant linkage between university endowments and inflated capital markets), universities have all along been integral sites for the elaboration of those procedures of socialization and accumulation that I trace here as a genealogy of attention. We see this most apparently with the disciplinary formation of psychology around the problematic of attention both in Europe and the U.S. We will see it later in the pedagogies and aesthetic theories of mid-century literary-critical studies. We see it throughout the century in a more general sense as the socially reproductive function of higher education, and in particular, of the language arts. These connections between American research universities, discourses of attention and the U.S. regime of corporate accumulation are by now so well remarked upon as to seem obvious. Nevertheless, I find my take on the matter to be sufficiently distinct to

---

13 The critical literature on links between the organizational cultures, agendas and forms of modern American corporations and research universities is well-developed and still moving.
attempt a redescription of a few of the more salient aspects of these links near the end of this study.

Before proceeding to thicker historical descriptions, I would like to propose and argue for the importance of yet another seemingly obvious point: the millenialist form of (a- or anti-) historical consciousness that characterizes the nationalist ideology of American exceptionalism. A millenialist and exceptionalist form of historical consciousness is based in the idea that America occupies an exceptional place in (or, rather, outside of) history, based on her republican government and extensive economic opportunity and capacity. In a manner consonant with the rubric of this national self-conception, American social thought around the turn of the twentieth century was further shaped by its Protestant legacy in the form of a millenialist belief that the American Republic would be additionally delivered from the ravages of historical change, and from the mass poverty and class conflict that had plagued Europe by virtue of its evangelical religious culture. Beyond being an interesting and often-unrecognized species of religious thought, American exceptionalism and the form of historical consciousness that it entails underwrite important aspects of U.S. hegemony over the long twentieth century both in terms of the overt justifications they provide for American military interventions in the name of “democracy,” and in terms of the


peculiarly ahistorical principles of scientificity that get institutionalized in the American research university system. As Dorothy Ross demonstrates in detail, the influence of American exceptionalism is particularly apparent with the formation of the modern system of disciplines as configured by professionalizing social sciences in the decades following the U.S. Civil War. In her history of the *Origins of American Social Science*, Ross organizes her account around the observation that “[t]he particular kind of scientific stance American social scientists chose cannot be explained without recourse to their particular kind of historical consciousness.”15 She then narrativizes how it was that these “particular kinds” of scientism and ahistorical consciousness interacted during the formative years of American social science (1870-1929) to enforce lasting political and anti-historicist constraints on social thinking both in universities and in the public culture they quickly came to influence. The “scientific stance” at issue amounts to an enduring (indeed, institutionalized) heuristic habit of modeling the social sciences on the natural sciences so that American social thought is constrained and transformed into social *science* in a way that attempts to transmute the contingencies of historical change into a positivist accountancy of natural tendencies and laws of the social, the political and the economic—conceived as autonomous realms.

This de-historicizing reduction and segmentation of American social thought and political culture has also been informed in important ways by an American tradition of liberal republicanism. Against the idea that America’s “liberal consensus” framework of political thinking was or is either simply an enduring native tradition (as in Louis Hartz’s *The Liberal Tradition in America* (1955)), or an extension of British liberal

15 Ibid., xvi.
political theory, Ross asserts that this framework “developed in the late eighteenth and early nineteenth centuries at the intersection of Protestant, republican and liberal ideas around the idea of America.”

Inscribed in this idea of the American Republic are Protestant and republican ambivalence toward capitalist development and historical change. This ambivalence, in turn, complicates the absorption of an Enlightenment faith in reason, science, commercial development, representative government and progressive modern civilization that characterize the main early nineteenth century sources of liberalism (i.e. English and continental radicals who wanted to displace remaining elements of feudal and mercantilist power in the state with representation and economic activity conceived in individualist terms). The American research university and its particularly scientistic species of professionalized disciplines come into their own in the wake of an historical conjuncture that engages America’s political culture of liberal republicanism to its core: Rapid industrialization, unmanageable market swings,

16 Ibid., xvi.

18 Ibid., xvi.
class conflict and the growing popularity of socialist ideas all demanded that social thought engage questions of economic value and social harmony.

These central questions eventually find a scientific and ahistorical distillation in economics with the marginalist proposition of “utility” as the mathematically equilibrating principle of economic distribution. In psychology these questions are rendered again in scientific and ahistoric forms as a problematic of mathematically-defined, functional attention (particularly in studies of attention span and unconscious/automatic attention). Deep and enduring racial tensions surrounding the Reconstruction and Jim Crow structured social thought of the period, everywhere overcoding an aggressively de-historicized value dimension that gets institutionalized in emerging university’s legitimization scripts as scientific meritocracy. With specific respect to the kind of social thought institutionalized by the modern system of disciplines, my most immediate point is that the central political questions facing an emerging American national culture were disciplinized in terms of the ahistorical political framework operative at that time. As Ross demonstrates, that postbellum

---

19 As Christopher Newfield notes, “It is a bitter fact that the research university’s great leap forward came in the decades, 1890-1910, during which Jim Crow segregation was being systematically installed in American life. Having cloaked stratification in the languages of nature and science, meritocracy insured that future attempts to value individual difference and diversity through higher education would appear not to expand merit but to compromise it.” *Ivy and Industry*, 103.

20 I adopt this term from Nikolas Rose’s work on the history of psy-disciplines. Disciplinization is the formation of an academic disciplinary field; such formation consists in the “lashing together of various constituencies of practitioners, journal editors, funding bodies, fellow academics and university administrators into the alliances necessary to force itself into the apparatus of truth.” It also consists in the incorporation of what Rose terms the “technical forms of positivity” into the object of disciplinary investigation. For psychology, this object is the psychological subject, experimentally and statistically defined. “Power and Subjectivity: Critical History and Psychology,” *Historical Dimensions in Psychological Discourse* (Cambridge: Cambridge University Press, 1998), eds. Carl F. Grauman and Kenneth J. Gergen.
political framework was embroiled on many fronts in a series of defining struggles over how historical change would be accommodated and accounted for in a manner that preserved the nation’s organizing self-conception of exceptionalism. However pat the observation, “Americans have no sense of history,” it also marks a truth that has been encoded in the principles of ‘scientificity,’ and synchronic models of cognition that worked in tandem to organize the kind of social thought that was to be generated by the university-based system of disciplines.

If my treatment of attention as such has seemed underdeveloped up to this point, there is good reason for this. In addition to its sheer positivity as a discrete discursive object (which is to say, in this case, “word”—the fact that this word and not another gains currency) at a particular point in history (circa 1870), one of the features that makes the problematic of attention both particularly American, and an adept “immutable mobile,” is its consistent refusal, evasion or transcendence of historical time. This helps explain why, for instance, even though the experimental model of cognitive attention was initially formulated in German psychology labs, it was not taken up more widely there\(^{21}\), or in France\(^ {22}\), or even in Britain.\(^ {23}\) Whether distracted, or

\(^{21}\) The German psychological tradition has been famously more dominated by Gestalt perspectives; and its social sciences are more broadly historical and deeply psychological so that, for instance, German neoclassical economics (“The Austrian School” formulated under Carl Menger) is (from an Anglo-American perspective) scandalously “psychological.”

\(^{22}\) French psychology around the turn of the twentieth century was comparatively untouched by experimental psychology’s model of attentive cognition, pre-occupied as it was by discourses of hysteria, hypnotism, and the thought of Pierre Janet and Jean-Martin Charcot. See Mark Micale’s introduction and lead article in *The Mind of Modernism: Medicine, Psychology, and the Cultural Arts in Europe and America, 1880 - 1940*, (Stanford: Stanford University Press, 2004); and Henri F. Ellenberger, *Beyond the Unconscious*, ed. Mark Micale, (Princeton: Princeton University Press, 1993).

\(^{23}\) Daniel Broadbent is British, and stands as one of the key postwar formulators of selective theories of attention (particularly his 1958 work, *Perception and Communication*, 1958).
concentrated and aestheticized, attention is a concept of “the moment” defined by supersessions of history. Synchrony is even more general than attention, and yet this temporal dimension is important when understood as a form of historical consciousness coded in the idea of the American Republic in time. To the extent that this form of consciousness informs and constrains models of citizenship and conceptions of polity and freedom, it underwrites “the dominant framework of politics” in the U.S. over the long twentieth century.24

I have avoided premature definitions of what I mean by attention because, without this dimension of the form of historical consciousness embedded in American exceptionalism, attention loses acuity as a historically and culturally specific problematic. It becomes instead a much more limited (and to my mind underspecified) critique of distracted and other-directed subjectivity under modernity and/or consumer culture.25 Against this Frankfurt School tradition, the proposition offered here is that we

---

25 I am speaking here of the intellectual project, common from the 1940s forward, of anxiously diagnosing the loss of an authentic, autonomous self as a consequence of mass market, consumer society. Anti-modern laments of this sort pre-date post-WWII social theory, to be sure. The set of interpretations at issue (e.g. “authoritarian personality,” “managed self,” “other-directed individual”) are identifiable as a particular intellectual project by virtue of their shared, postwar translation of the “social self” theorized hopefully by turn-of-the-century Progressivist reformers and intellectuals into a proto-fascist conception of the “socially-determined self.” (The critical task following on such a translation has then been to recover an autonomous, authentic selfhood from the clutches of bureaucratic rationality, corporate managerialism, and consumer culture.) Although traceable in the American context to Walter Lippman’s conception of manipulable mass electorate (i.e. the “phantom public”) and Reinhold Neibhur’s worries over
understand attention not as the tacitly normalized or idealized condition of a previously-whole-but-now-shattering (or alienated) transcendental subject, but rather as a discursive space of emergence that often operates as the material-cultural plane on which are worked out problematics of value and social order of an emerging (1870-1929), consolidating (1940-1950s), and flailing (post-1980) world hegemon. And so I trade in one analytic (“distraction”) for another (problematics of value and social order) because it seems to me that the latter offers a better—if less neat—frame for understanding what is at stake in discourses of attention as well as a more relevant genealogy of the present.

The rise of individualized, synchronic attention as a model of cognition in Western Europe and North America marks a reconfiguration of subjectivity that has been widely studied and diversely construed. Most often, this reconfiguration is understood in the context of cultural modernisms as a kind of destabilization or disintegration of subjectivities.27 Judith Ryan’s much-cited study, The Vanishing Subject: Early Psychology and Literary Modernism proposes that conceptions of disintegrating subjectivity in modernist literature were instigated by the “new psychologies” (empiricist and experimental) of the 1870s and 1880s.28 Critical

---

28 Ryan’s model of causality is not entirely clear. In chapter one she is tracing the “transmutation of empiricist thought, the psychologies of the 1870s and 1880s, into modern literature.” In the opening pages of her introduction, however, she proposes that the new psychologies “evoke[d] anxieties” about dissolving subjectivities in writers of the period. On
characterizations of modernity in terms of experiences of distraction (e.g. Georg Simmel, Walter Benjamin, Theodor Adorno) take up and effectively naturalize the paradigm of attention by offering accounts of modernity as a process of fragmentation in which premodern forms of psychic and communal wholeness and integrity are broken by urban, socioeconomic, or technological re-organizations. In much the same vein, canonical accounts of literary modernism invariably describe the metaphoric disintegration of subjectivity as a core feature of early twentieth-century cultural production. What these accounts of the historical emergence of vanishing, distracted and disintegrating subjectivities fail to take into account is the historicity of attention as a model of cognitive synthesis—and likewise, the historicity of those models of perception and cognition that preceded and were displaced by attention at the end of the nineteenth century.

The rise of psychometry (i.e., attempts to quantify or measure mental processes) in the second half of the nineteenth century is the operative context and epistemological lever here. Psychometry and the experimental psychology that it anticipates set up

the whole, her model seems to be that the new psychologies investigated and reconceptualized subjectivity in a way that provoked a “literary response” by which these “anxieties were both depicted and held at bay.” Judith Ryan, The Vanishing Subject: Early Psychology and Literary Modernism, (Chicago: University of Chicago Press, 1991), 4.


30 For an influential example see Malcom Bradbury and James McFarlane, eds., Modernism, 1890 – 1930, (London and New York: Penguin Books, 1991). In “The Name and Nature of Modernism,” they characterize modernism as “the art consequent on the disestablishing of communal reality and conventional notions of causality, on the destruction of traditional notions of the wholeness of character.”

31 Psychometry, and in particular Gustav Fechner’s influential work in psychophysics, originates in Europe and not the U.S., and takes place full decades prior to the periodization
conceptual and institutional conditions of felicity for the model of attentive cognition that shapes central procedures of socialization and accumulation for U.S. hegemony in the long twentieth century. The shift marked and elaborated by psychophysics and psychometry more generally is one from a classical or Romantic conception of a qualitative sensation that is proper to the interiority of an originating subject, to a modern conception of discrete, functional and quantifiable sensation (e.g., Fechner’s famous unit of measurement, “a just noticeable difference,” (or JND) is only intelligible under investigative conditions oriented toward the quantification of human sensory experience). The social space and technological arrangements of modern psychological laboratories are critical sites of elaboration for this shift.

Beginning near the end of the nineteenth-century, one finds a paradigmatic experimental scene that gets reproduced again and again: an isolated experimental subject whose solicited responses to randomized perceptual cues are measured and recorded. Tools change, terms mutate, and so on, but the scene stays much the same. Whether Hermann Ebbinghaus’s memory experiments, or Wilhelm Wundt’s diverse accumulations of reaction times, or Fechner’s more philosophical interest in perceptual sensitivities, the knowledge being re/produced is of an experimental subject under the conditions and presuppositions of a particular, technical apparatus of truth. Jonathan Crary traces some of the key implications of such technical arrangements,

Within this increasingly sophisticated laboratory environment, sensation became an effect or set of effects that were technologically produced and were used to describe a subject who was compatible with those technical conditions. That is,

---

proposed by this study. Fechner’s two volume *Elemente der Psychophysik* was published in Germany in 1860. The experimental work informing this text was undertaken in the 1850s.
its significance as an “interior” faculty disappeared and it became a quantity or set of effects that could be measured or observed externally. […] 

Within this vast project, an older model of sensation as something belonging to a subject became irrelevant. […] It cannot be emphasized too strongly how, by the 1880s, the classical idea of sensation ceases to be a significant component in the cognitive picture of nature.32

This new figuration of sensory force as the solicited or conditioned capacity of an experimental subject runs counter to the predominant conceptions of human consciousness and sensation in the century and a half leading up to the middle of the nineteenth century. This shift in the locus of sensation from the interior, cultivated faculty of a empirical subject of “dis/interest” to the stimulated physiological density of an experimental subject of attention has as a set of its preconditions an earlier rise of subjective models of vision that Crary traces in Techniques of the Observer: On Vision and Modernity in the Nineteenth Century.

In Techniques of the Observer Crary makes the case that historical transformations in ideas about aesthetics and vision were inseparable from a larger reconfiguration of subjectivity at the beginning of the nineteenth century. This reconfiguration took the shape of “a massive reorganization of knowledge and social

32 Crary, Suspensions of Perception, 26-27, emphasis in original. For more on the technological transformation of physiology and psychology in the nineteenth century see also Timothy Lenoir, “Models and Instruments in the Development of Electrophysiology, 1850-1912,” Historical Studies in Physical and Biological Sciences 17, pt. 1 (1986), pp. 1-54. Cited in Crary (1999) See also Freidrich Kittler’s Discourse Networks 1800/1900, trans. Michael Metteer, with Chris Cullens (Stanford: Stanford University Press, 1990), 214. “The victory of psychophysics is a paradigm shift. Instead of the classical question of what people would be capable of if they were adequately and affectionately “cultivated,” one asks instead what people have always been capable of when autonomic functions are singly and thoroughly tested. […] There is no universal norm (inwardness, creative imagination, high idiom, Poetry) transcending the particular functions. Each has a standard only in relation to defined experimental subjects and conditions.”
practices that modified in myriad ways the productive, cognitive, and desiring capacities of the subject.” In particular, Crary points to a discontinuity, or shift between 1810 and 1840 with the rise of physiological optics. He conceives of this shift as the rise of “subjective vision,” and it is set against the classical model of human vision, embodied in the epistemological figure of the camera obscura. For the seventeenth and eighteenth centuries, the camera obscura stood as a model, in both rationalist and empiricist thought, of how observation leads to truthful inferences about the world. (In the work of Leibniz, Descartes, Newton and Locke, the camera obscura held a central place and it was notably not problematized from the perspective of human physiology. For instance, theories of vision did not investigate implications of bi–nocular human vision).

As Crary depicts it, this early nineteenth-century rise of subjective models of vision participates fully with the larger emergence of disciplinary society that Michel Foucault documents in western European culture between 1760 and 1840. Crary considers physiological optics to be fundamentally concerned both with the production of knowledge and the leveraging of that knowledge to administer an exploding population under the rapidly changing conditions of developing industrial economies and emerging forms of post-sovereign governance. Physiological theories of vision were, then, oriented toward making populations simultaneously docile and economically productive. What is new with the rise of attentive models of cognition at the end of the nineteenth century consists in the socio-technical arrangements under

---

which the subjects of physiological vision were turned into experimental subjects of attention. Whereas the bodies of disciplinary subjects of physiological vision were “invested in depth; behind the great abstraction of exchange,” experimental subjects of attention are constituted as so many depthless interfaces—composed and investigated in terms of their relations to new apparatuses of truth.

We can also pose this shift from disciplinary subjective models of vision to experimental models of cognitive attention in terms of the epistemological quandaries it mitigates. The thorny issue thrown up by early nineteenth-century investigations of physiological vision was one of perceptual synthesis: if highly variable, corporeализed subjects of physiological vision cannot be counted on to perceive, let alone reliably report and extrapolate from, objects of perception, then how might truthful inference and rationality be secured? Attention as a model of synthesis was the answer offered by late nineteenth century experimental psychology. The terms of this new synthesis were, however, contingent upon experimental conditions that articulated the intelligibility of human attentive capacities in terms of how an individual responds instantaneously to the prompting of randomized perceptual cues. Two tightly coupled sets of issues emerge from the epistemological solution provided by attention as a model of individual perceptual synthesis. The first is very practical: how to secure and quantify attention. The second issue is an outgrowth of experimental solutions to the first: the fixation of attention generates reciprocal instabilities in the form of automatic or unconscious attention, and so new theories of automatic behavior and unconscious mental processes
proliferated as a means of talking about states of absorption and engagement that are not related to an interiorization of the subject.

The practical issues return us to a consideration of the experimental scene of psychology as paradigmatic. What accounts for the experimental subject’s paradigmatic status is its extraordinarily wide and diverse articulation of cognate forms of address and related norms of attentive cognitive behavior. These forms of address and related norms of cognitive behavior act as a common grammar linking an array of late nineteenth- and early twentieth-century visual technologies of cultural production and display, with institutional imperatives and attendant arrangements of social space. The psychological experimental subject, conceived and addressed in terms of its functional capacity to attend to stimuli is constituted in the laboratory, in the classroom, in the marketplace, in new cultural institutions of “improvement,” “amusement” and “education,” on the factory floor, in managements offices, university laboratories, and so on.

These diverse constitutions of an attentive subject rely upon and further articulate the prior production of a psychological truth-object in individual consciousness—experimentally defined. In Constructing the subject: Historical origins of psychological research, Kurt Danziger asserts the foundational importance of early psychological experimental research protocols to the subsequent definition of individual consciousness as psychology’s truth object. Danziger is particularly interested in the regulation of social relations inherent in the practice of psychological research first carried out in Wilhelm Wundt’s lab from 1879 forward. Wundt is held by many to have
inaugurated modern psychology as a positive discipline largely because he designates the social space of the psychological laboratory as the site of psychological truth production. Whatever Wundt’s original reservations about the generalizability of his limited studies of perception and sensation, his psychological laboratories were the training ground for the first generation of professional psychologists as well as the production site for communicable protocols for the generation of psychological truth that were later institutionalized as conditions for the disciplinization of modern psychology. Danziger points out that, while Wundt’s laboratory adopted material technologies of investigation from earlier physiological studies, and literary conventions from an experimental tradition dating back to the seventeenth century royal societies, the psychological laboratory does initiate a new social structure of research by dividing labor into two categories: there are “experimenters” and there are “subjects” who are experimented on.

This structural division of labor, at first a practical necessity, quickly becomes a defining feature of psychological truth as revealed through the content of early research articles. The self-experimentation of Fechner and Ebbinghaus’ day declines in frequency, and the new experimental research protocol becomes rapidly institutionalized and generalized both as a part of the more common development of

---

34 An entire generation of psychologists who were responsible for transforming the field came through Wundt’s laboratory and the other experimental laboratories that sprang up around Germany. Americans were particularly keen to study at the labs, and then return home to establish their own. As a consequence, the center of activity in psychology had already begun to shift to the United States by the late 1890s.

35 Wundt believed this methodology was only applicable to psychophysical phenomena such as sensation, reaction times, and attention, holding that memory, thinking, language, personality, social behavior and the like belonged to the humanities (Geistewissenschaften) rather than the sciences (Naturwissenschaften).
institutional forms for scientific work at the end of the nineteenth century, and as a means of disciplining what was fast becoming modern psychology’s truth object—the individual consciousness of an experimental subject. These early research articles describe an “interaction system,” or ritual of subjection, not between historical individuals, but between the occupants of specific roles that are increasingly described functionally in standardized and abstract language. In the very earliest of research articles, participants were described variously according to what specific operation they were conducting in that experiment, and the terms were flexible. As the disciplinary apparatus of psychology becomes established, however, a terminological stability sets in so that psychological subjects are either “subjects” or “observers” whose individual consciousness is defined in terms of their responses to another new discursive object, “psychological stimuli.” These stimuli are operationally defined as events whose status depends upon an experimental subject’s conscious response, but their relevance here consists in the complex, “psychological stimuli”—“experimental subjects,” that issues forth as a paradigmatic scene for the disciplining of psychological truth-objects. These truth-objects about which psychologists become expert are so many individual consciousnesses that attend to stimuli under conditions that are procedurally controlled for purposes of socialization and accumulation. In the case of early psychological laboratories, socialization is a procedure enabling the social relations inherent to psychological research and psychological knowledge is the accumulated good.

---

Danziger follows subsequent developments in early twentieth century American psychology as this experimental complex finds concrete purpose in the markets of industrial, military, and especially educational administration (see especially chapter 7, “Marketable Methods”). I am less interested in tracing the specific trajectory of psychology as such and more interested in the proliferation of its disciplinary-apparatus-and-truth-form. This scene, or complex, is what one finds replicated at a number of sites as so many procedures of socialization and accumulation that hinge on isolated experimental subjects attending to stimuli in functionally normalized ways. Before proceeding in the next two chapters to present a few of the more relevant examples and contexts of this replication, I’ll pause here to tease out one aspect of what makes the model of cognitive attention that arises from late nineteenth-century experimental psychology so distinct from the perspective of intellectual history. And then of course, there is the matter of what difference this distinction makes—its socio-political powers of representation and intervention.

**Sensory “Force”: A Bridge from Soul to Mind**

Among the major differentiating features of attention as a model of cognitive synthesis is the reconceptualization of sensation that accompanies it. As mentioned above, sensation moves from an idea traded on in eighteenth century discourses of sensibility, where it is a faculty proper to the interiority of an originating subject, to a modern conception of sensory “force,” a functional and quantifiable effect that (rather
than being cultivated as a matter of character) is solicited from an experimental subject attending to stimulation under socio-technically controlled conditions. Under the terms of this reconceptualization, the roots of personality and sociability are no longer thought about in the context of historically conditioned breeding (aristocratic lineage), or cultivated disposition (bourgeois sympathy), but rather, as conditions of interface to be administered or regulated under a rubric of attentional capacities.

To get some sense of the intellectual play and popular uptake enjoyed by the model of cognitive attention at the end of the nineteenth century, it helps to understand that its innovative feature, sensory force, was a mechanical concept that fit and moved well with authoritative physical metaphors of its time. Whether we term it an “complementary outgrowth,” “homologue,” or “parallel,” quantifiable and functional sensory force is a notion that found particular resonance with the classical thermodynamic concepts and related metaphors that characterized mid- to late-nineteenth century thought.\(^\text{37}\) It reframes the passions, interests and sensations of an earlier set of psychologies into a mathematical ratio of efficiency in energy transport across a divide. Sensory force is, in other words, a way of describing the relationship between physical magnitudes of stimuli and their mentally perceived intensity. This

\(^{37}\) The most popular of these physical concepts was the conservation of energy (i.e. the “first law of thermodynamics”), associated typically with Herman von Helmholtz and his 1847 paper (though it was not immediately recognized, and a number of other names are rightfully associated with the law). J.W. Burrow notes this cross-disciplinary convergence of metaphors in *The Crisis of Reason*: “Thus complementary discourses in physics, in the chemistry of life and in neurology seemed, optimistically regarded, to promise a whole series of reductions and derivations, from the ultimate laws of physics and chemistry to the functioning of living beings, and as part of that functioning not merely sentience but all the phenomena of consciousness.” J.W. Burrow, *The Crisis of Reason, European Thought, 1848-1914*, (New Haven and London: Yale University Press, 2000), 35.
relationship (staged as an interface, “psychological stimuli” – “experimental subject”) is then expressed as a mathematical function under the Weber Law of sensation, which states: "In order that the intensity of a sensation may increase in arithmetical progression, the stimulus must increase in geometrical progression." Although the equation that Fechner derived in order to express this law \( S = c \log R \)\(^{38}\), has not stood the test of time, the concept it expressed (i.e. quantification of sensory force) was taken up in its general form as a way of talking scientifically about psychological questions.\(^{39}\) Relevant for present purposes is the fact that Fechner’s articulation of what is now known as the “Weber-Fechner law of sensation” is widely understood to have impacted Wundt profoundly—to such an extent, in fact, that the experimental methodology of Wundt’s early laboratory is premised precisely on the question of how to measure sensory force.

Despite its success in the laboratory and resonance with popular physical metaphors, sensory force had its detractors. In one of his earliest and most influential writings\(^ {40}\), John Dewey criticizes the “nest of difficulties and assumptions” that plague this reconceptualization of sensation and the narrow theory of experience that accompanies it. In “The Reflex Arc Concept in Psychology,” Dewey calls experimental psychology out on its attempt to sidestep previously sensitive metaphysical issues by

---

\(^{38}\) Where \( S \) stands for the sensation, \( R \) for the stimulus numerically estimated, and \( c \) for a constant that must be separately determined by experiment in each order of sensibility.

\(^{39}\) The “stimulus-response” schema of behaviorist psychology, which dominated at least the methodological aspirations and research paradigm of much of early twentieth-century American psychology from 1913 to the early 1950s, is (among other things) a testament to the popularity and prevalence of sensory force as a guiding problematic.

driving mind/body questions into a new and underthought conception of sensation that somehow traverses the divides on which experimental protocol are based. What I have been calling the paradigmatic scene of experimental psychology (“psychological stimuli” – “experimental subject”), Dewey terms the “reflex arc concept”:

no matter how much it may prate of unity, [the reflex arc concept] still leaves us with sensation or periphery stimulus; idea, or central process (the equivalent of attention); motor response, or act, as three disconnected existences, having to be somehow adjusted to each other, whether by intervention of an extraexperimental soul, or by mechanical push and pull. 41

Here and throughout Dewey’s chief concern is to point out that the three terms of the reflex arc (stimulus-attention-response) are artificially disjointed from each other and decontextualized to the point of meaninglessness because cognitive stimulation-attention-and-response are all necessarily connected, directed and driven by a telos or interest in the world. As a consequence, he suggests, psychology’s emerging research paradigm is fundamentally flawed by its failure to frame investigations into the mechanics of human cognition in terms of a broader and more elaborated theory of embodied experience. In the absence of such a theory, the reflex arc concept is still left with the question of how it is that stimulus, attention and response are unified without a supernatural or theological harmonizing agent (i.e. an “extraexperimental soul”). Psychology’s proposed solution to this classical coordination question is the apparently “mechanical push and pull” of sensory force. Needless to say, Dewey is not convinced—and he does not stop here. Later in the paper, Dewey goes on to engage the

41 Ibid., 365.
broad and more enduring intellectual legacies at issue in this new conception of sensation:

the ordinary conception of the reflex arc theory, instead of being a case of plain science, is a survival of the metaphysical dualism, first formulated by Plato, according to which the sensation is an ambiguous dweller on the border land of soul and body, the idea (central process) is purely psychical, and the act (or movement) is purely physical. Thus the reflex arc formulation is neither physical (or physiological) nor psychological; it is a mixed materialistic-spiritualistic assumption.  

From the perspective of intellectual history, Dewey is spot on here. Metaphysical inconsistencies abound in late nineteenth-century psychology. He likewise cuts to the quick in naming the coordination problem – and I’ll return in to the issue of experimental psychology’s de facto importation of a Protestant soul in the theory of mind that emerges under the late nineteenth-century problematic of attention. First, however, there is the matter of the conceptual difficulties identified by Dewey, and what these difficulties reveal about the specific form of problematization being proposed in the rubric of psychological attention.

Dewey points to two failures in the explanatory work attempted by the “mechanical push and pull” of sensory force: first, it does not explain how human cognition works, and second, it is a category confusion rather than clarification. (The classical realms of idea and sensation are confused rather than articulated.) In light of the fact that the reflex arc concept was being advanced at the end of the nineteenth

\[42\] Ibid., 359.

\[43\] See Edward S. Reed’s From Soul to Mind: The Emergence of Psychology from Erasmus Darwin to William James, (New Haven and London: Yale University Press, 1997), especially chapters 2: “The Impossible Science” and 4: “The Breakdown in the Concert of European Ideas,” for a presentation of some of these inconsistencies.

\[44\] The coordination problem here is the continued conceptual necessity of a soul.
century as a “unifying principle and controlling working hypothesis in psychology” (as Dewey puts it), these failures are serious indeed. And yet, what Dewey is calling the reflex arc concept (stimulus-attention-response), and what I have termed the paradigmatic scene of experimental psychology have been tremendously successful as ways of modeling, predicting and intervening in human cognition. They remain the disciplinary truth-form and apparatus of experimental psychology in its diverse applications as so many cognitive norms and forms of address aimed at securing and maximizing individual attention. What remains to be articulated is their simultaneity and forms of proliferation; both are best understood in terms of the analytical frame that Foucault was working with in his final years – problematization.

Generally, a problematic is comprised of the discursive terms and socio-technical conditions under which a problem becomes both intelligible and actionable. It is the development of a given into a question that calls for diverse (often competing) practical solutions. By bringing in the added specificity of Foucault’s later thought, I want to emphasize how this sort of critical framing (problematization) transforms intellectual and social historiography into an analysis and presentation of the additional degrees of freedom opened up by certain, historically specific movements of “thought.” I understand attention as a model of human cognition to be just such a movement of thought\textsuperscript{45}, with reverberating degrees of freedom opening up in its wake. In this context,

\textsuperscript{45} I will generally refrain from making this difficult word, “thought,” do too much work. For the purposes of introducing Foucault’s later idea of ‘forms of problematization’, however, I find it necessary. Foucault briefly describes his use of the term: “What distinguishes thought is that it is something quite different from the set of representations that underlies a certain behavior; […] Thought is not what inhabits a certain conduct and gives it meaning; rather, it is what allows one to step back from this way of acting or reacting […] Thought is freedom in
sensory force is best read as a conceptual bridge in establishing these openings into human cognition—however limited the concept may be by its own metaphysical inconsistencies.

Two points bear emphasizing here. The first is that the degrees of freedom – the increased capacities for modeling, predicting and intervening in individual human cognition – are necessarily ambivalent. Increases in social control, while generally (and specifically in the meta-case of American hegemony) are freedoms put to work in the service of decidedly unjust kinds of capture and power consolidation, always also retain, and are in fact driven by concomitant increases in potential and capabilities for resistance. The symmetrical capacities of power is a Foucauldian point beyond the scope of this discussion. I bring it up here in connection with a second point of emphasis, and that is the diversity of practical solutions that emerge in response to a form of problematization. Moving with an understanding that diverse, even contradictory practical solutions to a single form of problematization are genealogically related despite their apparent differences is a necessary precondition to making sense of the singular and proliferating significance of attention to the long twentieth century.

In a May 1984 interview with Paul Rabinow, Foucault formulated the critical work of thinking problematization in the following way:

To one single set of difficulties, several responses can be made. […] But what must be understood is what makes them simultaneously possible: it is the point in which their simultaneity is rooted; it is the soil that can nourish them all in their diversity and sometimes in spite of their contradictions.
But the work of a history of thought would be to rediscover at the root of these diverse solutions the general form of problematization that has made them possible [...] It is problematization that responds to these difficulties, but by doing something quite other than expressing them or manifesting them: in connection with them, it develops the conditions in which possible responses can be given; it defines the elements that will constitute what the different solutions attempt to respond to.46

In Foucauldian terms then, attention is a “general form of problematization.” Arranged initially in the paradigmatic scene of experimental psychology (“psychological stimuli” – “experimental subject”), the rubric of psychological attention is the point in which the simultaneity of diverse responses to new difficulties of socialization and accumulation in late nineteenth-century America was and remains rooted. As a socio-technical set of arrangements (with political and economic ramifications), the model of attention develops the conditions under which, and defines the elements to which, subsequent solutions formulate responses. John Dewey’s particular prescience in 1896 was to articulate and object to the fact that these (socio-technically arranged) conditions and elements (i.e. stimuli-attention-response) constitutive of what might count as a psychological solution to the array of politico-epistemological difficulties thrown up by the early nineteenth-century shift to “subjective vision,” were artificially disjointed, created their own metaphysical muddle, and offered a grossly reductive model of human cognition.

In light of the limitations and confusions introduced by its distinct conception of sensation, why then, did the rubric of attention find such success? What freedoms were introduced by this new form of problematization, and how were its inconsistencies...

overcome? As it turns out, these inconsistencies were not overcome (they have persisted in plaguing twentieth-century psychology), and more importantly from the perspective of intellectual history, the conceptual innovation of sensory force succeeded in making the science of psychology un-impossible. Throughout the first half of the nineteenth century, the broadly shared theoretical framework for considering psychological topics followed the influential thinking of Immanuel Kant and Thomas Reid\(^47\), each of whom insisted on the impossibility of psychology as a science for one reason in particular: relations between the mental and physical realms were held to be categorically beyond human understanding (because the correlation between these realms was taken to be God-given). Despite the fact that Kant and Reid are perhaps the only two theorists in this tradition to remain true to the conviction that it is impossible to explain the relation between matter and mind, the premise was forcefully maintained as a matter of doctrine in pulpits and professorial chairs all across Europe – particularly from 1815 – 1848.\(^48\)

And yet, scientific psychology emerged in the 1880s and it did so precisely on the claim that the interface between physical stimuli and mental perception could be modeled,

\(^{47}\) Such a broadly construed consensus is obviously unstable and far from monolithic, but on this point – the impossibility of psychology as a scientific explanation of causality – a powerful consensus did exist. Edward S. Reed terms this consensus, and the unstable theoretical framework that its proponents operated “traditional metaphysics.” Its most consistent characteristic was the use of correlational frameworks – because the study of efficient causation in mental matters was not permitted. “Traditional metaphysics is nowadays, often disparagingly, dubbed faculty psychology. The idea the God has shaped the human mind into a number of distinct organs, or faculties, each with its own “office” or pattern of activity.[…] Reid’s claim that we can never know how God so arranged it that sensory impressions give rise to perceptual beliefs is transformed into the doctrine that each faculty makes manifest a God-given correlation between mental and physical process.” Reed, \textit{From Soul to Mind}, 27 – 28.

\(^{48}\) For the purposes of this discussion, the American context varied little on establishment doctrine: what Reed terms “traditional metaphysics” (i.e. post-Kantian & post-Reidian theorizing) was “allied with Unitarianism and republicanism as well as with orthodox Protestantism and Federalism.” Ibid., 35.
mathematically measured \( (S = \text{clogR}) \), and (as in the many subsequent variants of applied psychology) controlled or manipulated. In this way, attention – a domain of cognitive behavior previously taken for granted (or presumed beyond investigation) – was established as a new object of thought in the Foucauldian sense. This new objectivity of attention grounded freedoms of investigation and intervention into individual human cognitive behaviors in ways previously unavailable. But this all begs the question: Why, in the final decades of the nineteenth century, was a science of the soul suddenly intellectually feasible and practically desirable?

Edward S. Reed formulates a concise answer to at least the first portion of this question in *From Soul to Mind*. By reading official nineteenth-century thought in the context of some of the potentially subversive popular literature (especially Erasmus Darwin’s fluid materialist writings and Mary Shelley’s *Frankenstein*) with which it was often in contentious conversation, Reed makes the case that, “Psychology succeeded in becoming a science in large part because of its defense of a theological conception of human nature typically associated with Protestant theology.” In support of Reed’s argument there is first of all the obvious fact that most of the early reports on the new psychology in the American context were published in the liberal Protestant periodicals of the time (e.g. *New Andover Review*). Beyond the site of publication there is also the content of these articles, which often defend scientific psychology as an explicitly anti-materialist endeavor. In 1890, referring specifically to the new “scientific psychology,” James Mark Baldwin wrote in the *Presbyterian Review*: “It is spiritualism and not

---

49Ibid., 7.
materialism which is profiting by the advances of science.”

But then, of course, a spiritual view is not necessarily a liberal Protestant theology.

What marks early scientific psychology’s theory of mind as secular theology is its purified conception of human nature wherein “genuine evil and irrationality are considered to be external to the core self.” Thus the new psychology’s key conceptual move consists in a new demarcation between conscious mind (seat of the previous soul, now located firmly in the brain) and unconscious mind (affected by forces “outside” the soul, including the body). Corollary to this view is the very traditional special treatment of human mental energies and intuitions because these are thought to be the God-given faculties by which humans discern morality, and maintain their position as the undisputed, and independently created, lords of nature. It is in this vein that we should interpret Baldwin’s insistent defense in 1887: “To say that the soul is natural is not to say that is it mechanical, nor is it to say that there is continuity in the natural and spiritual world.” This was and is the strategic retreat of new psychology’s theory of mind under the rubric of attention: sensory force bridges the mental/material divide, but in such a way as to preserve the purified, demarcated status of a human inner sense (i.e. the conscious mind). This retreat is not entirely different from the truce maintained by traditional metaphysics’ insistence on the impossibility of a science of the soul—indeed, Reed states as much early on in From Soul to Mind:

---

50 Ibid., 7. James Mark Baldwin was among the most respected American scientific psychologists in the final decades of the nineteenth century.
51 On the general pervasiveness of liberal Protestant belief during this era, see G.M. Marsden’s The Soul of the American University: From Protestant Establishment to Established Unbelief, (New York: Oxford, 1994).
52 Reed, From Soul to Mind, 7.
What distinguished the psychology of 1890 from that of 1815, besides the change of name from *moral philosophy* to *psychology*, was primarily the way in which psychology was used to support religious ideas. Early in the century, psychology was considered a science of the soul. By the end of the century, psychology had more or less abandoned the soul and replaced it with the mind.\(^{53}\)

*By the end of the century, psychology had more or less abandoned the soul and replaced it with the mind...* to this I would add that the soul was not so much abandoned as reformulated such that it fit with an emerging set of difficulties that were simultaneously epistemological and political problems of accumulation and socialization in late nineteenth- and early twentieth-century America. I’ll hold the matter of these broader practical contexts in reserve for subsequent sections. On the topic of the sudden intellectual feasibility of a science of the soul however, we can say the following: a science of the soul became possible at the end of the nineteenth century by virtue of a shift in psychological discourse (from the overtly metaphysical soul to an apparently secular mind), coupled with the creation of a newly demarcated truth object and purified realm of human cognition – the conscious (as opposed to unconscious) mind.

### Unconscious Mental Processes

In part because of the shift in language – from “soul” to “mind” – that accompanied its rise, scientific psychology at the end of the nineteenth century is often

\(^{53}\) Reed, *From Soul to Mind*, 3.
understood in intellectual and disciplinary histories to announce the triumph of a secular and materialist perspective in accordance with the apparently secular positivism\(^{54}\) of late nineteenth-century thought. It is against this interpretation that Reed advances his thesis that the new psychology was effectively a retrenchment against the materialist, anti-theological implications of both Darwins’ (Erasmus and his grandson Charles) ecological views of distributed cognition.\(^{55}\) I’ll return in a moment to the broader socioeconomic context of this theistic retrenchment and its consequences for intellectual life and American political culture around the turn of the century and beyond. More immediate is the matter of connecting early psychology’s liberal Protestant conception of human nature with the form of problematization that I locate at the root of experimental psychology – that is, attention.

\(^{54}\) Reed understands late nineteenth-century positivism in the same vein as he does the new scientific psychologies; that is, as agnostic truce between religion and science. He re-names the positivism of Ernst Mach and others “pan-phenomenalism” and points to scrupulousness with which adherents of positivism avoided or downplayed the ontological implications of their views (by shrugging them off as being metaphysical and therefore unworthy of being answered). Reed suggests, in fact, that positivism’s popularity was due to its antimaterialism, agnosticism, and (Comtean) progressivism. “Positivism thus supplied a simple formula for advancing the social sciences: abandon metaphysical questions.” Ibid., 158.

\(^{55}\) This Darwinian lineage has never-the-less persisted within contemporary discussions of distributed, ecological cognition in a broad, biological sense as elaborated in Susan Oyama’s developmental systems theory. Likewise, autopoietic theories of cognition, such as those of Francisco Varela and Humberto Maturana present the same basic challenge in terms of the distributed, insistently materialist conception of embodied cognition. In every case, the scandalous implications are today much what they were in Erasmus and Charles Darwins’ respective days and they follow from the proposition of distributed, embodied cognition: “the mind simply is the body in all its senses.” As Reed notes, “this supposition meant first that the soul lacked mental unity, although it may have had physical coherence; and second that even the visceral feelings would have to be treated as equal in importance to rational thought. [...] third, it threatened to obliterate the distinction between animals and human beings [...] Fourth, this theory left no separate and distinct sphere for mental unity. [...] no place for an immortal soul.” Ibid., 41- 42.
One could say simply that attention is the specific name of what Reed treats more broadly as “consciousness,” or the conscious mind, in *From Soul to Mind*. This invites some confusion, however, because (as Crary is right to point out) “Both ‘attention’ and ‘consciousness’ are historically constructed notions, and over the [twentieth] century they have had a variable and independent relation to each other.”

In light of the noncoincidence of attention and a bifurcated theory of consciousness, and yet in order to highlight their conjunctural co-emergence as particularly useful ways of thinking about human cognition in the closing decades of the nineteenth century, I would offer another formulation: attention is the form of problematization under which conscious behavior is simultaneously separated from and articulated to “subthreshold,” unconscious behavior. The bifurcated conscious/unconscious theory of mind, with its crafty externalization of sin, evil, and all things bodily, would have achieved no scientific authority or articulation without the socio-technical experimental conditions designed to measure attention. It is important to understand here that the Freudian unconscious is a relatively late formation that, like other dynamic psychologies (i.e. those concerned with motives and feelings inaccessible to solitary introspection), has roots more properly traceable to traditions of spiritualism, hypnosis and shamanism.

The unconscious mental processes studied by scientific psychology were “subthreshold” cognition and behavior – that is, below the threshold of measurement by the experimental conditions of interface designed to model attention – and not

---

56 Crary, *Suspensions of Perception*, 44.
57 This book is massive and older (1970), but not dated and still the most comprehensive I have come across after reading around on the topic: Henri Ellenberger, *Discovery of the Unconscious*, (New York: Basic Books).
particularly concerned with healing. The challenge with unconscious mental processes was in how to account for the fact that a sleeping person would wake upon hearing their own name, but not other sounds, or for the capacities we have for performing routine tasks without paying attention or being aware of having done them. Scholarly American solutions to such difficulties varied from William James’ famous chapter on attention in *Principles of Psychology*, to Gertrude Stein’s laboratory study of automatic writing, to the impressive accumulation of reaction-time studies produced.58

Although it is certainly the case that many thinkers throughout the nineteenth century pondered the nature of the unconscious, and that something akin to the notion of unconscious ideas can be found as early as Leibniz, it is also the case that no special theory of unconscious mental processes was articulated before the institutional establishment of the scientific psychologies at the end of the nineteenth century. According to Reed, up through and including the Romantic unconscious (which was simultaneously ontological and psychological and can therefore be treated as a distinct amalgam), theorists of the unconscious “treated the unconscious as existing in opposition to the conscious soul” (i.e. the rational soul of Christian dogma).59 Up through at least the 1840s, the unconscious was a vague and shifting source of irrational forces, and certainly not an integrated part of the picture of human cognition.


59Reed, *From Soul to Mind*, 7.
Typically, historians will locate the emergence of a theory of unconscious mental processes with either Helmholtz or Wundt in the 1860s (particularly their doctrine of “unconscious inference”); Reed wants to push this back to John Stuart Mill’s *Logic*, published in 1843. Whether or not Mill is the source of the first special theories of unconscious mental processes, what matters for both Reed’s larger argument and my own is that, rather suddenly, in the late 1860s, a theory of the logic or processes of unconscious behavior became “a bulwark of mainstream theorizing—a concept found useful by several different schools in the new psychology.”61 This abrupt arrival of the need to have some theory of unconscious mental processes matters for Reed because he reads it as the theologically-driven container-concept into which all the scandalous implications and undigestible bits of Erasmus and Charles Darwin’s embodied theories of naturalistic cognition are hidden away. While I certainly agree that theories of the unconscious (dynamic and other) are generally storage tricks designed to preserve the purity of a disembodied rational mind and/or theological soul, my own historical interests in the sudden emergence of interest in unconscious and automatic behavior lie with what it announces about the underside of attention as a problematic of cognition. First, because attention is the first thorough-going “mind-in-the-brain” doctrine of human rationality, its very formulation prompts a series of counter-discourses of embodiment and irrationality that have been central to intellectual life in the twentieth century (intuitionism, phenomenology, psychoanalysis) —

60 The assertion here is that Mill advances a theory of the logical unconscious; in effect, shoring up his father’s associationism while also developing his own general theory of logic in accordance with associationist psychology. Since we know that Helmholtz and Wundt read *Logic*, Reed attributes the source of their theory to Mill. Reed, *From Soul to Mind*, 131 – 132.

61 Ibid., 141.
unconscious mental processes and the counter-discourses that hinge on them as forms of
evidence are merely indicative of a structured limit in the problematic of attention from
this point of view. And secondly, in a more specifically American vein, the
reformulated Protestant investments made evident by Reed’s analysis map to another,
broader theological reframing of cognition and rationality that takes place under the
sign of marginal utility.
Chapter II.
Neoclassical Economics’ Powers of Visualization

*Rational Frameworks: Theology and Economism*

At the end of the nineteenth century and leading into the twentieth, previously metaphysical questions of the universal principles of value and social order were being recast in a variety of expert idioms. In the U.S., these idioms were particularly scientific, ahistorical and, as we shall see, simultaneously theological and economistic. Broadly speaking, this expert way of considering and acting on society as a system amenable to rational reformation and professional administration has been understood and critiqued as the Progressive movement\(^1\)—and the managerial/corporatist values of efficiency, professional administration and centralized decision-making processes associated with this movement have certainly been crucial to the perpetuation of U.S. hegemony along a number of axes. What has not been widely understood or discussed is the extent to which the early twentieth-century Progressivist projects of efficient administration of social welfare traded on a rather abrupt decline in the epistemological and political powers of *official*\(^2\) theological thinking at the end of the 1860s.\(^3\)


\(^2\) I emphasize “official” here in two senses: first and foremost, in the institutionalized sense that the content of public intellectual life was dominated by theology, and that teaching posts...
William Paley’s *Moral and Political Philosophy* (1785) had been continually reprinted on both sides of the Atlantic from its first appearance in 1785 down to the late 1860s. Until the American Civil War it was the most widely used textbook of politics in the United States.4 *Moral and Political Philosophy* is based upon a “theological utilitarianism” that finds its justification in the Bible. (The ultimate credibility of Paley’s arguments here rest upon his final work *Natural Theology* (1802), specifically the Argument from Design.) Whether we understand the decline of official theological thinking to be an intellectual affair driven by the publication and wide reception of Charles Darwin’s *Origin of the Species* in 1859, followed closely by Herbert Spencer’s *First Principles* in 18625, or a more diffusely practical effect of class realignments after the failed European revolutions (i.e. alliance between the old ruling classes and new middle classes),6 or a “structural secularism” emerging from how the university remained occupied by the clergy in the U.S. until the end of the nineteenth century (see sources in notes 3, 4 and 8 below). And in a second sense, I emphasize “official” because, if Reed’s presentation of the emergence of experimental psychology, and Dewey’s analysis of its research paradigm are correct, then attention retains specifically Protestant theological underpinnings despite having shed its more officially Christian formulation.

3 Richard Wrightman Fox notes a few exceptions, mostly stemming from an older post-World War II generation of historians who “managed to codify a standard linkage between Protestantism and reform that has not been entirely forgotten.” This is, however, in the context of a discussion of what he finds to be a much more characteristic tendency of historians to “overlook the centrality of religious conviction in the late nineteenth- and twentieth-century progressive ranks.” Richard Wrightman Fox, “The Culture of Liberal Protestant Progressivism, 1875-1925,” *Journal of Interdisciplinary History*, Vol. 23, No. 3, Religion and History (Winter, 1993), 639 - 660.


6 Edward Reed, *From Soul to Mind*, 110.
reorganized the material bases of intellectual life\textsuperscript{7} — or more likely, some combination of these and other causes—the one significant fact remains, and its importance to intellectual activity at the end of the nineteenth century is under-rated\textsuperscript{8} and germane to this discussion. With the decline of official theological thinking (and the consequent erosion of explicitly Christian theological bases for Victorian political culture) at the end of the 1860s people in the U.S. and Britain in particular\textsuperscript{9} were on the market a new “scientific” worldview and rational framework for political discussion.\textsuperscript{10} In the U.S.


\textsuperscript{8} Both Reed and Waterman note this neglect of the previous and enduring importance of theology to nineteenth-century intellectual life in Britain and America. Reed notes in his preface that “Modern historians of ideas, writing from an agnostic perspective, have tended to overlook the religious differences that animated a great deal of nineteenth-century work, especially in fields like psychology. […] Much of nineteenth-century psychological thought emerged from religious apologists’ efforts to justify specific views of the deity or the soul.” (3) From the perspective of economics disciplinary histories, Waterman understands the neglect as “not a matter of secularist bias” but “rather a matter of analytical method.” “Intellectual historians, taking a leaf out of the economists’ book, have postulated perfect rationality in their agents and perfect information in the implicit social system. Immediately a new “thought” is discovered and found to be true, it must of course be instantly adopted and universally disseminated. The anomalous fact that most highly educated and intelligent men & women in Britain and elsewhere continued to accept and further develop the theological presuppositions of a Christian society for two more centuries after Hume’s “great turning point” (and almost a century after Keynes’s “critical moment”) is somebody else’s business to explain.” (8)

\textsuperscript{9} As Waterman points out in chapter two, “Why the English Enlightenment was Different,” a primarily Protestant Britain – and by extension America – assimilated the “Enlightenment” critique of enthusiasm and superstition into official Anglican doctrine in a way that papist France, for instance, could not. This difference is due, in Waterman’s account both to general differences between Protestant and Catholic perspectives and to specific differences in the ways that enthusiasm was understood in the two cultures. In this context, the differences amount to relatively intact religious cultures and theological worldviews in Britain and the U.S., even after the “Enlightenment.” (16-25). In the U.S. in particular, academic curricula in the decades before the Civil War were “still dominated by theology,” as was teaching – which was still controlled by clergymen until the end of the nineteenth century. Robert Dorfman, \textit{The Economic Mind in American Civilization}, 1606 - 1865 (New York: The Viking Press, 1946), 512.

\textsuperscript{10} This late nineteenth-century “crisis of authority” has been well documented. See Howard Horowitz, \textit{By the Law of Nature: Form and Value in Nineteenth-Century America} (Oxford: Oxford University Press, 1991); Thomas Haskell, \textit{The Emergence of Professional Social Science: The American Social Science Association and the Nineteenth-Century Crisis of Authority}, (Baltimore: Johns Hopkins University Press, 2000 [1977]).
context economics came to answer this call at the macro level, and psychology at the micro.

The two disciplines provided interlocking solutions to questions of value and social order by talking about human nature and society (in this sense, modern psychology and economics can be understood as contiguous with their predecessors in moral philosophy and political economics). However, their co-emergent perspectives were integrated and shaped in the US national context in particular by a progressivist and scientistic category conflation: the economy was substituted for Nature\textsuperscript{11} and held to operate with the same lawfulness and independence—and with a new set of expert procedures centered on mathematical formalisms.\textsuperscript{12} Although positivist-instrumentalist

---

On the specific topic of the complex relationships between the authorities of theological and scientific explanations, see J.W. Burrow, *The Crisis of Reason: European Thought, 1848 – 1914* (Yale University Press: New Haven and London, 2000), 59. “Science was a powerful and much solicited voice rather than an unchallenged hegemony. It remained, however, at the popular level the chief guarantee of an optimistic belief in progress, while, on the other hand, the intellectual authority of the churches had perceptibly diminished at the end of the century.”

\textsuperscript{11} Appeals to Nature as the ground of values, variously conceived, have a long history. For a detailed reading of the senses in which classical political economy can and should be read as natural theology and theodicy, see Waterman, *Political Economy and Christian Theology since the Enlightenment*, especially chapter 1, “Political Economy and Christian Theology,” and chapters 6 – 8: “Wealth of Nations as Theology,” “The Sudden Separation of Political Economy,” and “Methodology of Classical Political Economy,” pages 1 – 16, and 88 – 139. In the U.S. context, Horwitz makes the case in *By the Law of Nature* that appeals to nature as the ground of value were a central strategy for artists, intellectuals and politicians alike throughout nineteenth-century America.

\textsuperscript{12} For the mathematical formalisation of experimental psychology, see my discussion of the Weber-Fechner law of sensation in chapter one. On the topic of mathematicization of economics, the most frequent reference is Gerard Debreu, either his work with Kenneth Arrow in military operations research (esp. game theory for the Navy), or his writings. Debreau’s account in “Economic Theory and the Mathematical Mode,” *American Economic Review* (1984) accords with that of most disciplinary histories in asserting that “the mathematicization of economic theory” was natural, progressive, and flowed organically from “the fact that commodity space has the structure of a real vector space”—a “fact” first described by marginalist theory and interrogated by the work of Philip Mirowski.

In *More Heat than Light* and a subsequent article, Mirowski investigates the how and why of the mathematicization of economic thought around 1870. He posits two “inflection
and Spencerian perversions of Darwin’s theory of natural selection operated far and wide as the new integrating framework for popular socio-political and social scientific analysis, in the U.S. they found their most enduring—and arguably most impactful—home in a kind of ahistorical and economistic market fundamentalism that structures our deepest political narratives and metaphors to this day.\(^{13}\)

This is not to make the presentist error of asserting that the Progressivist economism of the turn of the twentieth century is the same thing as the Chicago-school free market fundamentalism that is widely understood to undergird contemporary

---

\(^{13}\) Conceptions of freedom are a concrete example here, and as Eric Foner has argued, the concept has been central to American identity from colonial times forward. Foner’s most exhaustive textual treatment is *The Story of American Freedom* (New York: W.W. Norton, 1998). See also chapter three, “The Meaning of Freedom” from *Reconstruction: America’s Unfinished Revolution, 1863 – 1877* (New York: Harper & Row, 1988). More recently, Foner has used new media to put out a mini-lecture entitled “Freedom and American Identity,” which is available on YouTube <http://fora.tv/fora/showthread.php?t=812>. [29 August 2007].

In somewhat less academic circles on the left there is lately emerging a mini-industry of books about “how to reclaim the idea/narrative of freedom from its conflation with the supposedly ‘natural’ workings of a ‘free’ market.” George Lakoff’s recent work on this topic has been the most popular. Geoff Nunberg is, I think, more attuned to how political language works. His recent account of how and when FDR’s “freedom from want” became an ideal accomplished by the market is a convincing analysis of popular political discourse. See: *Talking Right: How Conservatives Turned Liberalism into a Tax-Raising, Latte-Drinking, Sushi-Eating, Volvo-Driving, New York Times-reading, Body-Piercing, Hollywood-Loving, Left-Wing Freak Show*, (New York: Perseus Books, 2006) My interest here is specifically with the ideological formation of a category conflation in intellectual life around the turn of the century. In this case, the “gradual replacement of the discourse of theology by that of economics as the rational framework of political debate” that Waterman traces is a shift that prepares the ground for narratives of the U.S. as a “Market Republic.”
neoliberalism—although they are “of a piece.” After all, the “Trust Question” and America’s subsequent “corporate reconstruction” (as Martin J. Sklar terms it) are nothing if not propositions of an administered market in explicit rejection of previous laissez-faire conceptions of classical political economy. Likewise, the late Milton Friedman and his Chicago school are understood appropriately enough\(^\text{14}\) as a reactionary movement against the planned government spending and regulation schemas of Keynesian macroeconomics. What Progressivists, Keynesians, and the Chicago-school economists and their libertarian and neoliberal believers do share is a worldview that takes mathematically formalized economics and the markets objectified therein to be something like the ontological ground of collective social and political life. Much like exceptionalism, economism\(^\text{15}\) is such a generalized ideological disposition as to be analytically unsatisfying. Yet it is a shift in the ground of discourse with enduring consequences, and it has an historical moment of emergence and conceptual consolidation particular to the national context of late nineteenth-century America. Since hegemony consists largely in the capacity of a dominant group to “place all issues on

\[^{14}\text{Philip Mirowski and Robert Van Horn have recently published an account of the formation of the Chicago School of Economics that would complicate but not overturn this common characterization. Specifically, they see the Chicago School as a rather deliberate creation by corporate sponsors through the Volker Fund’s support of Friedrich Hayek, Aaron Director, and Milton Friedman. Robert Van Horn and Philip Mirowski, “The Road to a World Made Safe for Corporations: The Rise of the Chicago School of Economics,” 2005. <http://economix.u-paris10.fr/pdf/journees/hpe/2006-06-16_Mirowski.pdf> [15 August 2007]. While Van Horn and Mirowski’s account is on point and interesting, it seems to me that this sort of strong commercialization thesis underrates the intellectual and institutional points of contact and articulation between earlier neoclassical theorists and the postwar neoclassical orthodoxy.}\]

\[^{15}\text{To be clear on the matter of definition, economism is a set of beliefs and assumptions regarding the nature and efficacy of markets that consists in the following conceptual moves: taking the law-like nature of the economy as a given, understanding its effects on other elements as a linear causal relation operating in a closed system, and subsequently, advancing economics as the rational framework for political debate.}\]
which conflicts rage on a universal plane,” the peculiar ways in which a modern American political culture framed key issues of popular and intellectual debate during the formative years of its emergence as a world hegemon are central to the horizon of this study. Moreover, the discourses and techniques of attention that constitute my object of study have been continuously articulated to this economistic political framework over the course of the long twentieth century.

In order to apprehend this framework both in its theological dimension, and as it articulates to the model of cognition outlined in the previous chapter, one must understand the historical emergence of economics as a discourse and proposed domain of causality. The reigning critical consensus is that the economy became a distinct object of knowledge and governmental practice in either the late-eighteenth, or early-nineteenth century. The most well-known version of this argument is Karl Polanyi’s assertion in *The Great Transformation* (1944) that the economy emerged as an institutional sphere separate from the rest of society in the nineteenth century – whereupon it grew more and more “disembedded” from wider social relations. In a similar vein, Foucault’s work on “governmentality” theorizes the large-scale management of populations in the eighteenth and nineteenth centuries in relationship to the emergence of the economy as a new object of political management (though it should be noted that “commerce” is the operative term in many of his arguments). Bracketing for the moment the question of specifically

---

16 In contrast to Gramsci, in which corruption or fraud fills the grey area between coercion and consent, hegemony is “understood as the additional power that accrues to a dominant group by virtue of its capacity to place all the issues on which conflict rages on a ‘universal’ plane.” Arrighi, *The Long Twentieth Century*, 28.

capitalist-accumulationist markets, I propose a reconsideration of the historical timeline underwriting the “socially disembedded” economy argument and a revised extension of Foucault’s “governmentality” analysis.

I am not alone in advocating such a reconsideration. Recent work in the related fields of science studies and sociology of science have located the emergence of the “economy” as an object of knowledge in the contemporary sense in mid-twentieth century American economics. Timothy Mitchell’s work in particular has gone the furthest in making the case that “the economy” is a recent product of disciplinary economic’s sociotechnical practices emerging only in the 1930s, and an even more recent popular term that came into more common use after World War II via new forms of consumption, marketing, business management, government planning, financial flows, colonial administration, and statistical work (esp. econometrics). He defines the economy in the contemporary, macro sense as “referring to the self-contained structure or totality of relations of production, distribution, and consumption of goods and services in a given geographic space.” In addition to his attention to the empirical work of tracing specific textual instances, absences and mis-translations involving the term “the economy,”

Mitchell’s work is especially productive in teasing out the ways that this interwar emergence of “the economy” facilitated new ways of constructing geopolitical space that have been commensurate with neoliberalism and the growth of U.S. hegemony.\footnote{Mitchell notes that in the traditionally cited works of seventeenth- and eighteenth-century political economy (e.g. William Petty through Adam Smith) were never concerned with the “structure of production or exchange in an economy.” Rather, the term was used to indicate frugality and best use of resources (esp. the proper management by sovereigns) all the way up through the second edition of *Palgrave’s Dictionary of Political Economy* in the 1920s. He notes too post-war mis-translations of Weber and Walras that substituted “the economy” or “economic system” for “economic action” and “society.” On the geopolitical dimensions, see especially Mitchell’s two most recent essays.} By providing a new way for the nation-state to represent itself, a new representation of the political order, and a novel conception of politics as intensive economic growth, this new totality – “the economy” – transformed political languages and inter-/national imaginaries by effectively superseding law as the technical language of administrative power.\footnote{Mitchell, “Economists and the Economy in the Twentieth Century,” 136.} Mitchell’s arguments here around the powers of geospatial representation and intervention that have conditioned and accompanied the recent emergence of “the economy” are good (great, in fact) as far as they go. And I think he is right to pay attention to the fact that it was not until 1946, when the Council of Economic Advisors was established in the U.S executive branch, that the voice of economic expertise was placed squarely in the center of political discourse.

In addition to these matters of geospatial representation and national administration, however, there are matters of political culture and the significant question of how and when it was that disciplinary economics first settled into the forms of evidence and expertise that came to be institutionalized in so many post-1945 seats of inter-/national power. That is a story that begins earlier; and although an image of the
self-contained domain of causality and structure of relations referred to by “the economy” in its contemporary, economistic sense was already prefigured in discourses taking “the market” and commerce as their object, it is true that the term “the economy” was not yet in use around the turn of the twentieth century. My argument here is that the economy in its modern sense was “disembedded” as a discrete (geometric rather than geopolitical, but never-the-less) spatial representation of governmental, cultural and business practice in the final decades of the nineteenth century, and that this representation was formulated first as a reconceptualization of economic value and distribution under the sign of marginal utility by early disciplinary economics.

Manifold Marginalism: The Development, Applications + Implications of Diminishing Returns

The final three decades of the nineteenth century were a time of vigorous intellectual and public debate about “the market”—its mechanisms of action and disposition as a historical agent, its ideal form, proper relationship to the state and society, and so on. Particularly in the U.S. context, the struggle to understand and counteract the features and forces of the “Great Depression”22 provided the operative context for the emergence of economics as a modern, formalized area of inquiry with

22 “The Great Depression” of 1873 – 1897 was and is a topic of some debate. As a matter of record, this period of volatile market instability in U.S. and western European history is marked by cut-throat price competition and consequent crises of profitability for capitalists. These years also mark a period of increasing productivity and economic growth, and rising real wages (in the sense that workers were able to afford more with the same wages under conditions of price deflation), thus complicating a more contemporary, properly economic designation of “depression.”
explicit relevance both at the level of public policy and at the level of business enterprise. The fact that neoclassical economics emerged and was disciplinized as a science in concert with a flurry of overtly political public debate about “the market” is not particularly surprising for any but the strictest of internalist historians. However, what is sometimes lost in either internalist or externalist accounts of the emergence of neoclassical economics is the peculiarity of the hybrid grain of thought that gets formalized in terms of “marginal utility” during the first decades of America’s formation as a national industrial apparatus and mass marketplace. Consequently, most assessments and configurations of the “mass market” as the central social institution of twentieth-century consumer society fail to account either for its comparative newness, or for its articulatory powers as a scientific framework for the representation of and intervention in mass marketing as it emerged for the first time around the turn of the twentieth century.

Mass marketing, bureaucratic management and the Taylorization of industrial work processes often figure centrally in critical accounts of the capitalist “market” at the turn of the twentieth century—as indeed they should, and I might add that this study partakes of that tradition. Yet it is difficult to get a grip on turn-of-the-century mass marketing and scientific management as discursive formations and sociotechnical practice without a clear idea of the neoclassical vision – or rather, visualization – of mass markets on which they came to rely. In order to present what I find to be historically distinctive about neoclassical economics as it bears on my larger set of arguments about the centrality of discourses and techniques of attention, I’ll briefly set out a standard internalist account of marginalist economics, then a slightly more elaborated account that takes into consideration American marginalism’s sociopolitical roots, and then a different
sort of critical history that pays attention to the institutional context, and relatedly, the forms of evidence that conditioned the emergence of disciplinary economics. Although I can of course make no claims to comprehensive coverage, my hope is that, by holding together this conjunction of perspectives, the peculiarity of “marginal utility” as an American idea\(^\text{23}\) with global consequences will take on new dimension.

Certainly, “marginal utility” is but one of many twists and turns taken by the meaning of “utility” over the centuries.\(^\text{24}\) Accordingly, part of my work here is to indicate its late nineteenth-century formation as a confused mathematical idea with afterlives as a mutating and often contradictory political rationality that postulates a model of cognitive behavior that is at once continuous with and distinct from the strains of thought associated with Benthamite utilitarianism and the individual calculations of self-interest that underpin Adam Smith’s “invisible hand” theory of the justice of capitalist markets. I spell out the more salient distinctions at this chapter’s end. More immediate is the conceptual-discursive emergence of marginal utility.

\(^\text{23}\) Note two points of comparison: in the British tradition of marginalist economic theory (stemming from W.S. Jevons and Alfred Marshall) the term “utility” has been largely abandoned and replaced with the analytical concept of “marginal rates of substitution”; the Austrian tradition (beginning with Carl Menger) has developed an analytical framework based explicitly on the psychological dimensions and assumptions of marginal utility that led to their elaboration of “methodological individualism” (hence their alternative name, the “Psychological School.”)

\(^\text{24}\) Two contemporary historicizations of the complex usages of “utility” spring to mind. The first is Foucault’s historical understanding of utility as generated by his analysis of disciplinary power; that is, subjectivation is the most recent form of the relationship between truth and power. Here a body’s value or usefulness is coordinated and amplified through disciplinary techniques of subjection that are historically specific to that power regime (i.e. modernity). The second is Barbara Herrnstein Smith’s treatment of humanist’s anti-utilitarian stance and its confused reliance upon and invocation of a “double discourse of value,” as presented in chapter 6 of Contingencies of Value (Cambridge: Harvard University Press, 1988). To my mind, the additional economic dimension I tease out here neither conflicts nor competes with either of these accounts.
The Accounts

From one set of perspectives, “marginal utility” is a dramatic (though not discontinuous) reconceptualization of value that both accommodates mathematical modeling of the economy (i.e. as a “commodity space” amenable to calculation via linear algebra and vector calculus), and corrects or supplements a central hypothesis of classical political economy (Say’s Law of Markets) by advancing an alternative view of how markets accomplish the just distribution of resources. Thus, in disciplinary and internalist histories of economic theory, classical political economy is depicted as having been preoccupied with conceptualizing “the circular flow of income,” or “the economy as an interdependent system:” Neoclassical economics simply added a set of equations (“the optimization calculus of individuals and firms”) to this previously incomplete conception of the market by specifying a law of marginal utility. In these accounts, marginal utility is presented as a generalization of Ricardo’s earlier law of diminishing returns (which was previously applied only to rent) to all factors of production. With the discovery of

---

25 Say’s Law held that under freely competitive conditions, production and demand would naturally balance each other out.


27 Jurg Niehans states that the classical era of economic theory (ca. 1680-1830) was characterized by a “common leitmotiv” of the “conception of a circular flow of income, of the economy as an interdependent system”; and the neoclassical era (ca. 1830 – 1950) by “the optimization calculus of individuals and firms.” A History of Economic Theory: Classic Contributions, 12 & 160.
this “law of marginal utility,” the locus of value shifts from the factors of production (either land, capital or labor) to a more abstract price and welfare equilibrium achieved at the level of the market because all market factors operate according to utilitarian calculations of the relative value of a commodity to them. The fact that the empirical specifiability of “marginal utility” has been and remains an item of notorious debate bears mention, and many histories of economics are careful to note as much even if only to immediately rehabilitate the concept with an operational definition. What matters here though, are the uncomplicated and progressive trajectory of the traditional (i.e. disciplinary and internalist) account recapped above: Neoclassical economics marks the birth of scientific and professional economics because the “law of marginal utility” affords mathematical specification of value and the modeling of a commodity space (i.e. the mass market) in such a way as to accommodate and justify a view of market dis/equilibrium that accounts for business cycle fluctuations, thus making these

---

28 Since a provisional definition might be of help; marginal utility is understood most basically as the increase in utility gained by the use or acquisition of one more unit of a commodity. Utility, another extraordinarily fluid concept, is used in disciplinary economic discourse to indicate the “revealed preference” of an economic subject (i.e. consumer) for a commodity object (i.e. good or service). Alternately, commodities can be said to bear utilities in themselves, again as measured operationally and ex post facto by the economic subject’s preference for elements or features of that object, or by their gains acquired in the using or owning of that object.

The term is also, of course, historically sedimented. As Mirowski traces the development, the marginal utility theory of consumption has been “a play in two (possibly three) acts” that moved from early demand theory rooted in cardinal (and interpersonal) measurements of utility, to the “ordinal revolution” of Vilfredo Pareto (1927) and others, to the “revealed preference theory” of Paul Samuelson (1938). Each development has been presented and taken up as a way of putting utility-based demand theory on more scientific footing and it is Samuelson’s iteration that operates most widely today. *Agreement on Demand: Consumer Theory in the Twentieth Century*, Annual Supplement to Volume 38, *History of Political Economy*, ed. Philip Mirowski and D. Wade Hands, (Durham: Duke University Press, 2006), 3.
fluctuations amenable to prediction and intervention through various forms of market administration.

A second set of perspectives, externalist in historiographical orientation, read the rise and institutional consolidation of neoclassical economics at the turn of the century in terms of the justifications the discourse provides and the corrections it prescribes for a destabilized capitalist market system and a crumbling class order. In these accounts the radical challenges posed by the writings of Henry George and by socialist invocations of Marx’s labor theory of value to discredit classical political economic theories play a particular, instigating role. Of course, points of critical purchase in these accounts differ. Dorothy Ross understands marginalist economics in two main ways: first, as a liberal-exceptionalist accommodation in the face of socialist threats near the turn of the century, and secondly, as the composite expression of two generations of American economists’ desires to “justify the capitalist economy in less contested terms than those provided by classical political economy.” From the perspective of the then-professionalizing discipline of economics, Ross reads the success of the marginalist movement after 1890 as in large part consolidated by a conservative, ahistorical reaction to the radical historicist challenge presented by social scientists in decades prior. Marginalist theory is thus, for Ross, a scientistic restatement of the American exceptionalist desire to escape

---

30 Ross, The Origins of American Social Science, 120.
qualitative historical change that “redefines the exceptionalist ideal as possessive individualism.”

Martin J. Sklar takes a different tack on the sociopolitical roots of marginalist theory by presenting it as one aspect of a wider reconceptualization of the capitalist market taking place around the turn of the twentieth century. He situates the disciplinary discourse of neoclassical economics in the context of a broad “corporate reconstruction of American capitalism” that includes influential non-academic financial journalists such as Charles A. Conant and that was legally enabled by judicial and legislative re-definitions of property and the market. Two elements of this perspective are unique and relevant to the terms of my larger argument: first, Sklar follows the implications and applications of the marginalist-backed\footnote{Sklar uses the language of “theoretical grounding,” “theoretical basis,” and “scientific grounds” to describe the relationship between marginalist economic theory and its political and business applications.} reconceptualization of markets through to their foreign policy mandate that the U.S. create an international investment system in order to offset effects of the declining marginal productivity of capital; and second, he notes and unfolds the fact that “On American soil, marginal utility took corporate root and yielded a hybrid

\footnote{Ibid., 122. The phrase “possessive individualism” here indicates the fact that Ross is reading marginalist economic theory as a modified extension of classical liberalism in the Lockean tradition (though notably, she makes no reference to C.B. Macpherson and takes exception to Louis Hartz’s version of an American liberal tradition). Since Ross is something of an expert on American elaborations of liberalism (she wrote the entry for “Liberalism” in the \textit{Encyclopedia of American Political History}) it is difficult to disagree with her. In my next chapter I will however, put some pressure on this phrase “possessive individualism” as I think it obscures a shift in the terms of U.S. republican political culture and theories of political personality around the turn of the century. It is possible to understand this pressure more as an exfoliation of the multivalent meanings accommodated by the fact that (as Ross notes) “Liberalism was, and still is, subject to differing interpretations, and is put to different uses, depending upon what implications are drawn from the view that the individual is ‘self-possessed.’” (11)\textsuperscript{11}}
While he does not use this language, Sklar’s account of the explanatory work done by marginal utility links it to two procedures of accumulation and socialization that define the “U.S. Free Enterprise System” as it emerged at the end of the nineteenth century: These are the internalization of transaction costs through vertical integration and the development of a system of national markets and transnational corporations.34

As suggested above, the peculiar “corporate root” of marginal utility consists both in its political-ideological legitimation script (i.e. as a justification for the “corporate reconstruction of American capitalism”35) and in the planning capabilities it introduced at the level of business enterprise. One might take “opportunity costs”36 as an example. Some version of this neoclassical theorem dates from at least the 1850s37, but its formal elaboration and use as a method for establishing priorities and in microeconomic

---

33 Sklar, The Corporate Reconstruction of American Capitalism, 68.
34 Arrighi, The Long Twentieth Century, 239.
35 The invalidation of populist theories of monopoly and money (two primary ideological weapons) are a concrete instance of the political-ideological uses to which marginalist economic theory was put. The populist movement was, according to Sklar, a more substantial threat to the corporate re-ordering of American capitalism than was socialism. In the 1890s populists such as William Jennings Bryan advanced a quantity theory of money (under the Free-Silver campaign) and the theory that “unnatural” monopolies were responsible for the Great Depression. Marginalist economic theory, as conveyed by policy-influencers like Charles A. Conant, provided a scientifically grounded counter to these populist positions by focusing on the diminishing returns yielded by a rising supply of capital in order to argue (in line with popular conceptions of Darwin) that it was not monopolistic power that disrupted the competitive equilibrium, but the disequilibrium inherent to modern business conditions that caused capitalists to adapt by consolidating. Sklar, The Corporate Reconstruction of American Capitalism, 70.
36 “Opportunity cost” accounts for cost by taking measure of the next-highest-valued alternative use of whatever resource is being used.
37 Frederic Bastiat’s “broken window fallacy,” which developed the idea of unintended and unaccounted consequences of an action, is read by some economic historians as a forerunner to the marginalist concept of “opportunity costs.” Bastiat’s parable of the broken window was published in an 1850 essay entitled, “That Which is Seen and That Which is Unseen”.
planning is based upon the marginal theory of value as it was popularized in the 1890s. By quantifying the opportunity costs of investing capital at one time or place rather than another – for instance, in a main product line or in countercyclical products, or in the development of new functional capabilities within the firm as against anticipated declines in price should an excess of goods saturate the market – firms were better able to make deliberate decisions about what to do when, and thus could begin to act as price-makers rather than price-takers through the calibration and diversification of productive capacities that ensured the maintenance of scarcity and therefore of more profitable prices. In the language of the day, the economic concept of “opportunity costs” allowed firms to plan and manage their way out of the previously devastating and unpredictable problem of “overproduction”. In this sense, marginal utility was understood and put to work in the context of business enterprise (but also by business-minded thinkers like Conant) as a sophisticated cost of production theory that capacitated and indeed called for planned, scientific management. Verticle integration — also known as corporate

---

38 As points of comparison, consider the two previously dominant accounting practices in American business enterprise, statements of profit-and-loss (i.e. “P&L”), and a procedure pioneered by the engineers who developed mid-nineteenth-century railroad companies, “operating ratio.” An “operating ratio” is thought to express a company’s operating efficiency by means of dividing operating costs by total revenues (All three business accounting procedures are still widely used). For context on the early development and use of operating ratios, see Alfred Chandler’s The Visible Hand.

39 Though he makes no mention of opportunity costs, Sklar states the matter directly, “marginal utility […] converted an economic reality productive of unmanageable abundances into an economic calculus suited to the restoration and management of relative scarcities.” Corporate Reconstruction of American Capitalism, 1880 - 1918, 70. Livingston does point to the example of opportunity costs as a way that corporations put marginal utility into practice. Political Economy of Cultural Revolution, 61.

40 Beginning in the 1880s “overproduction” (previously understood by classical political economy to be theoretically impossible) was becoming the standard explanation for panics and depressions. Economists Arthur T. Hadley and David Wells both devoted treatments to the problem: Arthur T. Hadley, Over-Production,” Cyclopaedia of Political Economy 3 (1884): 40-43; and, more popularly, David A. Wells, Recent Economic Changes (New York: G.P. Putnam & Sons, 1888).
“rationalization” of sub-processes of production and exchange — consists precisely in this planful articulation of a complex mass production chain to processes of mass distribution. It was this new science of elongated business organization and management, along with the great wave of corporate mergers between 1890 and 1904 that allowed corporations to internalize transaction costs, thus superceding market instabilities in everything from raw materials to available labor, capital and consumer markets.

Insofar as economic accounting and planning concepts like “opportunity costs” and the declining marginal productivity of capital enabled corporations to grow into successful business entities operating at unprecedented scales, marginal utility’s microeconomic “corporate root” is something of a taproot for U.S. hegemony. America would not have attained a position of global dominance without these planful and quickly proliferating agents of intensive accumulation. But the cultivation of international markets in which to conduct business and for purposes of direct investment of surplus capital beginning in the late 1890s was another, more extensive articulation of marginalist economic theory. According to Sklar, the major works on this topic of “investment imperialism” were Conant’s *The United States and the Orient* (1900), and

41 See Alfred Chandler’s *The Visible Hand* and Naomi Lameroux’s *The great merger movement in American business, 1895 – 1904* (Cambridge: Cambridge University Press, 1985). Shifts in the judicial and legislative environment that Sklar outlines in *The Corporate Reconstruction of American Capitalism* were critical as well.

42 American investment imperialism has required not only the establishment of commercial and colonial relations, but a full-scale export of corporate-capitalist property and sociopolitical relations to non-capitalist countries. Sklar summarizes the matter concisely: “It required ‘modernizing’ the host government’s fiscal, budgetary, and taxations systems; the host society’s laws of property and contract along with its judicial administration; the host society’s class structure in the direction of the commoditization of land and the creation of a wage-earning class. […] Investment imperialism required, as well, the tying of the host’s monetary and banking system into the international monetary, banking, and investment system, so that capital, foreign exchange, and repatriation of profits could proceed smoothly and routinely.” Sklar, *Corporate Reconstruction of American Capitalism*, 81.
Paul Samuel Reinsch’s *World Politics* (1900) in the sphere of political science. Conant’s influential economic explanation of the need for “modern capitalist-investment imperialism” (as opposed to older commercial, territorial and settler imperialisms) develops his theories of the business cycle and surplus capital, both of which turn on a marginal utility theory of value. Conant made the case that business cycles were specific to modern industrializing conditions (which combined mass production with rapid transportation and communication and elaborate systems of credit), and were rooted in excess savings, either individually or at the level of corporate investment. Since it was oversavings, or the sitting-idle of surplus capital, that unhinged demand from supply, the sustenance of market equilibrium under “modern” conditions required that surplus capital be put to work. But, because of the law of diminishing returns (i.e. marginal utility), surplus capital could not be expected to yield reasonable profits unless it could be put to work in capital-scarce areas (where its marginal utility and therefore return on investment would be higher). Therefore, Conant’s thinking went, the sphere of enterprise and especially investment opportunity must be extended globally to capital-scarce areas.

In the sense outlined above, Conant (and Reinsch) could be said to have provided public, scientifically “backed” justification for American investment imperialism. Likewise, John Bates Clark and other economists of his generation could be said to have provided an academic “grounding” for the corporate reconstruction of U.S. capitalism and exceptionalism. Indeed, in both Ross’s and Sklar’s accounts, the largely academic development of various implications and applications of the economic idea of marginal

---

43 Ibid., 79-80.
utility suggests as much — and they are not alone in this dimension of their work.44 But the articulatory powers of academic “backing” and “grounding” in the now-mainstream field of neoclassical economics is precisely the question I wish to hold open.

Equilibrium Analysis + the Re-Modeling of Distribution

Professional, academic economics was disciplinized in the late 1880s and 1890s on a particular model of the market. Much as psychology in the U.S. disciplinized its paradigmatic experimental scene and model of cognitive attention, neoclassical economics formalized as its object the administered mass market based on its central analytic category of an ideal price and welfare “equilibrium” in a way that I will set out below. First, however, it may be worth pointing out that, in a manner even more salient than was the case for psychology, the critical context for the disciplinization of economics was its institutional setting. Whereas the social scene of investigation coupled with other demands of methodology and communicability characteristic of a longer tradition of experimental science in the case of early psychological laboratories, economics’ professional fate, investigative techniques and forms of evidence were profoundly shaped by particular exigencies that accompanied the establishment of public

---

higher education in the U.S. As Marion Fourcade-Gourinchas demonstrates in a comparative context, the professionalization of American economics happened extremely fast, in an administrative form of organization that kept economists particularly beholden to conservative business interests (via the external control of the board of trustees), and – most distinctively – in the context of such tremendous and various political controversy that there emerged an a-political “backlash” with enduring consequences. Others have elaborated some of the intellectual and political legacies of this conjunctural fact in the history of U.S. higher education. I am more immediately concerned with how it shaped the discursive domain of that was to become “economics” as we now use the term.

Economic discourse up through the last decade of the nineteenth century had been, as mentioned above, a matter of political, somewhat public debate. As such, early economists (i.e. “political economists”) were a relatively politicized group whose members advocated for particular views of society all along the political spectrum. What characterizes the turn to marginalist analysis (as opposed to the more overtly political

---

45 I’m referring here to the 1862 passage of land grant legislation and the foundation, by philanthropists, of a series of endowed universities. The subsequent growth of public higher education was phenomenal: between 1870 and 1920, the number of students at American universities and colleges quadrupled.


47 The particularly a-political “scientificity” or “scientism” of American social sciences is, for instance, central to Dorothy Ross’s analysis of the role of American exceptionalism in *The Origins of American Social Science*. Christopher Newfield likewise comments on the broad institutionalization of an ideology of de-politicized, supposedly objective “merit” in new universities in ideological conjunction with the even broader institutionalization of Jim Crow laws such that any subsequent discussions of diversifying access to higher education are thought of as compromising a scientific standard of merit. Closely connected are various reflections on positivism; both the kind that dominated at least the methodological declarations of many turn-of-the-century forms of science, and the interwar “logical positivism.” Edward Reed reflects on positivism as a sort of tacit agreement to not talk about causality in *From Soul to Mind*. See also the collection edited by George Steinmetz, *The Politics of Method in the Human Sciences: Positivism and its Epistemological Others*, (Durham: Duke University Press), 2005.
schools of economic thought available at the time such as institutionalism and historicism) is the apparent escape from controversy provided by mathematical method. This sort of scientistic de-politicization of academic endeavors was part of how emerging U.S. research universities secured their cultural authority in a nation that exhibited little respect for intellectual authority as such and had no tradition of either academic guilds (as in Britain) or state-supported university systems (as in France and Germany). In the absence of these traditions American university professors thus relied on professionalization in order to establish their legitimacy.  

In the specific case of economics, mathematicization of method provided disciplinary identity, a standard of competence, and the basis for agreement such that economic discourse was lifted out of the domain of public discourse and ensconced in an expert idiom.

What I would like to point out is that this translation of controversial political issues into a technical idiom was (as all translations are) a transformation. In creating a basis for professional agreement and credentializing, the neoclassical paradigm not only “reframed” the core problem of distribution as technical and economic, it actually staged a whole new scene of investigation and intervention. In the classical tradition of Smith, Ricardo and Mill, value had been defined by labor and distribution was a question of

48 Burton Bledstein, The Culture of Professionalism: The Middle Class and the Development of Higher Education in America, (W.W. Norton and Company, 1976) This professionalizing drive in American social science should be additionally understood in relationship with two broader contexts, first as part of a pervasive methodological conversion from “advocacy” to “objectivity,” and as part of an enduring institutional linkage between U.S. universities, administrative government and business. This linkage operated as mentioned above through the board oversight of trustees as academic knowledge was evaluated for its “usefulness” to society, and in accelerating ways throughout the “Progressive Era” as U.S. government administration capacities became more scientific and expansive, drawing on methods of investigation and forms of knowledge developed in the emerging social sciences. See Mary O. Furner, Advocacy and Objectivity: A Crisis in the Professionalization of American Social Science, 1865-1905, (Lexington: University Press of Kentucky, 1975).
what the classes or factors of production were entitled to or owed. The neoclassical reconceptualization of value under the aegis of utility not only displaced the labor theory of value, it re-formulated distribution as a matter of the satisfaction of consumer demand. In fact, from its inception in the 1870s and popularization in 1890s, throughout the course of the twentieth century neoclassical theory has been above all, a theory of demand.\footnote{Demand theory is the theoretical heart of neoclassical economics. Unlike, say, the theory of market price determination, the characterization of the competitive firm, or the theory of cost and production, demand theory has consistently been the centerpiece of neoclassical theory (originally called marginal utility theory).” Philip Mirowski and D. Wade Hands, Agreement on Demand: Consumer Theory in the Twentieth Century, 3.} Although it has also operated as a meta-theory of value derived from the “law” of diminishing returns with applications and implications at least as diverse as those presented above (i.e. the theorem of “opportunity costs,” theories of the competitive firm and international investment imperialism, and so on), the compelling and characteristic conceptual-discursive innovation of marginalist economics was and remains an image of market operation modeled on the axiomatic assertion that any market agent’s behavior is determined by marginal calculations of optimal utility. Neoclassical theory thus took up and transformed a previously loose set of concepts about “the market” in the tradition of Ricardo and Marx – a set of concepts connected to the city, the factory and agriculture, and narrated as features of social marketplaces — and translated this classical configuration of concepts (i.e. land, labor, rent, population and wealth) into a geometrically conceived, utopic space of demand.

As Mirowski (1989) has demonstrated, this space of demand and the utility functions that constitute it were borrowed term-for-term from the physical models of late-nineteenth-century thermodynamics. In this borrowing, utility replaced energy as the
value concept under which the various problems of economics were consolidated and reconceived. The result has been a model of market operation based in the physical theories and vector calculus of classical thermodynamics. Although he is far from the only one, the best example of this analogical borrowing is American economist Irving Fisher.

Fisher was far and away the most influential pre-WWII economist. Throughout the early twentieth century, he was the most cited economist in the world.  

Fisher’s theories of capital and interest continue to underpin significant portions of contemporary mainstream economics, and a number of theorems bear his name. Most relevant to present purposes is the fact that Fisher also pioneered physical and mathematical modeling techniques for neoclassical economics’ central macroeconomic category of market analysis (equilibrium) that are admired still today as forerunners of computable general equilibrium modeling. Written under the direction of physicist and pioneer of vector calculus Josiah Willard Gibbs, Fisher’s 1891 doctoral dissertation was published the following year as “Mathematical Investigations in the Theory of Value and Prices;” it introduced general equilibrium analysis to American economics with a visually compelling hydraulic model and the kind of formal mathematical clarity associated with Leon Walras and his successors.  

Fisher developed his equilibrium model independently

---


of Walras but the thermodynamic concept of equilibrium enjoyed wide currency at the end of the nineteenth century, so the idea that it should be put to work independently and in multiple fields of knowledge production isn’t particularly striking (in fact, Fisher plainly regarded his model as “the physical analogue of the ideal economic market”). What was innovative, and unique to Fisher’s model was that it both suggested and demonstrated the possibility of further articulating equilibrium analysis by constructing specific numerical models with a relatively large number of commodities and consumers, and then solving for equilibrium across these many dimensions. This level of internal coherence coupled with multi-factorial analytical capabilities across massive data sets have set the standard for subsequent formulations of economic expertise in the American neoclassical tradition (moreso in practice than even the more popular “Walrasian” and Pareto versions of equilibrium analysis). Disciplinary economics would in fact have to wait until early computers and econometric techniques of quantification became available in the 1930s to solve such complex calculations were it not for Fisher’s hydraulic simulation of an “ideal market”.

Fisher reported that he continued to teach using a version of his hydraulic model for twenty-five years (the original was destroyed en route to the Columbian Exhibition in Chicago in 1893); but his influence is not understood to have been transmitted through teaching because he had few students and even fewer disciples. In fact, Fisher’s enduring influence in the field has only really been recovered in the last ten-to-twenty years of economics history writing through reviews of citation trends in the field over the course

of the twentieth century. This previous neglect has been due in part to Fisher’s misplaced optimism leading up to the 1929 stock market crash. His public reputation suffered greatly after 1929, and it was already strained in the eyes of his professional colleagues by his other advocacy projects for social improvement and eugenics (having barely survived a bout with tuberculosis, Fisher was particularly concerned with health; ironically, his best-selling publication was the non-economic text *How to Live* (1915)). Despite his unpopular enthusiasms, Fisher has enjoyed enduring influence in economics because he developed the discipline’s characteristic form of evidence and key methodology – and it turns out that both travel well. He was the first to compose a thorough mathematical representation of constrained optimization calculations (i.e. utility vector functions) aggregated and depicted graphically as a utopic space of equilibrium. In thus modeling markets hydraulically and geometrically, Fisher invented a powerful new technique of economic visualization.

As indicated above, the primary epistemological condition of felicity for marginalism’s spatial representation of markets as an equilibrium field was the mathematical formalization of disciplinary economics’ techniques of intellectual expertise. In the American context in particular, it was the vector mathematics of Fisher’s thesis advisor Gibbs that allowed for the commensuration of all demand in terms of formalized utility functions, which Fisher then represented graphically as “indifference curves.”

It is to my mind remarkable that, over a century later, economists still map indifference curves, conduct analyses of market equilibria, and formulate problems as

---

matters of the constrained optimization of utilities. Also remarkable, if less apparent, is a set of governmental mechanisms arising from this series of enduring expert formulations: the Marginalist’s mathematical commensuration and formal representation of all demand in terms of utilities and equilibrium analysis made consumption into an object of economic discourse and governmental rationality whereas it had previously been “merely” a topic of worry for moralists. I will re-visit the broad shift in American political discourse from a “producerist” perspective that denigrated consumption to a perspective that takes the satisfaction of mass market consumer desires as an administrative task and economic-governmental objective. Taking matters here as they have been presented at the conceptual-discursive level of disciplinary economics, I would first simply highlight the politically resonant fact that a framework of equilibrium analysis meant that, beginning around the turn of the century, the equity of class relations was replaced in economic discourse by the health (or, “welfare”) of the entire system as the normative standard for justifying intervention. Semiotically, this replacement of normative standards was transacted as a transformation in the political-economic meaning of “distribution” (traced textually in many intellectual history accounts as a matter of the influence of John Bates Clark’s Distribution of Wealth (1899)).

Rhetorically, and over the long haul (as measured by citation practices within disciplinary economics and by the policy influence of monetarism, the Federal Reserve, modern finance theory and later, neoliberalism), this transformation in the truth of economic discourse has been formalized, articulated and extended (i.e. made effective) not as a set of moral or political economic arguments about distribution, but rather, as an expert

Homo Economicus

If, as Foucault insists, “the historical root of a science lie[s] in the reciprocal genesis of the subject and object of knowledge;”\(^{56}\) the historical root of economics in its modern sense can be said to consist in this twin emergence in the 1890s of a visual object (equilibrium calculated via vectors of marginal utility) and subject of mathematical expertise (academic economists) that model, and later come to actually perform, a utopic, demand-driven market.\(^{57}\) But these economists are not, to my mind, the only or even the most interesting subjects constituted by this new science of economics. The intelligibility of disciplinary economic discourse consists less in the cadre of economic experts that arises at the end of the nineteenth century (Mitchell is right to note that economists do not begin to hold administrative court until mid-century), than in the consumer subjects of mass markets who are understood and cultivated as the driving force of America’s


\(^{57}\) On the late twentieth-century performativity of markets, see *Do Economists Make Markets? On the Performativity of Economics*, (Princeton and Oxford: Princeton University Press, 2007), edited by Donald MacKenzie, Fabian Muniesa, and Lucia Siu. See also Donald Mackenzie’s earlier study of the emergence of derivatives markets in Chicago in the early 1970s (the Merc and the CBOE), and the subsequent performativity of the “efficient markets hypothesis” specifically and neoclassical finance theory more generally by social actors engaging in tacit arbitrage on these exchanges. On the international development front, see Timothy Mitchell’s “The Work of Economics: How a Discipline Makes its World,” *European Journal of Sociology*, 45 no. 2: 297-320. Here Mitchell examines a Peruvian land titling experiment as an example of how academic economics uses the world as its laboratory.
emerging national marketplace because they are, after all, the arbiters of marginalism’s new conception of value. Before proceeding in the next chapter to take a closer look at the ways in which the attentive capacities of these consumer subjects were addressed, I’ll briefly situate marginal utility vis-à-vis earlier theories of economic behavior as a means of indicating its particular governmental rationality and conceptual-discursive innovation.

According to conventional accounts of the birth of economic science that date its emergence from the 1776 publication of Adam Smith’s *Wealth of Nations*, marginalism’s “subjective theory of value” is yet one more iteration in a long tradition of economic first principles hinging on Smith’s “selfish hypothesis” (i.e. that all human motivation stems from self-interest). Such accounts typically (and understandably) transmute Smith’s theory of interests into marginalism’s generalized and mathematically formalized theory of “utility-maximizing behavior.” A full examination of the mechanisms of this transmutation of interest into marginal utility would take us too far afield, but we can say that the transfer point is generally understood to be some version of philosophical utilitarianism, usually Benthamite.

While it is certainly the case that political and aesthetic debates taking place in Western Europe in the decades around the turn of the eighteenth century put a popular (not only) Smithian paradigm of economic interests into productive, indeed directly sympathetic, ideological and intellectual contact with Bentham’s reformist utilitarian

---

philosophies, and later (post-1830) popular, middle-class extensions thereof, it is by no means clear that this muddle of debates can be said to have issued forth in a coherent first principle undergirding moral philosophical/political economic theories of human behavior and resource allocation. To begin with, Adam Smith’s understanding and presentation of self-interest as an axiomatic of human behavior was enormously complex and shot through with ambivalences about the market traceable to the influence of Rousseau on his thinking.\(^5^9\) However much the paradigm of interests may have influenced statecraft and raison d’Etat theory,\(^6^0\) and indeed become a popular theory of human behavior, it was not a science for the same reasons that psychology was not yet a science; because of a widespread theological and epistemological interdiction against theorizing across the mind-matter divide. It is important to recall that the eighteenth-century empirical subject of interest operated in conjunction with commerce not as a paradigm for representing and intervening in human behavior as such, but primarily as a “doctrine of limitation and wise restraint” aimed at state reason and power.\(^6^1\) “Interested affections” and “passions of interests” operated as epistemological figures of subjectivity through which the regularities of commercial society were defended as “calming,” “refining” and civilizing. In thus positing the benign opacity of economic processes in commercial society, Smith may be understood as having visualized an economic object in


the figure of the “invisible hand;” but the point and effect of this imagery was, after all, to
demonstrate the impossibility of economic sovereignty precisely because interests were
impossible to represent. Marginal utility, on the other hand, provides an epistemological
figure and model of macro- and micro-economic behavior that theorizes the mind-matter
split as an interface across which marginal utility calculations are conducted and
subsequently graphed in aggregate as so many “revealed preferences.” As such, marginal
utility is less an political-economic first principle of self-interest, than a vector of
intervention-by-scientific-representation.62

Though not a contender for the mantle of “first economic science,” philosophical
utilitarianism is another complex and major re-articulation of aesthetics and political
philosophy with a viable claim to having set the conceptual-discursive precedent for
marginal utility. Bentham’s key axiomatic assertion that “it is the greatest happiness of
the greatest number that is the measure of right and wrong”63 was systematically
elaborated (in contrast to Smith’s treatment of interests) and defended as a principle of
social order and felicity. In this sense it is at least easier to characterize and trace as kind
of doctrine and ethical invocation. By Joyce Appleby’s account, the doctrine had
surprisingly little truck in the United States.

Jeremy Bentham’s utilitarian philosophy, which might seem well attuned to
American sensibilities, in fact found little resonance in the United States. The

---

62 In summarizing Foucault’s account, Gordon frames a similar point: “the great departure
here from eighteenth-century precedent is that, whereas homo economicus originally meant the
subject the springs of whose activity must remain forever untouchable by government, man who
is perpetually responsive to modifications in his environment.” Ibid., 43.
well-being of the individual rather than the mass of people was being promoted, and that individual was seen as the material embodiment of moral virtue.  

Appleby’s historical period here is the end of the eighteenth century, but her point about the particularity of U.S. political culture obtains. Benthamite utilitarianism, with its emphasis on the greatest good for the greatest number, ran contrary to Americans’ distinct conception of commercial society as a natural zone of freedom (a conception which reigned until the end of the nineteenth century) wherein the task of good government consists in not interfering with the expressive morality of individual (Protestant) souls. So, while it seems to me entirely sensible to assume that some version of Benthamite utilitarianism made its way over the pond in the nineteenth century with the work of J.S. Mill and as Ricardo began finding an American audience, one must also recognize that whatever ethical charge it might have animated a theory of economic behavior with would have been seriously diminished in encountering the deeply Protestant and individualist assumptions of U.S. political and intellectual culture. As such, an ethically neutralized Benthamite utilitarianism cannot be said to have conducted either the object (an equilibrating market) or the subject of a science of economics. In addition to having no facility with the new sociotechnical language of the mathematicized market, utilitarianism just plain wouldn’t fly as a rationale of pastoral government in a nation of individualists — at least, not in advance of the broad, post-Civil War transformations in American political and intellectual culture.

---


65 Ibid., 121-123.
Chapter III.
A New Model of Polity + Citizenship

The new sciences of experimental psychology and economics that emerged in the final decades of the nineteenth century have achieved enduring influence as theories of micro and macro cognition in the long twentieth century because they furnished the conceptual vocabularies for a new model of polity and citizenship to a political culture\(^1\) in extraordinary flux. Historical studies looking into this flux of the Gilded Age and Progressive Era have agreed on two defining features: First, what emerges is a “new,” “modern” or “revised” liberalism\(^2\)—in any case an altered, Americanized liberalism that

\(^1\) Political culture is a concept directly descended from World War II analyses of national character, which were often conducted in parallel with development discourse with the objective of delineating a national personality profile. Critically, one might locate limitations to the concept’s analytical effectiveness in this psychological orientation and questionable political nexus (i.e. postwar development discourse). This seems fair as far as it goes. Political culture retains its usefulness for me here as a multi-disciplinary approach to the question of nation-building which accommodates a complex analysis of whole political systems conducted at the intersections of micro-analyses of everyday life and macro-analyses of societies and social structures. It is at these intersections that one can discern shifting frameworks for political change that are unique to an emerging national culture.

remains with us; And second, that the operative political questions in the decades surrounding the turn of the twentieth century were “the labor question” and “the monopoly (or Trust) question”. These questions of labor and capital concentration are, by contrast, understood by many to have been ideologically encrypted in the new dispensation of liberalism in a way that has since rendered the problem of class politically impossible to engage in any way that matters. In these historical studies there is some range in who does the encrypting and in what language: professionalizing social scientists demonstrating their scientific objectivity, Progressivist reformers preaching social amelioration through democratic revival of “the people,” Gilded Age intellectuals advocating for the education of “economic man,” economists discerning an ideologically motivated “law of marginal utility,” or corporate liberals stimulating “effective demand” in an administered market. What identifies this diverse grouping of agents and discourses as specifically liberal is a shared conceptual move: all posit a figure of harmonious equilibrium wherein divergent interests can reach an accord and that figure is loosely understood to be a re-instated (if somewhat re-vamped) competitive market. What makes this liberalism new is the philosophy of an administrative, general welfare state that accompanies it (in contrast to previous laissez faire theories of state non-intervention)


and in turn, a model of citizenship and language of political obligation based not on property or the nexus of production and property, but on consumption. And herein lies what I have termed the encryption: the “education” of economic man is understood to have been posited around the turn of the twentieth century as the solvent of social conflict in general, and of popular producerist partisanship in particular. As a result, from around 1890 forward, the political framework of the U.S. is peculiarly unable to “think” class.

The above-outlined rubric for understanding the turn of the twentieth century and its “new liberal” wake does a fine job diagnosing the decline of a populist-producerist politics of (white male) class, but such a diagnosis also entails what is, to my mind, a tendential misconception of the “educational” techniques and public culture of scientific objectivity that developed between the end of the Civil War and the interwar years. While I agree that the Progressivist values of efficiency and scientific objectivity that were variously instituted around the turn of the century were liberal and economistic in their assumptions and rationality, the reforms undertaken were not necessarily therein antidemocratic or de-politicizing. Insofar as many of these “educational” techniques and scientific culture continue to characterize the procedures of socialization and accumulation underwriting American political culture in the long twentieth century, they hold critical and wide-ranging relevance for any understanding of U.S. hegemony.

Therefore, and without wishing to discount the established nineteenth-century history of a

---


In what is otherwise a lament for the decline of nineteenth-century popular politics, Robert Wiebe’s Self-Rule: A Cultural History of American Democracy (Chicago: University of Chicago Press, 1995), presents that political culture as a “democracy of white men defined against white women and people of color.” (16)
once-strong producerist movement and its attendant culture of a partisan species of participatory politics (that was genuinely democratic in its way, if significantly limited to white men), I find it necessary to put some pressure on this narrative of a fallen public sphere de-politicized by the corporate, reformist or scientific encryption of class in a new liberal ideology.6

Here is my counter-proposition: What if this “new” American liberalism was not ‘merely’ a scientifically updated ideological consensus, but the emergence of a distinct political culture in the anthropological sense of the term? Political culture not as a ground or unified cultural field, but first of all a historical emergence and making visible of “the political”7 precisely because the various crises that rocked post-Civil War U.S. made apparent the contingent nature, and inadequate governmental capabilities of the previously reigning institutions and conceptions of social, political and economic order.

While it is very likely the case that the two generations of public intellectuals, liberal reformers and social scientists “collaborated”8 to lead a reconfiguration postbellum U.S. political culture in response to the perceived threats of universal male

---


7 I mean “the political” in the “post-Marxist” sense of Chantal Mouffe as that which shows the contingent nature of all structuring principles. See Chantal Mouffe, The Return of the Political, (London: Verso, 1993).

8 This phrase is Nancy Cohen’s, from The Reconstruction of American Liberalism, 1865-1914.
suffrage, urban political corruption and an increasingly organized and agitating laboring class, it is also the case that these intellectuals, reformers and scientists were responding to a more disparate and global set of transformations in public and intellectual life in the decades around the turn of the twentieth century. From the perspective of national party politics for instance, the middle class “collaboration” with corporate interests of an emergent Northern industrial capitalist class around the turn of the twentieth century was but one belated facet of the larger political transition that took place from the late 1850s through the Reconstruction to enable the emergence of American corporate capitalism. With the rapid growth of railroads and their attendant supply industries (especially iron and steel), the mechanization of farms (with McCormick’s reapers and plows), and the attendant increase in both economies of scale and fixed capital investment, a new alignment of interests emerged on the national scene. The objective of this new alignment was plain: they advocated for and won the infrastructural build-out and expansion of a domestic market at the expense of the Atlantic trade system. (It is worth noting here that the Atlantic trade system was central to the then-declining British “Free Trade” regime of accumulation in addition to being the last vital common interest conjoining Northern merchants and Southern slaveholders.)

With the rise of the Republican Party in the 1850s this new political alignment passed into law a series of programs conducive to the construction of a national industrial

9 On the importance of this political realignment to the emergence of corporate capitalism, see Robert Schneirov, “Thoughts of Periodizing the Gilded Age: Capital, Accumulation, Society, and Politics, 1873-1898” (July 2006).
apparatus of accumulation. Whatever can be said to have caused Southern states to secede, the fact that industrial manufacturing, railroad, and later corporate capitalist interests were able to effectively institutionalize conditions so favorable to an epochal transformation of the country’s economic, political and cultural infrastructure depended critically on the power vacuum left by that departure: the secession of Southern slaveholding states from the national government was an historically unprecedented relinquishment of power resulting in a political reconfiguration across class lines. Thus it might be conjectured that the as-yet unprecedented emergence and prompt defeat of radical third parties representing populist, socialist and producerist interests on the national scene near the end of the nineteenth century owes less to a reactionary middle class collaboration with new corporate capitalist interests and their collective elaboration of a “new liberal” ideology of the market than to the anomalous situation of Southern secession followed by a series of national re-alignments that were as much about race, regional interests, and pragmatic cross-class coalitions as about containing the threat of populist and producerist politics.

None of this is to say that the “new liberalism” was unimportant as a form of political reason. On the contrary, the several shifts in perspective and practice that accompanied the above-outlined realignment amount to nothing less than the emergence

10 These included: land grants to railroads, federal aid to higher education, protective tariffs, and a national banking system. Also important to the corporate capitalist transformation were the use of greenbacks to finance the war and the federal retirement of war-time debt: the first inflated the currency and ended up wiping out the pre-war debt of Northern manufacturers to wholesale merchants, while the second effected a transference of debt from Northern merchants and banking elite to emergent industrialists. Taken collectively, these governmental actions capacitated a transformation of the U.S. economy from a previously mixed small-producer/agricultural economy to a corporate one by building out infrastructure, protecting a national market, and transferring wealth to Northern industrialists who in turn invested in large-scale manufacturing. , 204.
of a new governmental rationality, regime of accumulation and political culture in the decades around the turn of the twentieth century. Beyond understanding “new liberalism” as something more complex than a scientifically updated ideology of the market, the difference in my presentation of all three elements of the emergence of U.S. hegemony consists in attempting to integrate into my account some of the long-reaching politico-epistemological ramifications of the changes in techno-scientific representational practice and strategy in the decades around the twentieth century. It is my contention that we cannot apprehend either the mass market polity or the consumerist/scientific forms of citizenship that together characterize the long twentieth century without such an integration because what is at stake with techno-science and its ideal of objectivity in the twentieth century is a new way of thinking about public practice and the common good.

The “Market Republic”: Truth Techniques, Public Goods
+ the New Liberal Objectivity

In the previous chapter I outlined a shift in thinking about “the market” accomplished by theorists of marginal utility in general and more specifically by Irving Fisher’s mathematical visualization of utility as a vector function in utopic, geometric field-space. The utopic, “view-from-nowhere” market perspective formalized by marginalists as the social-scientific embodiment of economic objectivity gained currency as the new rational political framework of an emerging hegemonic regime of
accumulation for sociopolitical reasons outlined in the previous chapter and because it
named an increasingly interconnected national market that was in fact coming into being
in a way that changed everyday life. The transformations that accompanied the
emergence of a predominantly capitalist U.S. marketplace around the turn of the
century are legion in number and epochal in nature. I’ll endeavor therefore to limit my
discussion to those changes that depended centrally on the new communication
technologies and infrastructure of the period. Most dramatic among these were of course
the invention of wireless telegraphy (1887/1894), the telephone (1876), and the
effective contraction and de-facto standardization of public time and space
accomplished by national railroad networks — all three developments enabled a faster
rhythm of communication and thus new social temporalities. Equally central to the
infrastructural build-out of an increasingly interconnected national marketplace however,

---

11 Notwithstanding the postwar consensus historian’s tendency to find capitalism and liberal
political theory everywhere, there seems to have lately emerged a new consensus that the U.S.
national economy was not in fact predominantly organized around market-based accumulation at-
a-distance (my Latourian definition), or characterized primarily by a social relation of wage-labor
(more standard Marxist definition) until around 1870. See Alan Kulikoff, “The Transition to
Capitalism in Rural America,” William & Mary Quarterly 46 (January 1998), 120-144; and
Schneirov (July 2006). It might be said that the U.S. mode of production was, however, capitalist
insofar as it participated in the British Free Trade regime of accumulation. This participation was
that of a colonial outpost providing raw materials and a secondary or even tertiary market outlet,
which is not the same thing as a market society or national industrial apparatus.

12 Beniger, The Control Revolution, 245.

13 As measured by census data, the diffusion of telephones after 1880 was rapid: from 3,000
telephones in 1876 (1 phone per 10,000 persons) to 54,000 by 1880, tripling in the next four
years, and then nearly doubling to 266,000 phones (4 phones per 1,000) by the time the bell
patent expires in 1893. By 1900 the number of phones reported was 1,356,000 (17.6 phones per
1,000). Carolyn Marvin, When Old Technologies Were New: Thinking About Electronic
Communication in the Late Nineteenth Century (Oxford: Oxford Univeristy Press, 1988), 64.

14 Railroads began imposing four standardized time zones on November 18, 1883, the U.S.
government did not official recognize such a standardization until 1915. This rationalization of
time depended in turn on simultaneous communication capabilities of wireless telegraphy.
Stephen Kern, The Culture of Time and Space, 1880 - 1918 (Cambridge: Harvard University
were the typewriter, a mass-circulation print culture, and the related conceptual schemas of “aperspectival” and “mechanistic” objectivity that came to the dominate representational practices and strategies of all kinds of “science” around the turn of the century. Each of the diverse institutional sites wherein these communication technologies were put into practice retains a kind of disciplinary autonomy (ad campaigns are not electoral reforms are not managerial systems and so on), but all share in an epistemological context defined by increased interdependence and a related crisis of authority aptly described by Thomas Haskell as changes in “the conditions of adequate explanation.”

Haskell’s account of these changes in “the conditions of adequate explanation” center on the emergence of indirect and multiple causalities as explanations for things like poverty (versus earlier character-based explanations), and I’ll return to this point. First, however, I would connect the general thrust of his account with others. Historians of Progressivist social science like Haskell and Dorothy Ross don’t necessarily use this language, but their accounts of the emergence of social science and its particular species of American scientificity couple with other evidence of the period to describe an epistemic shift in the last few decades of the nineteenth century from what was basically a Platonist or classical conceptualization wherein Truth is defined as a matter of adequate representation or fidelity, to a cognitivist conception of “modernist” truth as a matter of

---


16 Literature on the late-nineteenth-century destabilization of collective faith in traditionally defined, transcendentally conceived, conceptions of scientific and religious Truth (i.e. their “Unity”), is too vast to survey here. For a sampling, see: Burrow, *The Crisis of Reason*; Herbert,
progressively mastering the experimental procedures that allow a methodologically trained kind of scientific attention to accumulate useful “public knowledge.” Primary textual evidence of this shift range from the turn-of-the-century vogue in theories of science — especially the trans-Atlantic popularity in intellectual circles of Brit Karl Pearson’s *Grammar of Science* (1892) — to the pragmatist turn in American philosophy. Institutionally, the shift is traceable as the emergence of a new culture of learning and laboratory research in modern American universities and in the peer review practices of increasingly prevalent (especially economic) professional journals that displaced previous religious monthlies and middle-class journals and quarterlies. In histories of higher education in the U.S. this shift is also documented as a series of decisions around curriculum and student life that amount to a movement of the university’s public purpose away from the explicitly religious moral training of students.

---


I take this phrasing of a specifically “modernist” reconstruction of truth on cognitivist grounds from the introduction of Dorothy Ross’s edited collection *Modernist Impulses in the Human Science, 1870-1930* (Baltimore: Johns Hopkins University Press, 1994). Ross identifies a critical movement of cognitive modernism arising from “the turn-of-the-century recognition of the subjectivity of perception and cognition,” and understands this broad cognitivist critique of previous bases of Truth as underwriting and in many ways driving, the more commonly recognized cultural constellation of “Modernism” (i.e. *aesthetic modernism*) vis-à-vis the epistemological and institutional establishment of the new social sciences. (2, 8-9)

On the popularity of Karl Pearson’s *Grammar of Science,* see Herbert, *Victorian Relativity,* chapter 4; and Reuben, *The Making of the University,* pp. 151 - 152.

According to Nancy Cohen, “Economic discoveries were tested and codified in new professional journals, such as the *Political Science Quarterly,* the *Quarterly Journal of Economics,* and those of the AEA, which superseded the religious monthlies and middle-class journals and quarterlies as the place where serious intellectual dialogue would be convened. Cohen, *The Reconstruction of American Liberalism,* 179
and towards the production of objective and useful public knowledge. Likewise, intellectual and social histories of the period mark a broad and precipitous decline in the reputation of Protestant theology that is paralleled in inverse fashion by an unprecedented increase in prominence for economic and social sciences of the market as a scene of culturally mediated self-expression and freedom. In every instance, as I present them below, an experimentally defined model of cognitive attention organizes attempts to specify how the reliability of objectivity in this new, scientifically administered market polity can be guaranteed.

Karl Pearson’s theory of science, for instance, is as much a model of citizenship as an epistemology. Grammar of Science begins with Pearson holding “the scientific man” up as the “ideal citizen” because he is able to form an independent “judgment free from personal bias.” A few lines later in this introductory section (entitled “Science and Citizenship”) he states directly that the scientific “frame of mind seems to [him] an

---


22 Pearson, Grammar of Science, 6.
essential of good citizenship.” Pearson’s subsequent publications, while not as popular, likewise indicate that an ideal ethos of public practice was explicitly at stake in the turn-of-the-century conversation concerning philosophy of science (titles include, for instance, *The Ethic of Freethought* (1888) and *National Life from the Standpoint of Science* (1901)). More central to his epistemological and philosophical arguments in *Grammar*, however, is Pearson’s reconceptualization of scientific law as descriptive rather than metaphysical or ontological. In contradistinction to an older idea of scientific law as divinely ordained and operating independently of human interference, Pearson argued for scientific law as formulaic shorthand for an otherwise too massive accumulation of human experience. “We are thus to understand by a law in science, *i.e.* by a ‘law of nature’, a *résusmé* in mental shorthand, which replaces for us a lengthy description of a sequence of sense impressions. Law in the scientific sense is thus essentially a product of the human mind and has no meaning apart from man. It owes its existence to the creative power of his intellect.”

The American philosophy of pragmatism developed by Charles Sanders Pierce, William James and John Dewey from the 1860s forward works from a similar reconceptualization of scientific knowledge as the collectively elaborated product of humanity’s cognitive interactions with the world in explicit opposition to older “dogmatic” and “absolutistic” conceptions of Truth as pre-ordained and unchanging.

---

23 Ibid., 7.
24 Especially in the nineteenth century, natural theology was the predominant disciplinary paradigm uniting religion and science as coordinating paradigms of Truth.
26 See Louis Menand’s *The Metaphysical Club: A Story of Ideas in America* (New York: Farrar, Straus, & Giroux, 2001) for background on the development and popularization of
The impact of Darwinian evolution on pragmatist thought is well known and, according to Dewey’s popular essay “The Influence of Darwinism on Philosophy” this impact stems specifically from the way in which his theory of natural selection overturned Platonist “assumption[s] of the superiority of the fixed and final; [which] rested [in turn] upon treating change and origin as signs of defect and unreality.” Insofar as Darwin de-authorized transcendental and theological philosophies of nature and knowledge, Dewey finds his impact to have been simultaneously so profound and so expansive in scope that it “introduced a mode of thinking that in the end was bound to transform the logic of knowledge, and hence the treatment of morals, politics, and religion.” This sweeping evolutionary transformation in the “logic of knowledge” was most evident at the institutional level in the changed culture and practices of higher education in the postbellum U.S., and it is no accident that American pragmatist philosophers were (with the partial exception of C.S. Peirce) successful academics. Pragmatist’s interests were pragmatism as a distinctively American school of thought. For an account of the formation of professional American philosophy that places pragmatism’s communal theories of truth and encounters with late nineteenth-century science as central developments, see Daniel J.Wilson, Science, Community, and the Transformation of American Philosophy, 1860 - 1930 (Chicago: Chicago University Press, 1990).

27 This short essay was first delivered as a public lecture at Columbia University in the winter and spring of 1909, then reprinted in the Popular Science Monthly in July 1909, and then in book form as the title essay in The Influence of Darwin on Philosophy: And Other Essays in Contemporary Thought, (Bloomington: Indiana Press, 1910). In another book published the same year, How We Think (1910), Dewey expands on the themes presented above: “Understood in terms of Darwinian theory, scientific discovery is less the uncovering of a priori order everywhere the same, waiting for eternity to be found out, and more invention by man of diverse devices, material, linguistic, symbolic, with which to accomplish the most specific, the simplest, the most economical, the most convenient and elegant solution of the problems his experience presents him with.”

28 Ibid., 1.

29 Ibid., 2. William James notes the same effect of evolutionary theory in his essay “Humanism and Truth,” “up to about 1850 almost everyone believed that sciences expressed truths that were exact copies of a definite code of non-human reality.” in The Meaning of Truth: A Sequel to “Pragmatism” [1909], collected in William James: The Essential Writings, ed. Bruce W. Wilshire, (New York: SUNY Press, 1984), 263.
also, however, characteristically broad and in contact with both intellectual and political trends reaching beyond the walls of academe.\textsuperscript{30} Their codification of something as expansive as a new “logic of knowledge” around the turn of the century might thus be better understood in historical terms as indicative of an epistemic shift moreso than a particular “school” of philosophy.

Academics who were not philosophers of knowledge and thinking people who were not professional academics likewise experienced a cognate shift in the conditions of what counts as truth vis-à-vis two tightly related transitions in the meaning of the word “objectivity” in the late nineteenth century. Lorraine Daston documents a history of objectivity in its different modes from its emergence as an ontological or metaphysical claim made by theologians and aesthetic philosophers in early eighteenth century Britain and Western Europe, through a related-but-distinct Kantian mode of objectivity concerning epistemology in a transcendental vein,\textsuperscript{31} to the trans-Atlantic, late nineteenth-century and early twentieth-century emergence of a more compounded conception of specifically \textit{scientific objectivity} that is simultaneously moral, metaphysical and

\begin{itemize}
\item \textsuperscript{30} A germane example: Dewey in education and James in psychology (with both fields being broadly conceived) were both also explicitly in conversation with the problematic of cognitive attention that was, by 1890, measured, tested, and formalized in psychological laboratories of the day. It should be noted, however, that the pragmatist conception of knowledge directly complicates the experimental model of attention as a formalized and functional capacity precisely because it offers a naturalistic and experientially “thick” account of cognition-as-interaction. Influenced by Alexander Bain’s conception of belief as “preparedness to act,” which in turn defines bodily-cognitive attention as sensation linked inextricably with effort and movement (versus the then emerging conception of sensation as “sensory force”). It bears noting here that, precisely because of this interactionist theory of truth and cognition, Pragmatists located the locus of order for a democratic polity in the creative and collective cognitive abilities of individual citizens.
\item \textsuperscript{31} Interestingly, Daston finds that it was Coleridge who re-introduced the term ‘objectivity’ into English philosophical usage in 1817 in a way that crystallized and added moral valences to the opposition between objective and subjective, and that he did so based upon a “creative misunderstanding of Kant.” (1992, 602)
\end{itemize}
methodological. Scientific objectivity becomes a guarantee in the final decades of the nineteenth century primarily by virtue of increasingly institutionalized and widely publicized scientific methodologies of observation and representation that are subsequently adopted as ideals for the re/production of all public forms of knowledge, and the cultivation of a more generalized ethos of objective or independent (as opposed to subjective or partisan) public practice.

Around 1870, along with the rise in scientific ideals and practices based on laboratory research and the international circulation of highly communicable results, and the increased use of mechanically re/produced visual images, “aperspectival” and “mechanical” objectivity became moralized modes of scientific representation and address charged with guaranteeing empirical reliability across the growing distances and multiplication of professional contacts that were then re-organizing scientific life (e.g. via well-staffed labs, professional societies, international committee gatherings, and so on). As the scale and organization of scientific knowledge production became more complex, and more reliant upon growing communication infrastructures, the bonds of science could no longer be premised upon friendship and codes of gentlemanly conduct as they had been previously. Perhaps more to the point, people from different (not necessarily scientifically trained) backgrounds were being addressed as interlocutors both through journal and popular scientific periodical publication, as the ideal of “public knowledge”

---

(i.e. widely communicable and replicable results) became the new horizon of scientific research.  

“Aperspectival” and “mechanical” objectivity were not used rhetorically as honorific terms, but rather performed as rites through scientific observation and visualization techniques. As Daston presents it, the essence of “aperspectival” objectivity is an ethos of scientific observation and reporting concerned with the elimination of interpretive idiosyncrasies in order to facilitate the wide communication, comparison and accumulation of results for purposes of public knowledge. “Aperspectival” objectivity is recognizable today as the trope of scientific humility and self-discipline/-abnegation that continues to underpin scientistic conceptions of “objective truth” as opposed to “merely subjective opinion.” Arising with the proliferation of photographic evidence in medical atlases after 1870, “mechanical” objectivity likewise effected a transformation that remains with us. By forbidding interpretation in picturing or reporting scientific results, it shifts the burden of representation from the picture itself (where it was as recently as the early nineteenth century) to the audience. And “[t]his,” says Daston, “is the essential point. […] The psychology of pattern recognition replaced the metaphysical claims of the author.” Ideals of scientific objectivity were thus, at least as the level of representational strategy and practice, simultaneously concerned with the socialization of

---

34 Previously, scientific image-making techniques guaranteed their truth to nature via unabashed depiction of a typical or ideal type (fuzzy outlines were cleaned up, depictions of a specimen would more often be an amalgamation or composite than the reproduction of any one in particular).
increasingly institutionalized scientific observation and representation, the *conscription* of audiences convinced of their visually literal observation of scientific representations, and the *accumulation* of widely communicable “public knowledge” — all socialization and accumulation procedures functioned simultaneously to articulate and stabilize the historically specific modes of scientific objectivity invoked by so many as the “chief guarantee of an optimistic belief in progress” around the turn of the twentieth century.\(^{36}\)

With the guarantee of liberal progress authorized by scientific objectivity being thus bound up specifically in procedure or method rather than ontological or metaphysical Truth claims, it might seem that the necessarily universalizing claims of an ascending hegemonic political culture and regime of accumulation would have moved pretty far out of reach. As noted by Daston and others, however, this late nineteenth-century species of scientific methodology (both as an ideal of citizenship and of investigative and representational practice) was simultaneously moral and metaphysical in scope — positivist disavowals notwithstanding.\(^{37}\) It is important to understand that this shift in knowledge practices was not a matter of straightforward “secularization” ("methodological"\(^{38}\) or other) as so many accounts presume, but rather a conjoining of

---

\(^{36}\) This phrase comes from J.R. Burrow’s *Crisis of Reason*: “Science was […] at the popular level the chief guarantee of an optimistic belief in progress, while, on the other hand, the intellectual authority of the churches has perceptibly diminished by the end of the century.” (59)

\(^{37}\) With the rise of positivist theories of science “metaphysics” became a term of derision against which positivist theorists of science like Karl Pearson defined themselves. See Reed, *From Soul to Mind*, for an account of the historically sedimented meanings of metaphysics, especially in connection with late-nineteenth-century positivism.

\(^{38}\) Marsden characterizes the late nineteenth-century decline of Protestant belief in U.S. higher education as a period of “methodological secularization” in which scientific techniques, professional independence, specialization and other changes in scholarly practice were not aimed specifically at discrediting religion, but rather at improving scholarship and meeting the needs of an increasingly technological modernity. In his account “ideological secularism” follows on...
previously distinct technologies of government under the telos and form of reason of a new rationality. In his lectures on the “genealogy of the state” Foucault distinguishes between the Christian pastorate as a spiritual government of souls oriented towards salvation in another world and state reason as a political government of men oriented towards securing welfare in this world. By these terms, the governmental rationality of scientifically objective public practice that emerges with the new communication technologies of U.S. corporate capitalism is simultaneously political and spiritual in its specification of the market as a domain of order-via-welfare-equilibrium and salvation-via-market behavior.

The principle and history of a simultaneously transcendental and secular welfare state that stands outside society to secure the republic from stresses and guarantee progress by dispelling antagonisms amongst citizen groups or classes, and its attendant mode of legitimating regulatory state intervention are by now sufficiently theorized and documented\(^\text{39}\) that my treatment of them here will be limited to making three points:

\(^{39}\) For a good theoretical presentation of the welfare state as a problematic concerning the “governability of democracy” that emerges in the second half of the nineteenth century, see Jacques Donzelot’s “The mobilization of society,” in *The Foucault Effect: Studies in Governmentality*, 169 - 180. For an important alternative account of welfare in the U.S. that dates its emergence with relief programs in the Great Depression of the 1930s and interprets welfare as a social mechanism by which the poor are socially regulated during crises and the working classes are kept in line during times of affluence, see Frances Fox Piven & Richard A. Cloward’s *Regulating the Poor: The Functions of Public Welfare*, (New York: Vantage Books, 1971). Subsequent studies that date the emergence of a welfare state apparatus (specifically social policies of public provision and scientific charity) in the U.S. earlier than the 1930s find it in the decades following the civil war. Most important among these is Theda Skocpol’s *Protecting Mothers and Soldiers: The Political Origins of Social Policy in United States* (Cambridge: Harvard University Press, 1992). Social histories of welfare in the U.S. marking the same historical moment of institutional/scientific emergence include: Walter I. Trattner’s *From Poor Law to Welfare State: A History of Social Welfare in America* (New York: Free Press, 1974) and "methodological secularism” and something like the loose theology of liberal Protestantism. Marsden, *The Soul of the American University*. 
First, the scientific discourse of public welfare conceived as an optimal equilibrium that gains currency with the institutionalization of disciplinary neoclassical economics and Progressivist reform movements is distinguished by its assumption that it is the objectivity of the specifically geometric (“view-from-nowhere”) market that forms the telos of governmental action;\(^\text{40}\) Second, it was this market-based political framework of welfare (along with postwar discourses of development) that, at least until the 1980s, epistemologically grounded the U.S.’s hegemonic claims to global governmental competence in the long twentieth century;\(^\text{41}\) And finally, the day-to-day metric of citizen welfare has been, over this same period, keyed to one’s capacity to exercise “free (consumer) choice.”\(^\text{42}\) With the marginalist’s formal commensuration of all demand and

---

\(^\text{40}\) This proposition of a mathematically formalized “welfare optimum” or (in Vilfredo Pareto’s neologism) “ophelimity,” is understood by many to be the most important theorem of neoclassical economics: It states that “in a world of strictly private goods, general equilibrium of a perfectly competitive economy defines a welfare optimum — in the sense that it is impossible to make any individual better off without making another worse off as the individuals perceive their own welfare.” Waterman, *Political Economy and Christian Theology since the Enlightenment*, 234.

\(^\text{41}\) Arrighi, *The Long Twentieth Century*.

\(^\text{42}\) Concretely, this “key” is a consumer price index - a metric for which Irving Fisher is also known as an originator and populizer, and which still figures prominently in economic calculations designed to inform governmental policy and to provide the public with a sense of the “health of the economy.” (Fisher was the first U.S. economist to begin collecting this index data and to assert its analytical important in the context of his theories of money and interest. Tobin, “Irving Fisher, 1867-1947,” 20.

Also bound up in this indexical relationship between consumption capacity and twentieth-century U.S. conceptions public welfare are, a whole set of arguments around, and ideological implications attached to cold war ideas of “the American way of life.” Social movements of various sorts likewise articulated demands in terms of freedom to consume, two predominant ones were labor and “consumerists,” or consumer-rights advocates. On labor, see Glickman *A Living Wage: American Workers and the Making of Consumer Society*, (Ithaca; Cornell University Press, 1997). Consumerist movements are typically understood to have emerged in the Progressive Era as citizens first began organizing themselves as consumers for political and regulatory reform such as the Pure Food and Drug Act of 1906. After an interwar hiatus, the 1927 publication of *Your Money’s Worth: A Study in the Waste of the Consumer’s*...
mathematical modeling of an ideal price and welfare equilibrium as the normative framework justifying governmental intervention, American political discourse took up the figure of the mass market as its telos and rationality — indeed as its model of polity — as never before. In the first two centuries of U.S. political culture, commercial society was conceptualized (in a distinctly American liberal sense) as a “natural zone of freedom,” but with the emergence of the political idea of market-based welfare equilibrium, that transactional marketplace of freedom transitions from its previous incarnation as a zone of possible contractual agreement between individual, patriarchal proprietors, to a geometric (later to become geospatial) representation of the putatively universal, public good.\(^\text{43}\)

Encoded in this same set of economistic political discourses of welfare in the U.S. Market Republic have been a strange series of religious secularizations operating not only conceptually through the syntactical substitution of “the economy” for a previously theologically conceived Nature as the predominant rational framework,\(^\text{44}\) but more mundanely via mainstream Protestant churches encouraging their members to engage in the commercialized amusements offered by an emerging mass media culture. Like the confession before it, the “discipline of amusement” that has come to characterize social life in twentieth-century consumer society was taken up explicitly as a technique for

---

\(^{43}\) Appleby, *Liberalism and Republicanism in the Historical Imagination*, 121-123; Mitchell, “Economists and the Economy in the Twentieth Century.”

\(^{44}\) See my discussion and footnotes in the first four pages of chapter two for sources on this syntactical substitution of rational frameworks.
saving Christian souls by liberal Protestant churches around the end of the nineteenth century. Stepping away from their previous condemnation of theatre and other commercial amusements, mainstream churches began to see “public amusements” as not only unavoidable and in need of moral policing, but more importantly as an opportunity for shaping individual behavior through social salvation. Consequently, mainstream, increasingly liberal preachers and social gospel ministers, both within the Progressivist movement and without, began speaking to their congregations and writing to their audiences about how “the community ought to recognize this realm of amusement as belonging to them, and ought to enter in and take possession.” It was in this spirit that congregations and reform groups organized events like that of the People’s Tabernacle and the Educational Bureau of Cleveland’s Saturday series of evening amusement and education programs. For ten consecutive Saturday evenings, over 4,000 “working people” gathered in the Tabernacle’s hall to enjoy a precisely timed “fourfold intellectual treat.” The program began at 6:45 with an orchestral concert, culminating in a rousing national hymn, followed by a 30-minute “lecture- prelude” on “some scientific or practical subject,” and then “singing school” until, at 8:00 on the dot came another lecture or staged debate (on Free Trade vs. Tariffs, or Women and the Vote, for instance) which lasted until 9:30 precisely. In contrast to the rowdiness of earlier and more common pop

45 Fox, “The Discipline of Amusement,” 83-98.
46 Liberal and its adjectival form ‘liberality’ (i.e. not political liberalism) were terms used increasingly throughout the nineteenth century in the U.S. by Protestant churches and the public to distinguish themselves from (in their view stodgy) conservative or traditional Puritan denominations and churches.
48 Ibidbid., 95.
cultural entertainments, crowds in these events were expected to keep their seats and observe the disciplined decorum of church on Sunday in order to receive the new liturgy of education and amusement.

While I would not make the case that these church-sponsored events in particular were responsible for disciplining an emerging culture of twentieth-century commercialized amusement and leisure in the right kind of (quiet, non-foot-stomping, seated) passive attention-paying, what is significant about the programs, the sanction they signaled, the religious social space and interaction rituals they reproduced, and the more broadly influential Protestant “preaching of a discipline of amusement” wherein Christians “were called to accept a new regime of enjoyment,” is the religious nature of this orientation to the secular world. Richard Wrightman Fox names the phenomena a paradox of “religious secularization,” and makes the claim that it was precisely because American culture was so religious that various secular schemes of social salvation could take hold.

In another article, Fox further explains religious secularization in terms of broader late-nineteenth-century contexts of Progressivism and related shifts in intellectual culture.

---

49 See Lawrence Levine, *Highbrow Lowbrow: The Emergence of Cultural Hierarchy in America* (Cambridge: Harvard University Press, 1988) for an account of both the undisciplined nature of nineteenth-century American popular culture, and the processes by which culture was rendered hierarchical and sacred.

50 I take this phrase “interaction rituals” from Randall Phillips who in turn adopts it from Erving Goffman’s 1967 treatment. Interaction rituals take as their archetype religious rituals but are a ubiquitous feature of social life “which bind members into a moral community, and which create symbols that act as lenses through which members view their world, and as codes by which they communicate.” *Sociology of Philosophies*, 21 - 22.

51 Fox, “Discipline of Amusement,” 86.

52 Ibid., 85.
away from a transcendentally conceived, theological Truth as a process of
“immanentization”:

The merger of religion and secularism in the progressive era was not so much the joining of two distinct institutional or intellectual forces, but a deepening of “immanentization” — for want of a better word to describe the abandonment of a God conceived primarily as a transcendent judge and the embrace of the world itself as a prime locus of salvation. 53

Here I would counter any tendential implications of a total “immanentization” by recalling my earlier argument that, around the same time, the “economy” becomes what Derrida would call an “onto-theological” ground or transcendental horizon of political and scientific discourse alike with the intellectual popularization of marginalist visualizations of the market as a utopic plane of welfare equilibrium in the 1890s. All the same, Fox’s account of religious culture offers necessary complication to the notion of outright commercial or scientific secularization around the turn of the century precisely because he describes the reorientation (rather than obsolescence) of pastoral techniques and discourses of salvation in a national culture that remains, to this day, extraordinarily religious about its market culture and forms of amusement. The idea of “religious secularization” thus provides important and critically neglected context for understanding how a deeply religious political culture could come ‘round to taking up the market as its primary social institution and apparatus of governmental security and salvation in the world.

Religious secularization; the conceptual-discursive invention of an economistic welfare equilibrium as the normative political framework-for-intervention; the emergence

of specifically “scientific” species of objectivity and specifically objective public knowledge as ideals regulating public discourse; and a host of intellectual challenges to previously “onto-theological,” transcendental, and Platonist conceptions of Truth — all are operative politico-epistemological contexts for the discursive formation and institutional consolidation of the U.S. Market Republic because driving every one of these shifts in perspective is a preoccupation with articulating order under conditions of increased complexity and interconnectedness.

According to Arrighi’s macro-sociology of world historical capitalism, the character (and viability) of each hegemonic succession and its attendant regime of accumulation is determined by the specific organizational capabilities demonstrated by the rising hegemon.\(^\text{54}\) In the U.S. case, those organizational capacities for securing order turned, like other transitions, on the ability of the rising hegemon to integrate newly articulate social actants of various sorts. What was experienced as the increased technological complexity of modernity, and has been diagnosed as increased “interdependence” with consequent crises of authority arising from changes in the “conditions of adequate explanation,”\(^\text{55}\) was all of these things and too many more to name: the end of slavery and consequent expansion of political agency to include (in law if not in practice) all adult men, a demographic jump in immigration, increased urban contact between previously separate social and ethnic groups, an influx of women into then-emerging clerical and social work professions outside the home…these just begin to name newly articulate, postbellum human social actors in the U.S. scene. (This expansion

\(^{54}\) Arrighi, *The Long Twentieth Century*; Arrighi and Silver, *Chaos and Governance in the Modern World System.*

\(^{55}\) Haskell, *The Emergence of Professional Social Science.*
of socially and politically relevant human actors with the emergence of a national mass market is still impressive enough to me, and frequently enough goes unmentioned in historical literature, to mark it here as democratic.) More globally, the late nineteenth-century experience of systemic crisis and disorder is indexed adequately enough as the expression of an increasingly unruly colonial regime of a then-crumbling British empire.

In the language of Foucault’s theory of governmentality, the turn-of-the-century social apparatus, or diagram, of U.S. security that succeeds the British regime as a new system of rules for insuring order under these diverse conditions of increased interdependence and complexity is a disciplinary regime of attentiveness that is sociotechnically and institutionally articulated by industrialized communication technologies. In short, the panopticon is superseded by communication socio-technologies like the tachitoscope as Jonathan Crary implies, or by the typewriter and/or experimental scene as Kittler argues.56 Whether one takes up these diagrams of human-machine interface designed to quantify attention and situate bodies in space, or the paradigmatic scene of experimental psychology presented in chapter one, the disciplinary organization of labor, education, and mass consumption in the long twentieth century all hinge on discourses and techniques of attention that are characterized less by surveillance and the investment of bodies in depth, than by the arrangement of bodies in space such that their capacities for interfacing are organized in ways both predictable and productive.

---

56 The tachitoscope was a testing instrument designed in the 1880s to present unconnected visual stimuli in rapid succession with the objective of isolating an elemental unit of attentive behavior. Crary, Techniques of the Observer; Crary, Suspensions of Perception; Kittler, Discourse Networks.
The specific topic of this section is to describe the politico-epistemological conditions that have been operative for a new diagram of disciplinary attention — to outline, in other words, a new ideal of public practice and governmental rationality (or indeed, the new liberal ideology) that emerges with the U.S. “Free Enterprise” regime of accumulation. I find the unifying theme of these several shifts to be a socio-technological problematic of securing attentive behavior that is determined by historical changes in the contexts and conventions of institutional practice - and not the unifying interests of a ruling class. Moreover, since a distinctive feature of how the new liberal governmentality secures order and epistemologically guarantees the legitimacy of public practice has been through a series of discourses and techniques of economistic scientific objectivity, the rationalist legacy of any Marxist/Althusserian designation of liberal ideology runs the risk of quickly devolving into an impossible debate over whose science of society is “more rational.” As I think Foucault was right to point out, the thing to understand about liberalism as a modern political rationality, style of thought, or indeed, ideologically motivated science of society, is that it keeps inventing new domains about which to be rational, scientific and objective. The critical task thus consists in apprehending these newly invented domains and objectivities of government. In the case of U.S. hegemony, the “new liberalism’s” governmental domain of objectivity is an economistic, methodologically scientific, religiously secular Market Republic whose capacities for

57 “Liberalism is not a dream which clashes with reality and fails to insert itself there. It constitutes — and this is the reason both for its polymorphic character and for its recurrences — an instrument for the criticism of reality.” Michel Foucault, “History of Systems of Thought, 1979,” trans. James Bernauer, Philosophy and Social Criticism vol 8, (Fall, 1981), 355 - 6. (emphasis mine) Similarly, in his “Governmental Rationality: an Introduction,” Colin Gordon presents liberalism in Foucault’s thought as “a prodigiously fertile problematic, a vector of continuing invention […] whose main task is always that of devising a new definition of the governmental domain.” (18 + 22).
accumulation and organization hinge on people getting along with machines and paying the right kind of attention to communication sociotechnologies. Economism, scientism and religious secularism taken all together make for a long concatenation of ‘isms’; never-the-less, the special significance of these several shifts in politico-epistemological thinking about “onto-theological” Truth, objectivity and scientific representational strategy and practice that I outline above consists in their necessary institutional and conceptual-discursive participation in bringing about a “new liberal” recoding of the politics of order and public practice.

Technologies of Mass Mediation: “Ambushing” and Managing Functional Attention

The discursive formation and practical elaboration of the U.S. Market Republic as a recoded model of polity and new domain of governmentality was initially articulated and then made systemic (that is, self-perpetuating) at the material level through the interlocking operations of three institutional matrices around the turn of the century: a national mass media driven by advertising, systematic business management and the modern research university. Also important were changes in property and commercial law, the rapid growth of an administrative national state apparatus, and other broad political transitions — of course. My reading of these particular institutional matrices as

58 Sklar, Corporate Reconstruction of American Capitalism.  
59 Skowronek, Building a New American State.
predominate engines of historical causality stems from my desire to present the
emergence of U.S. hegemony and its mass market model of polity as both a governmental
rationality and a system of accumulation. Because it describes an emergent property of
self-reproduction rather than using an explanatory paradigm of expression or
dispensation, the language of system affords a way of apprehending continuity without
reducing all the component developments of what has been, after all, an enormously
complex and internally discontinuous long twentieth century. Likewise, an analytic of
governmental rationality presents the “conduct of conduct through practices of (free-
enterprise/free-inquiry) freedom” as one way of discerning a market-oriented logic of
communication in these institutional matrices without also finding oneself entrapped by
an array of spurious logical entailments (e.g. professionalism/mass media/managerialism
are ideological and irredeemably capitalist in nature). This is not to say, however, that the
U.S. Market Republic is not a capitalist one. Mass media, the research university and
systematic management cohere as a series of matrices precisely because each serves as a
Latourian “center of calculation” for the socialization and accumulation of mass markets,
which is to say, the ordered gathering of attention.

As Arrighi points out, each hegemonic transition in historical systems of
accumulation involves “a fundamental transformation of the agency and structure of
processes of capital accumulation” that is based in turn on a series of organizational
innovations wherein previously social functions are systemically “internalized”.
60 Mass media/modern advertising, systematic management and modern research universities
institutionalized the organizational control of previously social markets and therein laid

60 Arrighi, The Long Twentieth Century, 218.
the tracks for the U.S. “Free Enterprise” system of accumulation. Just as the British cycle internalized protection costs and production costs with its colonial governmental apparatus, industrialization of production and hegemonic designation of the “world market” as the universal plane on which all conflict rages — in parallel and superceding fashion, the U.S. cycle additionally internalized transaction costs by creating an agency and structure of accumulation in an economistic order of the mass market and a corresponding hegemonic discourse of a “welfare” equilibrium.

In order to avoid confusion over the apparent equivalencies between the politico-epistemological figures of the market through which the British and U.S. hegemonic (liberal) regimes each articulated their own interests as hegemonic (i.e. commerce/”world market” and mass market/”welfare”), it is important to tease out one more aspect of the difference between the two forms of organization. Each regime’s structure and agency of accumulation is additionally characterized by Arrighi as either “intensive” or “extensive” in orientation with respect to the rest of the world. This orientation, or form of organization, qualifies what is meant and achieved by each universalizing invocation of “the market” as a harmonizing domain. Where the imperial British “Free Trade” regime was extensive in the sense that it geographically expanded the capitalist world economy, the corporate U.S. “Free Enterprise” regime has been intensive in consolidating Britain’s previous territorial conquests into a system of national markets and transnational corporations centered in the U.S..

What this means is that the imperial governmental rationality of commerce (under the hegemonic horizon of a “world market”) was about political aggrandizement through the acquisition of territories, whereas the corporate

---

61 Ibid., 219.
governmental rationality of mass markets (under the sign of “welfare”) has been about political aggrandizement through the systematic mapping and integration of those territories as a system of national mass markets. Thus, while it is historically significant that the new metaphorical entity of the “world market” that provided cover for British “Free Trade” imperialism was a conceptual-discursive innovation with respect to the Westphalia system of capitalist modernity (the Westphalia system was based precisely on the principle that there was no authority operating above the inter-state system and the British “world market’s” laws were allegedly supernatural), the territorial-ideological uses to which that metaphysical incarnation of the market was put did not succeed in representing-for-intervening, or consolidating-for-purposes-of-governance, the world market. It was, after all, the systemic chaos brought on by an increasingly interdependent and complex world market that signaled a crisis (circa 1870 - the first “Great Depression”) and then transacted the decline (circa 1930 - the second) of the British “Free Trade” system.62 The U.S. regime, by contrast, is defined by its corporate capacities to represent, organize and control mass markets.

In Arrighi’s terms, it is the successful corporate-intensive “internalization” of the previously social function of markets that constitutes the specific systemic capabilities and organizational form of a U.S. regime of accumulation.63 While I agree with this formulation, I would make two translations to its terminology: First, by “internalization” (which Arrighi uses in manner that echoes the Marxian concepts of abstraction or

62 Ibid., 55, 159 - 173.
63 Note that with this assertion, Arrighi effectively historicizes the (late nineteenth-century) social “disembedding” of a market economy in a way that aligns with my argument of chapter two.
expropriation insofar as it is the “capitalist class” which internalizes), I understand formalization\textsuperscript{64} and sociotechnical institutionalization in the senses drawn out by Latour and compatible with Foucault’s account of disciplinary power. Second, I take the previously “social function” of markets in its most straightforward sense as the determination of price points and conditions of interface at which market transactions take place. Both translations accommodate a tighter fit between Arrighi’s macro-sociology of capitalist modernity, Foucault’s genealogical method (which focuses on the emergence and extension of technologies), and Latour’s micro-sociological account of the processes by which accumulation takes place (i.e. the mobilization of immutable mobiles). Not incidentally, both translations also analytically underscore the problematic of attention as a model of cognition and sociotechnical grammar of address by virtue of which the U.S. system of accumulation takes up position as the intermediating center of calculation.

If one wishes to understand the experimental model of attention as a sociotechnical grammar and architecture of address that is co-emergent with the U.S. system’s specific capacity to formalize mass-market transactions, then modern advertising and mass media - taken in conjunction - present a good example.\textsuperscript{65} As James Beniger shows, both modern advertising and mass print media were technologies of control taken up in order to address the new problem of over-production generated by the

\textsuperscript{64} Latour understands formalization as “the acceleration of displacement without tranformation.”

\textsuperscript{65} Since it might be helpful to unpack these terms: by sociotechnical I mean discourses and techniques which are both social (i.e. having to do mostly with human interactions) and technological (i.e. having to do mostly with machine interactions); by grammar I mean a set of semantic rules by which these interactions are ordered, a code; by architecture I mean the arrangement or disposition of bodies in built and social space.
implementation of continuous-process production technologies in a wide range of industries from late 1870s forward. Enabled by innovations like the power-drive multiple print rotary press, cheaper paper production and half-tone graphical inscription techniques, national advertising campaigns coupled with the cheap publication of mass market periodicals not only financially (in that advertising provided the revenue model for papers who provided the consumer-audience cultivated by the admen), and in terms of a shared medium (first paper, later broadcast technologies), but more importantly, advertising and mass print media were coupled in their pursuit of a new object — mass market consumer attention. In Beniger’s explanatory schema of control, the late-nineteenth-century emergence of “increasing control of consumption […] came through the coevolution of mass media and their messages to attract, hold, and imprint, mass attention.”

Critical to the particular form that this shared pursuit would take was the adoption of one advance in visualization and mobilization techniques in particular, half-tone printing. Previously, illustrations and photographs were rarely produced en masse because stereotyping, the casting in of metal in pulp-paper molds to produce plates, required expensive machinery. With the evolution and quick adoption of electrotyping (ca. 1880), the production of plates by electrically coating with copper or nickel a type mold or an engraving, the quality of mass-produced illustrations in particular jumped as the cost of casting type and picture plates alike dropped. By the turn of the century, half-tone printing techniques were being used by most U.S. dailies to print photographs,

---

66 Beniger, Control Revolution, 219-344; see also, Pamela Laird, Advertising Progress: American Business and the Rise of Consumer Marketing (Baltimore: Johns Hopkins University Press, 1992), and Ohmann, Selling Culture.
67 Beniger, Control Revolution, 273.
68 Ibid., 356 - 357.
and the first mass-circulation magazines were spun up on a newly profitable ad-revenue model. I therefore call half-tone printing a mobilization as well as a visualization advance because, like the graphical printing press, it was the last in a sequence of efficient sociotechnical causes that, taken together, made possible a massive upscaling in the circulation of immutable mobiles.

In *Selling Culture*, Richard Ohmann traces these and other shifts in advertising practices and mass media print publication to articulate his thesis that mass-circulation magazines and modern advertising are defined by their explicit and innovative orientation towards, and visual cultivation of, audience attention. In the two decades surrounding the turn of the twentieth century, advertising achieved its modern incarnation as an image-based form of visual address designed to “ambush reader’s attention, produce affect quickly, and lodge in the memory.” As opposed to earlier advertisements that circulated blocks of small and compact text which required engaging a literate mode of readerly attention, the design of modern advertisements is characterized by increased size and frequency with more blank space in each ad, by a pronounced increase in the image-to-text ratio, by prominent artistic fonts, and by the mobilization of a new set of codes and social semantics that Ohmann reads as amounting to “a new mode of address to consumers, and new meanings for material goods.” Indeed, perhaps the most enduring and broadest set of effects coming out of the modern discourse and discipline of advertising has been the tighter linkage between social identity and the purchase and use of commodities (especially cultural goods); and a strong feature in Ohmann’s study consists in his intertextual demonstrations of the linkage between these social-semantic

---

69 Ohmann, *Selling Culture*, 181.
codes and the increased household reliance upon commodities produced outside the home.

I’ll return briefly in my concluding chapter to the topics of consumer society and commodification as such, but for the purposes of illustrating the discourse of modern advertising that arose circa 1890 as sociotechnical grammar of address designed specifically to “ambush” a new object in consumer attention, I want to emphasize two things. First, advertising (like experimental psychology before it) was disciplinized by attention as a form of problematization — its claim to expertise and professional reproduction as a field has hinged continually on techniques for quantifying and securing attention — and in turn, advertising techniques for disciplining attention have proliferated as a form of address that structures seemingly unrelated sectors of the public sphere.70 And second, as Ohmann has argued, advertising has been absolutely integral to the development of mass media in the long twentieth century. First developed in the 1880s and 1890s, the funding structure of mass-circulation magazines like Munsey’s, McClure’s and Ladies’ Home Journal broke the mold of older, more literary magazines like Century, Harper’s and the Atlantic Monthly because it made the magazines available to the masses for a nominal subscription or cover cost (because ad revenue offset printing costs; cheaper paper, printing technology, transport technology and postal rates also helped). Part and parcel of this wider availability was a reorientation of purpose: Where

70 Most immediately, advertising has affected the conduct of twentieth-century politics in profound ways. For instance, McGerr traces the emergence of an “advertising style” in politics (to displace “educational politics,” which displaced partisan politics before it) around the 1896 election. The advertising style is characterized by the use of pictures and slogans to sell the candidate’s personality to consumer-voters. McGerr, The Decline of Popular Politics. Then later, the practice of public opinion polling was developed and first implemented on a national scale by advertising executive George Gallup in the presidential election of 1936 (he pioneered sampling techniques that made data useful for prediction purposes).
polite magazines were funded by large publishing houses to print the kind of text they wanted to see circulated and that their elite base of readers would pay for, the new magazines were in the business of leveraging content in order to gather audience attention and sell it back to advertisers. In order to gather and keep audience attention, mass-circulation magazines printed lighter, less literary text, more images, and, as one might guess, many more modern (i.e. visual, nationally branded) advertisements. This double feedback loop worked: In 1884 the *Ladies Home Journal* had a circulation of 50,000, by 1895 circulation had increased to 750,000 (double that of any other magazine).71

From around 1870 until the end of the first World War, the mass-circulation metropolitan press (led in terms of circulation overwhelmingly by new style mass-market magazines and by large city dailies) was the dominant medium of the public sphere on both sides the Atlantic.72 Although the altered definition and reporting of spectacular “news” in dailies was fully continuous with an objective of “ambushing” attention, cultural historians find that it was mass market magazines in particular that proved to be “the most important advertising medium of the age” as well as the first truly mass medium.73 Whatever their relative importance, there is no doubt that both the funding structure and the content of daily newspapers and mass market magazines were dominated by advertising. In 1905, for example, 56.7% of content in magazines and

---

71 By way of contrast, in 1887, only four of the older magazines (led by *Century* and *Harper’s*) had circulations in upwards of 100,000. Combined, the circulation of these four leading magazines barely topped 600,000. Beniger, *Control Revolution*, 357-8.
newspapers in 1905 were advertising — this according to a 1911 article on advertising in the general magazine *The Bookman: An Illustrated Magazine of Literature and Life*. The same year, *Printer’s Ink* (the advertising trade journal) reported ad expenditure figures for different media: outdoor signs $25m, street cars $19m, magazines $50m, newspapers $300m. These figures give information on only one year and come from a popular magazine and trade journal, but they indicate the relative predominance of advertising in mass circulation print media in particular, as well as in built public space around the turn of the century.

The currency of attention in which modern advertising and mass print media traded was conceptualized as “attention value” in explicit connection with the functional capacity first modeled and tested in Wilhelm Wundt’s psychological laboratories. William A. Shryer, a mail order businessman who assembled astonishing amounts of “scientific” (in this case, quantitative) data on advertising from operating his own business, published his findings in book form (*Analytical Advertising* (1912)) with a chapter devoted to each of the key terms of the form of problematization pioneered by experimental psychology. Early in the first two chapters (“Sensation” and “Attention and Attention Values”) Shryer cites Wundt’s attention experiments and Weber’s Law of sensation, each as a jumping-off point for discussing the centrality of attention to any science of advertising:

[T]here is no point of especial value to the advertiser in a study of “Sensation,” except to consider what is known as “Weber’s Law.” […] “The advertiser is, of

---

course, directly interested in but one of the senses, insofar as creating a “sensation” is concerned, and that is the sense of sight, through which he reaches the brain of his possible customer by means of the printed advertisement. (12-13)

Herr Wundt made exhaustive experiments and found that with conscious effort the human mind was able to give intelligent attention to never more than two things at a time. (15)

Liepzig-trained applied psychologist Walter Dill Scott likewise theorized the centrality of attention to the science of advertising in The Psychology of Advertising (first published in 1902, then again in 1908, 1910 and 1921). His central category is the more traditional “apperception,” which he then immediately translates into a problematic of attention:

The first thing to be said about apperception is that it is the act of the mind by which perceptions and ideas become clear and distinct. When considered from this point of view apperception is simply an act of attention, […] Furthermore, there are all degrees of attention. (20-21)

[T]his seems certain—one aim of every advertiser is to attract attention. Therefore, the entire problem of attention is one of importance to the advertiser, and an understanding of it is necessary for its widest application as well as for a correct understanding of advertising. (260)

Both Shryer and Scott use the phrase “attention value” and discuss attention as a central analytic category for scientific advertising in conjunction with measurable “sensation” in a manner fully consistent with the experimental model of attention on which psychology was disciplinized in the final decades of the twentieth century. Indeed, the linkage

---

75 Walter Dill Scott trained under Wilhelm Wundt and took his psychology doctorate at Leipzig.
between advertising and scientific psychology has been persistent and well documented in histories of advertising.\textsuperscript{76}

The most famous point of contact between the two fields has been behaviorist John B. Watson’s second career at the J.Walter Thompson advertising firm, where he was hired by the firm’s president Stanley B. Resor in 1920. In cultural and intellectual histories of the period, Watson’s presence at what was then probably the largest advertising firm\textsuperscript{77} is often taken as indicative of how applied psychology, and behaviorism in particular, has enabled the manipulative capacities of advertising from the beginning. The problem with such an assumption is twofold: first, 1920 is quite late in the development of scientific advertising; and second, there is little evidence to suggest that trained psychologists were being hired with any regularity by advertising agencies.\textsuperscript{78}

Moreover, an investigation of meeting minutes and in house publications of various agencies as late as the 1920s turns up very few references to findings of academic psychologists.\textsuperscript{79} Rather, Watson was a celebrated and exceptional case, and while he did contribute to the development of advertising practice at Thompson, it is important to realize that he came to the field relatively late, and it was the cultural cache of his \textit{scientific} expertise rather than his training as a psychologist that was valued by Resor and


\textsuperscript{77} See Pope 1983 on the difficulty of estimating the size of agencies before 1935.


other practitioners in the field of advertising.\footnote{Kreshel, “John B. Watson at J. Walter Thompson.”} Rather than being transmitted at a late date through the specific personage of Watson (or indeed any other specific psychologist), psychological expertise informed modern advertising practice from at least the 1890s forward by virtue of a shared practical problematic and conceptual language of attention.

The early and sustained focus of professional advertising discourse and practice was quite explicitly defined by a parameters of attention as a rubric for representing and intervening in human cognition. This is documented by popular business pubs like Shryer’s, by applied psychology books like Scott’s, and by a sampling of articles in the trade journal \textit{Printer’s Ink}.\footnote{“Advertising Cuts,” \textit{Printer’s Ink} 3 (December 24, 1890): 698-99; Leon Barrett, “Illustrations in Advertising.” \textit{Printer’s Ink} 5 (August 5, 1891): 100 - 101; Charles E. Mears, “Advertising that Appeals to the Senses the Coming Type,” \textit{Printer’s Ink} 90 (January 14, 1915): 132- 35.} Through a contextualized examination of the ads themselves, Ohmann goes so far as to argue that a new object of consumer attention is in fact invented by the early institutional coupling of mass print media and modern advertising in the decades around the turn of the century, and that this new objectivity of attention is the currency through which “culture” is sold to an emerging middle class though an array of new cultural institutions. While I agree fundamentally with the main thrust of Ohmann’s analysis, my argument here is that mass media/advertising is but one institutional matrix generating practical solutions to the problematic of attention around the turn of the century and, while it might have proven to be the most broadly influential in re-writing cultural codes and proliferating media-based grammars of attentive address, it was experimental psychology that first formulated the model of cognition as a form of problematization (some twenty years earlier) and thus set the terms in which solutions
might be articulated. Defining elements of this experimental model of attentive cognition are a new conception of sensation (i.e. “sensory force”) and a delimited scene of interaction and sociotechnical structure of address. Advertising and mass media co-evolved as communication technologies designed specifically to solicit attentive behavior from consumer subjects (i.e. to “control consumption”), and they did so precisely by staging a scene, or situation, of sociotechnical mediation that travels well. In contrast to previous communication interactions of a street crier, face-to-face sales, and/or textually-driven modes of address that took longer, required a then-rare level of literacy, and could not function on a mass scale to mobilize inscriptions across great distances — in contrast to earlier forms of print culture and advertising, mass-circulation print is a communication technology that formalizes (and therefore renders amenable to systematic deployment) its own conditions of interface. While it does not begin to exhaust the range of mass mediation’s significance as a social text, the staging of public space as a scenography wherein individual subjects’ visual attention is “ambushed” is itself a dispositional form of power. Bodies are arrayed individually to attend\(^\text{82}\) — this is the situational reordering of social space accomplished by mass mediation.

Systematic management was and is another communication technology with dispositional effects that I (following many others) read as an institutional matrix for the U.S. system of corporate accumulation. Working in the business history tradition of

\(^{82}\) Using a similarly Foucauldian frame, Crary examines some of the ways that bodies were arrayed individually to attend to non-print technologies of visual display (e.g. tachistoscope, cinema, kaiserpanorama). In his analysis, the dispositional form of power that characterizes late nineteenth-century discourses and techniques of attention works specifically by enforcing a particular sens intime that involves inhabiting time as disempowered. Crary, *Suspensions of Perception.*
Alfred Chandler, Jo Anne Yates documents the emergence of systematic management under a rubric of *Control through Communication* (1989). Beginning in the railroad industry in the 1850s, a new philosophy of management based on efficiency and system spread to manufacturing industries (and to books on the topic) in the 1870 and 1880s.\(^3\) With this philosophy, internal communication came to serve as a mechanism for managerial control and coordination of an organization’s employees and operations. Much like the move in advertising towards mass mediation and away from face-to-face interaction rituals, systematic management pursued efficiency and scale through substituting earlier, ad hoc and primarily oral modes of business interaction with a formalized system for the circulation of documents. Thus, for instance, although the telephone functioned to increase the range of existing informal communication, and the telegraph opened up the possibility for rapid and systematic communication across distances, neither was essential to the cause of scientific management because both were used initially on ad hoc bases.\(^4\)

The communication infrastructure on which the socialization and accumulation capacities of systematic management depended was aimed at the reliable conscription of visual audience attention as a means of managing workers and work processes. According to Yates and Beniger, it was written, office-based technologies of communication that capacitated systematic managerial control in the vertically integrating corporation. Although the Taylorization of industrial work processes on the

---


\(^4\) Ibid., 22.
shop floor did introduce a series of innovations germane to the procedural objectives of systematic or scientific management (especially time and motion studies of factory floor work methods), this movement came later (in the teens and twenties) and was more publicized than implemented.  

More broadly important to the changing nature of work and system of corporate accumulation around the turn of the twentieth century (and still today) were business communication technologies like the typewriter, graphical visualization and vertical filing (the devices themselves were important, as were conceptual schemas and conditions of interface associated with using them). The organizing conceptual schema of systematic management aligned with above-outlined reconceptualizations of truth and ideals of public practice under an ideal of scientific objectivity: as in scientific representation, the idea of systematic management was to increase efficiencies by transcending individual idiosyncracies of managers and workers alike. In other words, systematic management meant management from the aperspectival objectivity of the system, as ensured by mechanically objective implementation. As such, work at all levels of the firm was increasingly understood functionally and carried out in conjunction with sociotechnical apparatuses and procedures (e.g. typewriters, defined work processes, functional foremen, carbon copies, memos) designed to socialize the mechanical and aperspectival objectivity of systematic management. These various work functions were simultaneously accumulated as organizational memory (captured, reproduced and filed away as manuals and reports) and as the profit coming from whatever product or service in which the work functions eventuated. Skilled tradesmen were notoriously displeased with this functionalization of work processes and there is a

85 Ibid., 10.
developed literature describing standardized industrialization and systematic management as a “degradation” of work.\textsuperscript{86} More germane to the purposes of this study is the fact that systematic management’s twinned conceptual schemas of functional work processes and mechanical/aperspectival objectivity transformed the predominant currency of work in a business setting from time in the case of wage labor, or finished products in an agrarian economy, to information and the “brain work” associated with its manipulation.

Materially, the conceptual objectives of efficient and systematic management were taken up and implemented through communication technologies and the managerial information they inscribed and circulated. Of particular historical importance for the institutional emergence and endurance of a corporate regime of accumulation were the technologies listed above: typewriters, graphical reporting and forecasting techniques, and vertical filing. The last of these enabled ordered capture and reliable re/use of the vast quantities of operational information and institutional memory on which vertically integrated corporations and their elongated management structures relied. Closely linked was the typewriter, which dramatically sped up the production of documents used for internal and external communication, separated the production and reproduction (as with carbon paper) of documents from their creation, and, in that functional severance of composition from re/production, generated a whole new class of functionally defined clerical work. Clerks of various sorts existed prior to the popularization of typewriters in the 1880s, but their numbers were small and their primary job function was not the

reproduction and organization of documents. This clerical class of information workers who mediated between managers and the communication technologies through which systematic management was implemented was paralleled by the emergence of a much more publicized professional-managerial-class (PMC) of experts. Both classes of workers were increasingly defined, from around 1880 forward, by their functional capacities for mediating communication technologies (which is to say, working with information).

Yates, Beniger, Chandler, Arrighi, Trachtenberg and too many others to name have written on the importance of the systematic management and communication infrastructures as critical organizational innovations for the institutional, cultural and socioeconomic articulation of U.S. corporate capitalism as an historically unprecedented system of accumulation. This institutional matrix (systematic management/corporate

---

87 In light of the long legacy of gendered defenses of “productive” labor, perhaps it goes without saying that typing and stenography very quickly became women’s work: prior to 1871 commercial schools had 4% female enrollment, by 1880 that percentage rose to 10, by 1890 28%, by 1900 36%. In absolute numbers, this class of clerical workers grew from 33,000 in 1890, to 134,000 in 1900, to 387,000 in 1910, and then nearly doubled again at 786,000 in 1920. Yates, Control through Communication, 43 - 44. Although women’s clerical work with information in business and other settings have been consistently devalued and underpaid, it remains an important structural and social feature of the U.S. system of accumulation that women have over the entire course of the long twentieth century entered the workplace in growing numbers. Arrighi, The Long Twentieth Century.


89 This late-nineteenth-century emergence of an information economy (versus histories dating that emergence late in the twentieth century) is the organizing thesis of Beniger’s The Control Revolution: Technological and Economic Origins of Information Society. In a recent article on print culture around the turn of the twentieth century, Jan Radway explains the emergence of information and ‘brain workers’ as a corporate imperative following from the implementation of communication control technologies: “when corporations acted to integrate organizations, process, and people, they found it necessary to generate and circulate vast quantities of information to facilitate control and coordination.” Research Universities, Periodicals and the Circulation of Professional Expertise, 214.
communication) is, at this point, is sufficiently documented as a defining driver of U.S.-style capitalism that its causal mechanisms scarcely bear rehearsal. Beyond pointing out that the forms of information work that arise with systematic management and its communication technologies in the 1870s and 1880s are in fact procedures of socialization and accumulation premised on solutions to a problematic of functionally defined attention, I want to throw one more causal mechanism into the mix — graphs. Mid- to late-nineteenth-century physicists and mathematically inclined economists were not alone in their affection for graphical depiction, part and parcel of the systematic management movement was the use of graphs to display statistical data starting around 1880. As with early corporate accounting techniques, graphs were introduced into business practice by engineers (to represent experimental data and physical relationships). And as with neoclassical equilibrium and psychological attention, the graphical representation of managerial data was an innovation in visualization techniques that in fact designated a new domain of intervention.

As Yates presents them, managerial graphs were used as a “tool for getting and keeping the attention of busy executives.” By visualizing complex relationships, graphs presented a solution to two problems: the appearance of bias in reporting, and too much detail. Managers mapped actual over scheduled production over time, sales, production and distribution with respect to each other over time, reductions in labor costs in temporal

---

90 Yates, Control through Communication, 85 - 91. Though it did not gain popular currency as a useful technique until around 1914, graphical display was not new to the era. Graphs have been used since at least the eighteenth century to represent empirical data and (particularly in the U.S. case) in conjunction with demographic and trade statistics kept by modern states.
91 Ibid., 85.
92 Ibid., 86.
relation to the implementation of new management techniques, and other such trends, and they valued these lines on quadrilineal paper specifically as concise, objective facts. Because graphical techniques can display massive amounts of multi-factorial data and trends over time “at a glance,” they are valuable in a management setting as a solution to newly apparent cognitive limits of managerial attention. In this sense, they were used internally by managers with the same rhetorical objective of “ambushing” attention as were advertisements in the then-emerging mass-consumer market, but this was not their key operation. Graphs, like all math, are problem-solving machines built out of an accumulated language of symbols that is itself shorthand for human-generated counting concepts (add, take away, divide, etc.). As mathematical languages are intellectually articulated (by mathematicians and their calculating equipment), they become increasingly involuted and abstract (as with higher algebra, infinitesimal calculus, set theory, etc.) and in the process, elaborate a syntax of complex relationships that exceed the representational capacity of either ordinary noun-adjective-verb grammar or standard arithmetic.\(^\text{93}\) In short, higher math is not on a humanly-meaningful scale (at least, not for most humans); but that does not mean that its predictive modeling capacities are either supernatural or meaningless. Scientific equipment and experimental technique is likewise adept at (and valued for) generating multi-dimensional phenomena that, were it not for labs and their associated technologies, would exceed human-scale representational capacity either by virtue of complexity, microscopic size, astronomic size, combinatorial material or equipment requirements, etc.

\(^{93}\) For accounts of the ways in which mathematics is a social/human discourse see Brian Rotman’s work generally, or Collins, *The Sociology of Philosophy*, 848-854.
Corporate managerial graphs are, in this vein, techniques for the manipulation of multidimensional phenomena and processes created by the equipment of scientific management. Consider the added conceptual-discursive capabilities of geometric time-tracking⁹⁴ (and correspondingly, reliable and more sophisticated forecasting, operational planning and financial speculation capabilities), or the scalar multiplication of production capacity (i.e. “taking to (mass) scale,” which really means producing at a point along a series of intersecting curves that is identified as maximally profitable). More globally, and again in connection with neoclassical economics and experimental psychology’s respective mathematical formalizations of “utility” functions and “Weber’s (geometric) Law” of “sensory force,” “function” is a concept of algebraic geometry⁹⁵ that visualizes a complex relationship between conceptual abstractions of professionalized fields of discourse and is subsequently taken up by non-specialists as a bridge concept linking everyday human activities to the modern disciplinary domains that emerge around the twentieth century. Whether it is “Weber’s Law” of sensation (a geometric function), the marginal “utility” function, or corporate (work) functions made visible and managed through graphical techniques, mathematical formalization and modeling near the end of the nineteenth century critically capacitates the emergence of a mass market polity and

⁹⁴ On the topic of geometric time tracking and graphical techniques, I find it interesting to note that among Irving Fisher’s most celebrated innovations was an economic theory of specifically “inter-temporal choice.” Classical political economy had no such conceptual-discursive mechanism for thinking about individuals’ market behavior over time.

⁹⁵ General algebraic geometry is not, in itself, especially historically significant here, as its conceptual language of functions goes back to at least Rene Descartes. It was his algebraic geometry that “unified all the field of mathematics into a single conceptual realm.” Collins, The Sociology of Philosophy, 849. See FN 73 below for a discussion of the historically specific association of complex algebra to geometry via quaternions in the middle of the nineteenth century.
U.S. system of corporate accumulation by opening up additional degrees of freedom to control or manage previously un-named (and therefore socially inarticulate) phenomena.

These mathematical formalizations and the models of cognition, mass-market behavior, and systematic management in which they are inscribed are field theories of value (as Mirowski notes), but the historiographical apprehension of this series of conceptual homologies (functions traversing abstracted, geometric fields) is less interesting as a case of physics-envy, and more meaningful as a way of understanding the extra-ideological significance of science in the long twentieth century. Without the material reorganization of the bases of especially scientific knowledge that we now designate “The Emergence of the American Research University,” no amount of “new liberalism” or “Incorporation” would have held together a U.S. Market Republic with hegemonic capabilities. I therefore find the research university to be an institutional matrix of U.S. hegemony at least as important as mass media/advertising and systematic management.

**Instituting Cultural Authority**

Standard critical treatments of the research university as a driver or enabler of corporate capitalist hegemony hinge on either the education of consumer and managerial subjects or the ideological implications and operations of a culture of professional
expertise. While I am obviously indebted to this previous work in cultural history, my account centers instead on laboratories and mathematics because I think these have been critical university-based levers by virtue of which the U.S. has positioned itself as a global center of commercial and intellectual intermediation. University laboratories worked as modern laboratories always have, as organized scenes of persuasion whose findings are articulated rhetorically through literary technologies of virtual witnessing. The major difference they presented with the emergence U.S. research universities consisted in their institutionalized proliferation, and in a new pedagogical centrality for laboratory-based experimental research as an ideal type of student training. Mathematics, however, achieved a distinctively new epistemological prominence and generality as an intellectual field of innovation around the end of the nineteenth century with J. Willard Gibb’s development of vector analysis, and a related series of shifts in higher mathematical thinking/writing practices away from numerical computation and towards graphically-driven, deductive reasoning guaranteed by the self-consistency of an axiomatic system. With the exception of Gibbs and his student Irving Fisher, U.S.

---


university math was not a particularly hot spot of innovation; but the historic feature of these developments in math consists in their university-based, discursive-conceptual capacities for translating the multi-dimensional, equipment-generated phenomena of laboratories (like electricity) back to an increasingly connected (i.e. communicated with) world of engineers, managers and professional knowledge-workers of all types.

The tale of “The Emergence of the American University” is by now reasonably well rehearsed. The university reform movement began in Germany and was enthusiastically transported from there to the U.S. as an institutional structure and experimental scene of investigation by graduate students who studied in Germany and then returned home.\textsuperscript{100} British and French scholars likewise transported the German model, though on somewhat different timelines and to differing effects. In all cases, the institutionalization of research universities coincided with other political and cultural forces of the nineteenth century to begin replacing previously religious cultural and intellectual authority with academic, and specifically scientific, authority on a new model of knowledge. Randall Collins understands these university revolutions as a series of “structural secularizations” wherein theology’s declining authority in the educational system is a specifically institutional effect of university reforms.\textsuperscript{101} From the perspective of intellectual history, the most important among these institutional effects was the elevation of philosophy to an upper-level subject based on intellectual innovation, as it

\textsuperscript{100} The 1876 founding of Johns Hopkins University on a model of institutionalized research served a particular purpose in reinforcing this transportation because it “captured the academic imagination [as] a unique domestic example,” “fix[ing] an indelible image” of research as the ideal form of inquiry (Veysey, \textit{Emergence of the American University}, 129 + 158-159) Thus the intellectual influence of the German research model was highest in the 1880s, though it began in the 1870s and peaked quantitatively (i.e. in terms of American graduate students studying in Germany) in the 1890s. (128 - 130)

\textsuperscript{101} Collins, \textit{The Sociology of Philosophies}, 668.
was out of this chiasmus (and not a political revolution) that modern Idealism emerged as an intellectual response to reforms in the institutional base of learning. I find this account of philosophical Idealism and the “global theory of intellectual change” in which it operates compelling. What matters now, however, are features of this international re-organization in the material bases of intellectual life that were specific to, or especially resonant in, the U.S. case.

From the perspective of this study, the U.S. difference that has made the most difference was an early “matrix of inquiry” that articulated techno-science to industry from the 1870s forward. In a comparative context, Olivier Zunz isolates as unique and important the early institutional coupling between big business and not only research universities, which were indeed the most visible, but also federally- and state-funded land grant colleges, agricultural stations, specialized institutes of technology, industrial labs, and by the 1920s, private and public foundations.

This institutional matrix was the prerequisite for the “American century,” for it is the reorganization of knowledge, not merely the power of capital accumulation, that gave Americans the means to both generate prosperity at home and expand their presence into the world.

Relatively early on, this “matrix of inquiry” was coordinated and reinforced by umbrella institutions like the National Research Council (founded in 1916), but the conceptual relationship between science and industry in U.S. culture reached back through the late

---

102 Ibid., 664.
More recently, Christopher Newfield (2003) has attempted to re-insert this historical fact (a long history of institutional coupling between U.S. universities and industry) into discussions of the recently (post-1980) “corporatized” or commercializing university.
104 Ibid., 4 - 7.
105 Ibid., xi.
nineteenth century.\textsuperscript{106} By way of contrast, European research universities maintained relative autonomy from the practical imperatives of industry until well after WWII. The reasons for this vary by country but were largely a matter of there being more established traditions of intellectual inquiry in Europe, whereas in the ‘late blooming’ U.S., no such traditions existed to either buffer intellectual inquiry from practical imperatives or to rationalize the institutionalization of inquiry for its own sake. (Out of this situation came the need for a professional project of academic legitimation through “objectivity”).\textsuperscript{107}

Two national contexts were crucial, then: the lack of established traditions in intellectual inquiry, and the conjunctural timing of the university revolution and later industrialization in the U.S. (i.e. the “Second Industrial Revolution.”) By virtue of this late-nineteenth-century institutional co-emergence with large-scale, vertically integrated corporate industry, research universities have come to operate institutionally and intellectually as a central node in the larger industry-science “matrix of inquiry” documented by Zunz — not, as some would have it, only in either the post-WWII “commercialization” of the university or some post-1980 version of the same. And although translating laboratory research to industry and industrial research priorities to the university lab have clearly not been the only, or even the predominant principles guiding the development of American universities, this early coupling transformed both what it meant to be practical and the meaning of inquiry by bridging university-based conceptual technologies and social networks of intellectual innovation to the three-dimensional worlds of large-scale industry.

\textsuperscript{106} Ibid., 9.
One widely remarked upon feature of U.S. research universities and the practical culture of scientific objectivity that arose in concert with them has been a pedagogical reorientation away from traditional conceptions of pious learning (i.e. preservation and appreciation of a settled tradition) towards a progressivist enterprise of research and intellectual innovation aimed at ever-increasing claims to mastery through the development of specialized (experimental) techniques of empirical investigation.\textsuperscript{108} Historical conditions of felicity for this reorientation in the meaning of inquiry included landmark legislation such as the Morrill Act of 1862, which granted federal aid to states for the support of colleges devoted to the advancement of practical agricultural and mechanical subjects, as well as subsequent federal and state legislation supporting agricultural and engineering experiment stations. In the following decade, the number of engineering schools jumped from six to seventy.\textsuperscript{109} Another set of material developments vital to the university-based reorientation of learning and inquiry stemmed from the new multi-layered communication infrastructures (i.e. the mass-circulation press, a federally-subsidized national postal system, and professional circuits of knowledge production and transmission): along these networks of communication arose a popular culture of scientific literature (including books, magazines and related lecture tours)\textsuperscript{110} and the

\textsuperscript{108} Radway, “Research Universities, Periodical Publication, and the Circulation of Professional Expertise,” ; Veysey, The Emergence of the American University; Collins, The Sociology of Philosophies; Reuben, Making of the Modern University.

\textsuperscript{109} Noble, A World Without Women, 263.

middle-brow market for professional expertise of various sorts. Industrial capitalists were, as mentioned, another significant factor in America’s changing conception of learning and inquiry: they were involved with funding and overseeing the institutional orientation of new research universities at every step, and their utilitarian orientation remains a defining feature of what counts as practical, scientific research in the American “matrix of inquiry.” Thus, federal legislation, public and private availability of capital, and changed reading and writing practices of professional knowledge workers and the general public alike interlocked with, and effectively legitimated, the higher education reform movement under a Progressivist banner of practically oriented scientific research and the related production of useful “public knowledge.”

Out of this complex site of emergence, the ground-floor reorganization of student learning and scientific inquiry around laboratory research and its idealized experimental scene of attentive observation (circulated discursively as “the scientific habit of mind”) is perhaps the most obvious and relevant piece of historical evidence supporting my main

112 The postbellum higher education reform movement was (as most movements are) internally diverse, and I don’t want to give the appearance that this new intellectual ideal and model of knowledge (i.e. the scientific production of useful “public knowledge”) was either self-evident or simple. For some of the intellectual, institutional, and personally idiosyncratic differences amongst higher education reformers see Veysey, The Emergence of the American University, and the John Voss and Alexandra Oleson collection, The Organization of Knowledge in Modern America, (Baltimore: Johns Hopkins University Press, 1979).

Veysey’s thesis is, in fact, that three competing visions of purpose in higher education from 1865 - 1910 in the wake of the decline of the traditional college with its purpose in “discipline and piety.” Only the first two of these (utility and research) are addressed in my characterization above (the third was a humanist counter-idealization of “liberal culture,” which Veysey finds to have been ultimately unsuccessful in gaining a position of prominence). Significantly, Veysey’s basic criticism of the emergent American university was that, since “utility” and “research” were functionally (rather than substantially) defined conceptions of purpose, the university ended up a self-perpetuating set of institutional structures, a “bureaucratic shell” without enough moral (my term) counterweight to keep the managerialist values of industrial business administration at bay.
thesis in the current context of this discussion. This shift in learning objectives away from
the traditional character-cultivation (i.e. “discipline and piety”) focus, with its conceptual
basis in the matter-soul dualism of Kantian/Reidian faculty psychology (then called
“traditional metaphysics”) is a precise instance of the shift in thinking about human
cognition outlined in chapter one as the defining problematic of early experimental
psychology. It was in terms of the laboratory-based, sociotechnical architecture of this
idealized scene of interaction that research and scientifically objective knowledge were
defined under a rubric of empirical verification (i.e. as the paradigmatic instance of
“aperspectival,” ”mechanically”-guaranteed objectivity). Laboratories were in fact prime
institutional markers and scenes of investigation for the university revolution’s re-
organization of the material bases of intellectual life as well as an increasingly prevalent
feature of business enterprise. But my more immediate interest in this new centrality of
laboratory research consists more in what kinds of accumulation and action-at-a-distance
the university, engineering and industrial labs capacitated, than in the disciplinary regime
of attentive cognition they idealized and put into educational practice.

The institutionalization of labs and their attendant communication technologies
for circulating researched information amongst the networks of scientists, the learned
public, engineers and corporate managers established an enduring nexus of politico-
epistemological articulation from which an array of projects were launched and

113 Veysey, for instance, describes the shift in educational purpose as a movement away from
“The Psychology of Mental Faculties”: “In considering the aims of higher education, believers in
mental discipline began with an idea of the human soul. […] The soul constituted the “vital
force” which in turn activated mind and body. Science could neither measure the soul nor
discover its properties inductively.” “In the years after 1865, the common-sense view began to be
revised, usually in the direction of idealism.” (22 + 27)
stabilized. Another way of saying the same thing might be to say simply, with Burton Bledstein, that “[i]t was the primary function of American Universities to render universal scientific standards credible to the public.” 114 But the descriptive and analytical adequacy of this statement hinges entirely upon what one makes of the processes of rendering credible that were specific to the late-nineteenth-century university revolution. Cultural authority consists in the practical imposition of a specific vocabulary on broader cultural discussions, and in this sense, the “rendering credible” accomplished by American universities is indeed most comprehensively apprehended in the common diagnosis of a Progressivist idealization of professional-scientific “public knowledge” as the basis for political culture, and, correspondingly, of the social sciences as the university-based guardians of civilization.115 In this broad formulation of the university’s cultural authority, Bledstein’s perspective holds. But what is not made clear in this common characterization is that the credible rendering and consequent cultural authority specific to American universities around the turn of the twentieth century hinged materially on a mutually reinforcing double articulation: first, on the institutionalization of laboratory research practices that made little models of the world in which to render, and from which to deploy, scientific “facts,”116 and second, on the emergence of a mathematical technology of models that made the world its laboratory. In other words, the central historical development institutionalized by U.S. research universities was not

114 Bledstein, The Culture of Professionalism, 326.
115 As Rueben points out, the social sciences were the first home for the guarantee of public order represented by the research university; in the middle of the century, that home shifted to the humanities, particularly to post-WWII “Western Civilization” and “Great Books” courses. Rueben, Making of the Modern University.
116 See Latour (1987), (1988), and (1983, 1998 abridged) for accounts of the ways in which laboratories are fashioned as tightly controlled, little models of the world.
an updated gentlemanly code of professional-scientific conduct, exclusion and expertise (these have always characterized “rapid-discovery science” in the West)\textsuperscript{117}, but rather a new form of evidence and a broadened horizon of social relevance for that evidence.

Models, in the sense being discussed here, are abstractions that use mathematical language to describe a system.\textsuperscript{118} I’ll say again that mathematical languages and systems are not specific to the end of the nineteenth-century. There is, for instance, a rich literature in sociology and history of science that investigates the manifold impacts of probability as a mathematical form of reasoning that dates back to seventeenth- and eighteenth-century actuarial tables.\textsuperscript{119} What is new at the end of the nineteenth century — what emerges as a new form of evidence with distinct articulatory powers — is the

\textsuperscript{117} On gentlemanly codes of conduct and friendship networks as the social basis for modern or “rapid-discovery” science in the West, see Shapin, \textit{A Social History of Truth: Civility and Science in Seventeenth Century England}, (Chicago: University of Chicago Press, 1994) and Collins, \textit{Sociology of Philosophies}.

For an account of western scientific practice as an extension of masculist (often misogynist) Christian clerical culture, see Noble, \textit{A World Without Women}. Noble finds that it was the utilitarian/research focus of industrialists and educational reformers that provided the first opening for women to make “their earliest advance upon the established institutions [with the significant support of] science-minded industrialists whose view of education was expansive enough to include women.” (264) It was with the subsequent sexist “backlash” of professionalization documented by Bledstein and others that women were once again made systematically unwelcome along with the foundation of professional societies and rituals in the 1880s and 1890s.

\textsuperscript{118} This is in contrast to either a general, or a primitive idea of modeling as conceptual practice in its broadest sense (i.e. metaphor or analogy), or as the (archeologically speaking) “early” human “supramodal, motor-modeling capacity called mimesis” identified by Merlin Donald as a pivotal neuro-architectural development in the evolution of human cognition. In this sense, my treatment of mathematical models here is distinct from, for instance, James Thompson’s \textit{Models of Value}.

\textsuperscript{119} See MacKenzie (1981), Porter (1986), Stiglar (1986), Daston (1988), and Hacking (1975, 1990). Most of these accounts follow Foucault to date the emergence of probability theory with the Port-Royal Logic of 1662. Although games of probability (like dice) certainly go back in human history, probability did not become a form of evidence or demonstration (as opposed to opinion) until the end of the Renaissance.
“elevation of rule-governed, autonomous models over observed particulars.”

By many accounts, it was physical modeling techniques developed around electrical field theory in the middle of the nineteenth century, that initiated a post-1870 redefinition of the aims and methods of science such that talk of “models” began to displace truth claims of direct observation.

Electrical field theory is considered by many to have been the key theoretical shift in nineteenth-century physics — and indeed, it initiated a reverberating series of disagreements and contests about the foundations and methodologies of physics well in advance of the more celebrated revolutions in relativity and quantum theory.

---

120 Poovey, *History of the Modern Fact*, 3.


It should be noted that Poovey’s account is ultimately concerned with tracing a much longer lineage for mathematical techniques, locating as its relevant genealogy the politico-epistemological break between facts and induction with double-entry book-keeping in 1588, and the institutionalization of statistics in the 1830s. In her account, mathematical modeling techniques, with their “elevation of rule-governed, autonomous models over observed particulars” do become prominent in the late nineteenth-century with investigative techniques of the natural and physical sciences. However, by this late point in her narrative (i.e. after the end of the period she covers), and in light of her broader trajectory of abstraction, the thrust of this finding seems to consist in characterizing mathematical modeling techniques as examples of “postmodern” declension from experiential belief, and “avoidance of the problem of induction”: “As units of such models, postmodern facts are not necessarily observed particulars; instead, as digital “bits” of information, the “phenomenological laws” of physics, or poststructuralist signifiers with no referent, they are themselves already modeled and thus exist at one remove from what the eye can see.” (3 + 328)

122 One might also argue that the key theoretical shift out of which modeling emerged as a conceptual technology central to the development of mid-century physics was thermodynamics. This is Mirowski’s argument. Either way, mathematical languages were being used to describe a system (of either electricity or heat) that could not otherwise be apprehended, theorized, or experimented with by humans.

Out of this predominantly German “crisis” (as Kuhn terms it), or “efflorescence of competing conceptions” (as Porter terms it), emerge the major fault lines of epistemological positivism as we know it still today: on the one hand, an agreement not to propose “metaphysical” speculations about ultimate causality, while on the other hand elevating a systematic methodology with universalizing ambitions about how to rigorously explain the mechanics of causality. Now, there have been many positivisms since the end of the nineteenth century, and the enduring differences in inflection between (empiricist) Anglo-American “scientific objectivity” and (Idealist) German wissenschaftliche Objektivität have played an ongoing role in configuring what has been at stake in each iteration of positivism and the kind of objectivity it offers. But my more immediate point in delineating positivism as a kind of perpetual, philosophical recapitulation of the foundations crisis in physics consists in offering a broad and broadly ignored, but never-the-less-recognizable, example as a way of indicating how deeply troubling mathematical modeling has been to the status of the (apparently not mathematical) theory/experiment opposition. Positivist philosophy of physics proceeds from mathematical experimentation via modeling techniques to theorize a

126 “What would become the modern positivist movement started as an internal development among physicists, laying down methodological rules for their own discipline […] From the 1870s onward, experimenters in electromagnetism, light, and radiation formulated mathematical models which dispensed with depicting the mechanics of physical bodies.” Collins, Sociology of Philosophies, 721.
methodological interdiction against interpretive theory and in so doing, it idealizes a peculiar practice of axiomatic objectivity.\textsuperscript{128}

I have already put into play Daston’s historical studies of the trans-Atlantic, late-nineteenth-century emergence of “aperspectival” and “mechanical” objectivity. Here I want to tease out another, intimately related dimension to the kind of scientific objectivity that gets institutionalized specifically with the U.S. research university, and that is the conceptual technology of mathematical models and the linked location of certainty in rigorous hypothesis and innovative representation. My claim here is not that mathematical modeling was specific to the U.S. context — it emerged and was popularized, after all, in Western Europe first. The politico-epistemological implications and applications that were appended to modeling as an investigative technique and form of evidence (e.g. the Progressivist idealization of “free inquiry” and “public knowledge” as bases for political culture) did however, take particular root and find broad elaboration with the institutionalization of the U.S. “matrix of inquiry.”

In studies of the emergence of the American university, this shift in the meaning and practices of inquiry are often summarized as the replacement of an American version of Baconian induction\textsuperscript{129} or the inculcation of morality with methodological objectivity

\textsuperscript{128} Cantor’s set theory and Frege’s axiomatization of number are, for instance, elaborate mathematical languages experimentally modeling the system of logic so cathected by interwar Logical Positivists and by many contemporary analytical philosophers working in a positivist mode.

\textsuperscript{129} The simplified American understanding of Bacon was transmitted largely through the works of Thomas Reid and his disciples and consisted of three inter-related assertions about science: the ultimate aim of science was the inductive discovery of natural law from observable facts; natural laws were invariable; and hypothesis was forbidden. This culture of inquiry was predominant from the middle of the eighteenth century through the end of the nineteenth. See: Reuben (1998) chapter two, “Science and Religion Reconceived”
and experimental practice. Poovey makes this move for instance (though in a broader context) when she presents the late-nineteenth-century elevation of “objective” numerical description and model-building over narrative interpretation and induction as the key to apprehending the historical emergence of a new epistemological unit in the “postmodern fact.” In all accounts, a much-noted feature of the university-based, post-1870 reorganization of intellectual life and scientific practice around communicability has been the supposed replacement of individual belief and interpretation with the systematic deductions of a value-free, ((post)modern) “science.” These are the sets of historical portrayals to which I would like to add an analysis of the technology of mathematical models as an extra-ideological but still conceptual set of operations. Because mathematically described models of cognition (attention), the market (equilibrium), and systematic management (graphs) gain their ability to rigorously designate distinct domains of disciplinary intervention from a mathematical, rather than alphabetic, thinking/writing nexus, they are indeed particular kinds of facts with specific articulatory capabilities.

While I agree with Poovey’s basic periodization of this new, or “postmodern” form of evidence (or “epistemological unit”), I would note that she seems to be reading the post-1870 autonomization and scientific idealization of numerical description and model-making as a socially privileged instance of alphabet-based, linguistic interpretation. Mathematics is indeed a human language, but it is not “interpretive” in the

---

130 See: Reuben, Making of the Modern University; Veysey, Emergence of the American University; Marsden, The Soul of the American University; Furner, Advocacy and Objectivity; Christopher Jenks + David Reisman, Academic Revolution, (New York: Doubleday, 1963).
alphabetist\textsuperscript{131} sense she seems to presume.\textsuperscript{132} Rather, math is a distinctly intervening, inscription-based\textsuperscript{133} kind of conceptual technology that works by formalizing connections between symbols that can in turn be associated with diverse cultural or material elements in order to build a model. Math is thus best understood, in a Latourian sense, as a multipurpose translation device for connecting math-savvy scientists, engineers and philosophers to equipment-generated phenomena — or just to each other — by operational codification.\textsuperscript{134}

\textsuperscript{131} Alphabeticism is “the insistence that we interpret all writing [...] along the lines of alphabetic writing, as if it were the inscription of prior speech.” Brian Rotman, “Thinking Dia-Grams, Mathematics, Writing, and Virtual Reality,” in Mathematics, Science and Postclassical Theory, ed. Barbara Herrnstein Smith and Arkady Plotnitsky, (Durham: Duke University Press, 1997), 16.

\textsuperscript{132} The historical and conceptual distinctiveness of modern mathematics consists in its late-sixteenth/early-seventeenth-century transformation from a previous practice of verbal mathematical argumentation into a system of symbols and apparatus for manipulating symbols according to rules. Collins, Sociology of Philosophies, 848.

From a practical perspective, the difference of mathematics consists in its writing/thinking nexus. For instance, while the cognitive capacities made possible by literary interpretation can involve imagined proxies and identificatory surrogates of ourselves (and are thus, like math, a conceptual technology of projection), these and other interpretive practices made possible by alphabetic writing do not involve the participatory, materially effective manipulation of signs: in order to “read” math, one must not only project an imagined self into the world conjured by mathematical description, but also “do math” (i.e. manipulate signs according to rules encoded in the signs themselves). Rotman, “Thinking Dia-Grams,” 35.

\textsuperscript{133} As Brian Rotman has shown repeatedly in his semiotic accounts of doing math, “Thinking in mathematics is always through, by means of, in relation to the inscription of mathematics.” Ibid., x; Rotman, Ad Infinitum: The Ghost in Turing’s Machine, Taking God out of Mathematics and Putting the Body Back In (Stanford: Stanford University Press, 1993); Brian Rotman, Mathematics as Sign: Writing, Imagining, Counting (Stanford: Stanford University Press, 2000).

\textsuperscript{134} In Science in Action, for instance, Latour characterizes the conceptual work done by mathematics in terms of metaphors of joining, linking, association, and alignment. (239, 241, 242)

Randall Collins also offers a nice explanation: “Mathematical technique becomes important for scientists because it enables them to give an especially obdurate character to at least part of their arguments; but this is the obdurate reality of certain chains of reflexive communication operations, which it has become the business of mathematicians to investigate. [...] Mathematics is a bridge: it shares with the scientific network the character of being social; it shares with equipment genealogies the character of being a lineage of techniques.” (874)
Mathematical translation is not, however, arbitrary in the connections it facilitates and codifies. Mathematical branches developed independently of one another remain distinct symbolic systems until put into commutable contact. Prior to the middle of the nineteenth century, for instance, complex algebra and geometry were not on speaking terms. Over the course of the nineteenth century, however, many branches higher mathematics developed extraordinary capacities for translating complex algebraic quantities (previously only re-presentable in symbolic-numeric notations) to graphical depiction in geometric space. The full history and technical details of these developments exceed the scope of this study, in part because what is remarkable about nineteenth-century mathematics is the depth and breadth of work.\(^{135}\) We can however, mark three major, relevant developments: the quaternion analysis that became vector analysis, liberalization of the notion of function, and non-Euclidean geometry. Quaternion analysis (1843) solved the early-nineteenth-century foundations crisis in mathematics by conceptualizing “absurd” (negative and imaginary) numbers as geometric orientations of lines in space, thus inviting the reformulation of multidimensional algebraic problems in geometric terms.\(^{136}\) This association between complex algebra and geometry was then further developed by J. Willard Gibbs into vector analysis/calculus in the 1870s as a system of mathematics applicable to two-plus (i.e. especially three) dimensional space.

Equally fruitful in terms of extending the practical and analytical applications of


geometrically graphed space was the liberalization of the previously computational conception of functions that took place in the middle of the nineteenth century, primarily in the small German university town of Goettingen. Lejeune Dirichlet, Richard Dedekind and Bernhard Reimann (the latter most famously as an expositor of a non-Euclidean geometry) were focused collectively on reconceptualizing geometry in conceptual, axiomatic terms. For instance, in a paper on the representation of arbitrary functions, Dirichlet defined \( y \) as a function of \( x \) if to each value of \( x \) there corresponds a unique value of \( y \), independently of whether the correspondence could be captured by any mathematic expression or rule. Although it has not been without controversy, Dirichelet’s redefinition paved the way to the predominant twentieth-century conception of a function as an arbitrary “graph” which can be identified with a set of ordered pairs (typically but not necessarily, of numbers). 137

Dirichelet’s reconceptualization of geometric functions as ontologically arbitrary expressions of relations that need not necessarily be amenable to calculation was but one example of the broader shift in the writing/thinking nexus of mathematics near the end of the nineteenth century. 138

137 Ernset Nagel, "The formation of modern conceptions of formal logic in the development of geometry," Osiris. 7, 202. Nagel’s 1939 paper is a classic in the history of mathematics. His thesis here is that the emergence of the principal of duality (exhibited, for instance in non-computational conceptions of functions as sets of ordered pairs) helped to bring about the discipline of modern logic. “The formalization of geometry so that is can be construed as a hypothetico-deductive system, is only one example of the persistent attempt to axiomatize the different branches of mathematics, and to view them, at least for the purposes of further analysis, as so many “symbolic” systems with no specific reference or application…clearly formulated and systematically explored only after pure geometry had been freed from its traditional associations with space, and only after its character as a calculus had been isolated from its applications. (202-203)

138 See the essays collected in Revolutions in Mathematics, ed. Don Gillies, especially: Luciano Boi, “The ‘revolution’ in the geometrical vision of space in the nineteenth century, and
It is a fair if somewhat crude summary of the history of geometry since 1800 to say that it has led from the view that geometry is the apodeictic science of space to the conception that geometry, in so far as it is a part of natural science, is a system of “conventions” or “definitions” for ordering and measuring bodies.\textsuperscript{139}

The global philosophical, cultural and scientific influences of conventional, or non-Euclidean geometries has been the subject of much historical work that I won’t review here except to note that it emerged simultaneously with a number of foundational developments in algebraic number theory, projective geometry, Galois theory (incl. the theory of groups), elliptical function theory and more besides. Uniting vector analysis, graphed conceptual functions, and non-Euclidean geometry with these diverse developments in higher mathematics and geometry was an ontological generalization of mathematical evidence, or proof, that Jeremy Gray describes as a “new, more conceptual, less computational mathematics. With the changing conception of the objects of mathematics came new criteria for evaluating, governing, and directing their use. […] the new conceptual and aesthetic criteria have achieved paramount position at the level of explanation, overthrowing mere calculation as the criteria for truth.”\textsuperscript{140} Gray has argued for conceptualizing this “revolution” or Kuhnian paradigm shift in mathematical proof practices and philosophy as a mathematical modernism.\textsuperscript{141} Likewise, historians of cultural modernism are increasingly looking to widely publicized developments in math, geometry and related theories of physical space as sources of inspiration or influence.
defining the period. This all seems fine, but my specific focus here is on the multiple historical emergences (physical, algebraic, geometric) of mathematical models as an axiomatically elaborated form of evidence that critically capacitated the representation-for-intervention of three-dimensional space.

Practically speaking, the importance of mathematical modeling as a “hypothetico-deductive system” of explanation in the long twentieth century has consisted in the (commercial and scientific) popularization of graphical techniques for visualizing, and then intervening in, the connecting-formalizations of (sensation, utility, and work) functions in geometric space. Popularization has relied in turn, of course, on networks of mathematically or graphically literate people paying attention, on the material conditions of mass-circulation press and communication-based science, and on the broad politico-epistemological culture of expertise that values such forms of evidence—all part of the “rendering credible” mission of research universities. But my analytical point is this: If we understand mathematical modeling techniques as “multipurpose translation devices” with the specific conceptual capacity of re-presenting internally complex, hybridized systems by designating functional rules of inter-operability, correspondence, combination, etc. — if, in short, we “get” the conceptual agency of “hypothetico-deductive” modeling, then its simultaneous emergence in a number of disciplinary arenas

143 The phrase is Nagel’s. See FN 91 above.
144 Graphs and mathematical modeling were also becoming popular in academic fields like physiology, where they were used to represent multi-dimensional physical and chemical systems like blood. See Thomas L. Hankins, “Blood, Dirt, and Nomograms: A Particular History of Graphs” (1999).
and national contexts appears as a series of solutions for handling increased complexity and interactivity no different in kind from electrical field theory or contemporary fractal visualization techniques (i.e. as an conceptual/inscriptive articulation of newly relevant, equipment-generated, entities).

In the U.S. however, this conceptual technology and form of evidence was extended (i.e. made materially effective) in particular historical and institutional conjunction with a rapidly developing national industrial apparatus of practically-oriented research — which is to say, through the university-based institutional “matrix of inquiry.” As a consequence, managers, knowledge workers, and engineers of every sort (i.e. not only, but yes especially in corporations)\textsuperscript{145} were uniquely capable of putting conceptual and technological innovations like the mathematical modeling of three-dimensional space and the axiomatization of diverse work and utility functions to the service of a multi-site organizational revolution promoting extraordinarily complex and systematic accumulation through the cultivation of mass markets.\textsuperscript{146}

\textsuperscript{145} For instance, scientists were increasingly becoming/being made managerial in the management of labs.

\textsuperscript{146} Zunz, \textit{Why the American Century?}, 94.
Conclusions

Genealogical practice transforms history from a judgment on the past in the name of a present truth to a counter-memory that combats our current modes of truth and justice, helping us to understand and change the present by placing it in new relation to the past.

~ Michel Foucault

In Pursuit of the Historical Human/ities

Under what rules of evidence does one accomplish socio-historical cultural criticism in a way that does not amount to the close and clever reading of unusual texts? This has been my endeavor here, and in closing I find that the conceptual difficulties and rhetorical risks of such an effort are significant. To begin with, of course, there is no “Literature” in this study. Rather, my immediate object is a model of human cognition that underwrites procedures of socialization and accumulation critical to the emergence of U.S. hegemony. Concretely, these procedures are so many techniques for arranging bodies in space in specific conjunction with visually stimulating media and/or machinic interfaces in systematically staged interaction rituals that facilitate both socialization and accumulation. In this sense, I have looked at attention largely in the

---

1 At least, not as it has been traditionally conceived in its modern (post-Romantic) sense as “poetry in the broad sense,” or imaginative writing. For a concise treatment of the historical and lexical sedimentations of the meaning of the word literature, see Raymond Williams’ “Literature” entry in Keywords: A Vocabulary of Culture and Society. (Oxford and New York: Oxford University Press, 1983, revised ed.), 183-188.
same manner as Jonathan Crary has studied the topic — which is to say, as a condition of interface.

Beyond my formulation of the problematic of cognition that goes with this interface, the major place where my account has differed from Crary’s and other related accounts of the “attention economy” and “the society of the spectacle,” is in my way of thinking about micro-processes of capitalization and the historical emergence of “the economy” as a domain of causality in the long twentieth century. By taking up Arrighi’s macrosociology of “regimes of accumulation” in conjunction with Latour’s microsociology of irreversible capture, my framework for the causal dynamics of historical capitalism necessitates no talk of modes of production or of class-based ideological causality. It seems to me that the most substantial upshot in thinking about accumulation rather than production consists in refraining from an analytical preoccupation with labor and alienation, and therein, from engaging certain historiographical limitations of humanist forms of history as outlined in my introduction to this study. While it is certainly true that one can profitably conduct an expanded analysis and politics of labor which includes those presently predominant forms of socialized work that have been traditionally excluded by the category (e.g. affective-

---

2 Crary has been investigating the topic of attention since at least 1989, when he published, “Spectacle, Attention, Counter-Memory,” *October*, vol. 50, (Autumn 1989), 96- 107. *Techniques of the Observer*, and *Suspensions of Perception*, are, to my mind, ongoing investigations of the problematic of attention identified in this first article.

work and knowledge-work), it is also true that renunciation is preparedness for another relation — that, as I have indicated throughout this study, one does not need to engage analytics of labor or class to talk about capitalist accumulation and hegemony. So, while I do not claim to have here advanced an alternative critical framework for instigating outrage, or for imagining alternative forms of political organization (two perpetual, necessary tasks), I do understand one of the accomplishments of this dissertation to consist in its extended effort at reconceptualizing historical dynamics of causality so that the question of who or what is the agential “subject” of history remains an open question.

Indeed, what I have explicitly not found or presented is an attentional “theory of the subject” (hence the phrase “model of cognition”). If anything, it seems to me that the discourses and techniques of attention in the long twentieth century are rituals of subjection defined by a shared form of problematization whose articulatory project is specifically not Romanticism’s instructional project of character-formation, sensibility-cultivation, and other such tactics of subjective interiorization. Rather, attention is a functional capacity for registering sensory force in the moment; if this is a psychology or theory of human experience, it is, as John Dewey noted early on, decidedly under-

---


5 To clarify: subjection is neither subjectification nor subjectivization, and, unless one is working within a presumed psychoanalytic theory of the subject (which I am not), there is no entailment of a specific kind of subject-formation or psychology attached to subjection.

specified. Sensory force can be psychological stimuli, advertising messages, laboratory objects, utility vectors, or later, images on a screen. And this is part of my reason for selecting predominantly non-literary evidence despite the fact that the turn of the twentieth century marks a period of unprecedented increases in literacy rates, cheaper reading materials and consequent expansions of the reading public: Apprehending the diverse simultaneity of attention as a form of problematization requires that we drive a wedge between reading and reception, between language and representation, and between hermeneutics and human cognition. In other words, there is no determinant relation between attentive cognition as it has been articulated in this last long century, and linguistic interpretation.

Science studies enters the scene just here. Latour’s “immutable mobiles” are evidentiary documents establishing a disciplinary network and in this aspect, they might seem to privilege the linguistic-literary in an expanded sense (i.e. words written down) as the basis of technoscientific networks. But his emphasis on mobilization and the rhetorical powers of visualization couples with the field’s broader emphasis on rethinking agency as an always-locally-emergent property of human and non-human assemblages, collectifs, microbes, and/or conceptual technologies (e.g. math) to offer a powerful methodological corrective to literary-critical studies’ “pre-emptive

---


occupation with interpretive criticism." The thing to be critically apprehended in science studies’ symmetricalizing accounts is neither meaning nor a critical appraisal of how far from some myth of anteriority (Western Civilization, Nature, grace, cultural unity, “knowable community,” non-”dissociated sensibility”) we humans have fallen or stand at risk of falling from, but how compelling (in Latour’s language, “conscripting,”) evidence is stabilized and staged as such.

At points throughout this study, I have introduced work from contemporary science studies scholars in order to think differently about what criticism can be. With Latour’s microsociological account, I propose an alternative conceptualization of capitalization as irreversible capture across multiple domains. By pushing back Timothy Mitchell’s re-historicization of “the economy,” I propose a different timeline for, and way of thinking about, the emergence of a specifically mass-market economy and corporate system of accumulation in the long twentieth century. My intention in both instances has been to re-open one of literary-critical studies’ foundational foreclosures; the historical emergence of twentieth-century modernity. Previously a discipline with at least some historical investments, between 1930 and 1950 Literature institutionalized a division between itself and the “merely fragmentary and incoherent flux of history and historical knowledge” with its adoption of a critical pedagogy of “close reading”. That pedagogy and critical procedure of interpretive explication, in conjunction with shifting sets of aestheticizing rationalizations for why Literary texts are important (and

---

10 i.e. through literary history and philological studies of shifts in language-use.
11 Gerald Graff, Professing Literature, 163
esp. salvific), remains today’s disciplinary orthodoxy\textsuperscript{12} (however theoretically scrutinized and historicized that orthodoxy may be).

The idea that Literary texts and the aestheticized mode of attention they require can, in that staged interface of “close reading,” restore lost human unities is surely a belated instance of Foucault’s nineteenth-century “sciences of man,” in which “man” and his works are posited as the sole guarantee of the future and the sole reservoir of value and meaning.\textsuperscript{13} But I think too that this particular pedagogical and critical scene, arising as it does, in the postwar U.S., bears its own significance within the context of the genealogy of attention here traced. Like other modes of attentive cognition, “close reading” is an ahistorical form of consciousness defined in terms of a socio-technical interface across which a functionally defined sensory force (the putatively salvific “force” of Literature) psychologically stimulates the person paying attention.\textsuperscript{14}

Literary-critical studies, in its still-contemporary formation and pedagogical/critical procedures, articulates students of Literature to U.S. hegemonic power and procedures of socialization and accumulation primarily by training a national citizen-subject and a

\textsuperscript{12} The other, somewhat older orthodox feature of contemporary literary-critical studies’ disciplinary identity is the field coverage principle, established with the initial institutionalization of literature at the end of the nineteenth-century.


\textsuperscript{14} I.A. Richards’ psychological theory of the value of literature is the paradigmatic instance here. Beginning especially with Science and Poetry (1926) and Practical Criticism (1929), Richards builds a culturally therapeutic theory (ostensibly based on experimentally staged reading protocols) of poetry as the emblematic “means of ordering our minds,” if we are readers, and the medium through which writers accomplish their task of “ordering, controlling and consolidating” experience.” Richard’s theory of literature and pedagogical procedures were subsequently institutionalized in the postwar U.S. through the recommendations he co-authored in the Harvard Redbook and through the general education movement. See Graff, Professing Literature, esp. chapter 10, “General Education and the Pedagogy of Criticism,” 162-182.
professional-managerial class that can work with language. In light of the fact that enrollment rates jumped from fourteen to forty percent between 1940 and 1964, this historical conjuncture between pedagogies of “close reading,” the increased cultural authority of Literature (as formulated under a postwar program of general education), and a quantum leap in the social relevance of university-training is significant on its own terms as a massive democratization of who gains access to higher education. Indeed, Gerald Graff and others have remarked upon the scalable pragmatics of “close reading” — the way it allows more students and more teachers with less shared historical and cultural background to gather together around the same pedagogical object. The flipside to this postwar expansion of higher education has of course been an intensification and extension of the university-based “matrix of inquiry” to include military operations research and, more recently, the de facto public funding of industrial research for sectors like biotechnology and pharmaceuticals. As Christopher Newfield’s recent work documents, and contrary to conventional understandings, the people funding this “matrix of inquiry” are tuition-paying students and the humanities faculty that carry a disproportionate load in teaching those students.

---

15 Graff, Professing Literature, 155.
16 Conventionally, this tighter institutional coupling between research universities and emerging, R+D-heavy industries is traced to the Baye-Dohl act of 1980, which allowed for the transfer of the intellectual property rights on publicly funded university research to market.
What I would also point out here is that orthodox critical and pedagogical procedures, insofar as they tacitly enact an aesthetic ideology of Literature\textsuperscript{18} as an icon of human value shored up against the ruins of a “scientifically neutralized nature”\textsuperscript{19} and/or the vulgarities of mass markets, consumerism, capitalism and/or the culture industry — insofar as these domains and their discourses of value are “othered” in the epistemic privileging of texts and reading, the discipline of Literature is disenfranchised as a site for thinking critically about (among other things) how power and resources concentrate and disperse. I am not, by the way, under the impression that this critique is original. (Here I am in the specific shadow of Contingencies of Value.) I bring it up in this context in order to underscore the limitations that go with the fact of orthodox literary-critical studies’ initial and ongoing disciplinization by the problematic of (aesthetic, readerly) attention. To the extent that it has normalized the “close reading” of

\textsuperscript{18} Perhaps it does not go without saying here that aesthetic theories of Literature certainly pre-date contemporary literary-critical studies. For instance, Literature as an aestheticized category of artistic production (defined paradoxically in terms of its psychological effects on readers and as an independent aesthetic object) gained currency as a critical category with the concurrent development of Romanticism and aesthetics as a discrete branch of philosophy near the end of the eighteenth century (it was only then, for instance, that Longinus’ On the Sublime was taken up in connection with expressive theories of literature). Centuries later, this Kantian category of Literature as an aesthetic object formed Rene Wellek’s influential (if subsequently reduced) conception of Literature in Theory of Literature ([1949] 1970). Wordsworth, Coleridge, Arnold would all be intermediating nodes of influence, or key formulators, were I concerned here to lay out a genealogy of Literature as a modern modality of Aesthetic-Idealist cultural critique. See: Raymond Williams, Culture & Society: 1780-1950, (New York: Columbia University Press, [1958] 1983); Martha Woodmansee, The Author, Art, and the Market: Rereading the History of Aesthetics, (New York: Columbia University Press, 1994); René Wellek, Discriminations: Further Concepts of Criticism (New Haven and London: Yale University Press, 1970). Sarah Lawall describes how the reception history of Wellek’s Theory of Literature has reduced its legacy to a Formalist New Critical theory of literary “suchness:” “The major part of Wellek’s work to be welcomed into American academia was his Kantian emphasis on conceptualizing the literary work of art as an autonomous object of study.” See: Sarah Lawall, "Rene Wellek and Modern Literary Criticism." Comparative Literature 40, no. 1 (1988): 4 - 7.

\textsuperscript{19} This is phrase of I.A. Richards’, from Science and Poetry (New York: W.W. Norton, 1926).
textual artifacts as its defining pedagogical and critical procedure, the discipline of Literature has been more a characteristic moment of U.S. hegemony, than a site of transcendental, or even immanent critique of those vilified (but substantially unengaged) scientific and market-based networks of mass communication through which U.S. hegemony has largely been articulated.

To the extent that the broadening disciplinary field of “Literature” has attempted to move beyond “close reading” and engage these networks and technologies of mass communication, typically through some postwar conceptualization of mass or consumer culture in the critical mode now recognized as “Cultural Studies,” it has been significantly limited by early Frankfurt School formulations of commodity fetishism and reification. From Adorno and Horkheimer’s “Culture Industry” essay to the New Left’s revival of Lukác’s “Reification and the Consciousness of the Proletariat,” the commodity fetishism problematic conceptualizes the mass means of communication that characterize culture in the twentieth century as little more than means of capitalist “instrumentalization.” Indeed, many humanities-based applications and discussions of Arrighi’s macrosociology center on the way in which his cycles of material-financial expansion turn on investments in or extractions from the commodity form (i.e. the alternation between Marxian moments of M-C and C-M1). For reasons explained


21 For instance, Ian Baucom’s, *Spectres of the Atlantic* (Durham: Duke University Press, 2005) builds a Benjaminian philosophy of history in terms of this alternation.
earlier, I don’t understand financialization in terms of its relationship to commodities so much as a functional index of structural transformation and fluidity. Perhaps more to the point, “the commodity form,” as a socio-analytic theory of culture, relies upon and reinscribes a labor theory of value. Notwithstanding Marx’s mathematical derivation of surplus value in *Capital*, the labor theory of value is an axiomatic proposition that introduces more contradictions than it resolves and thus has simply never had legs for me as a way of thinking about culture, mass media or (especially) science.

Having said all of this, I should offer that I do understand this dissertation as a Cultural Studies project. Most of my key concepts can be understood as fully in the lineage of Cultural Studies: for instance, hegemony (however post-Gramscian) and Foucault’s theories of discipline, genealogy and governmentality are fully “Cultural Studies” in orientation and don’t rely on the commodity form as a critical category of analysis. I might emphasize, however, that some of this study’s greatest conceptual difficulties and rhetorical risks have been those involved in wrestling especially the former (hegemony) from the ontological or metaphysical philosophy of politics and history in conjunction with which epochal histories and periodizations are often presumed to operate in cultural studies. Choosing instead to construct an account of the

---

22 See pages 5-6, especially FN 6.
23 The notion of a “secret history of the commodity” invoked by the commodity form as an analytic is based on two distinct but connected and complementary theories. First, the theory of reification says that the relations in between people are transformed into relations between things as a result of the generalization of the commodity form. Second, the theory of commodity fetishism says that the products of human labor (understood here as the origin of value) are transformed into godlike creatures with the power to dictate the terms of daily work. Taken together, the two constitute an entire aesthetic wherein a previous “complex whole” of cultural life (food, work, worship, art, etc.) and human sensory experience is artificially abstracted, divided and taylorized.
24 See the “Rate and Mass of Surplus Value,” in *Capital*, vol. 1.
emergence of American hegemony in the purposefully weak idiom of “political culture,” and from domains as diverse as experimental psychology, neoclassical economics, mass print media, systematic management, and advanced mathematics, leaves me open to charges of structuralism (and therein to the charge of having unintentionally fallen into some version of the expressive causality explanation that I have worked to avoid). I will simply state, therefore, that the (constructivist) kind of Cultural Studies I’m doing here leaves the question of the “nature” of the connections amongst these different domains unengaged in those terms. Rather, I account for structural similarities between the different discourses and techniques of attention here traced in terms of their shared form of problematization. That form of problematization (conceptually-discursively and technically) articulates people — it links them up and makes them intelligible — to a diversity of domain-specific procedures of socialization and accumulation whose consequences and currencies vary according to context, but whose paradigmatic ritual of subjection has been defined in terms of attention.

Whether the currency is money, scientific knowledge, or audience attention, one long-term historical consequence of these discourses and techniques has been an emergent capacity for systematic self-reproduction and irreversible capture at-a-distance through the formalisation of mass markets and the internalization of their previously “social” conditions of transaction — corporate-capitalist hegemony through organizational innovation and systematic accumulation, in other words. I have however, shifted the grounds of this otherwise standard Cultural Studies argument (that hegemony/capitalism reproduces itself by staging the “relations of representation” to
which people pay attention), \(^{25}\) by relativizing the species of objectivity in terms of which the politics of cultural truth, order and authority were formulated in the decades around the turn of the twentieth century. With the university revolution in the material bases of intellectual innovation and cultural authority, a series of interlocking epistemological and representational shifts displaced and reoriented previously classical (and in the U.S., especially theological and Baconian-inductivist) conceptions of knowledge, truth and inquiry. Taking their place was an array of cognitivist theories of scientific truth and inquiry, and mathematical-formalist models of knowledge with their “hypothetico-deductive” systems of reasoning: both developments complicate epistemological questions of evidence and political questions of how it is that cultural authority works in the long twentieth century, and they do so in ways that are not quite reducible to analyses of class-based ideology or the “social” operations of professional/scientific expertise.

Materially, it was the research universities, agricultural stations, industrial labs, and engineering schools constituting the turn-of-the-century U.S. “matrix of inquiry” that institutionalized an enduring network of linkages between newly enfranchised (i.e. translated to three-dimensional problem spaces) mathematical models and graphs, equipment-generated phenomena (e.g. functional attention, electricity, information, marginal utility), and various information workers (e.g. secretaries, managers, scientists, consumers). On the strength of this network of mutually reinforcing

\(^{25}\) As Stuart Hall puts the matter, “The question of hegemony is always the question of a new cultural order…Cultural order [is] the power to define, to ‘make things mean’,” from Stuart Hall, The Hard Road to Renewal: Thatcherism and the Crisis of the Left, (London: Verso, 1988), 170.
inscriptural/conceptual techniques, equipment-generated phenomena and socio-technically-situated humans, calculating conventions and related institutional imperatives were re/configured in ways more adequate to the increasingly complex and interconnected times. What came to count, in other words, were the forms of evidence and interaction rituals that could be reliably circulated and staged according to the organizational logics of wide communicability (pursuant to public knowledge) and scientific objectivity (the “aperspectival”/”mechanical” kind). This historical emergence of a public culture of scientific objectivity around the turn of the twentieth century was thus driven by communicative technologies and visualization techniques well in advance of the much-maligned inter- and post-war mass mediation of broadcast technologies; and according to governmental rationalities quite distinct from “British Free Trade” liberalism. Outlining this point of relative difference and its complexity of emergence has been one of the historical investments of this study.

In closing, it may also be worth outlining my own points of differentiation as a scholar. My historiographical, methodological and theoretical investments hinge on commitments to the following cluster of critical interdictions and dispositions:

- symmetry (as defined initially by David Bloor26 and radicalized by Latour); a
- nominalist conception of the operations of language and math; an invested agnosticism

with regard to questions of the human (we are more variable, complexly mediated and

26 The symmetry postulate is a commitment to treat all beliefs and systems of thought — true or false, scientific or not — as requiring the same sort of causal explanation. It was initially formulated by the Edinburgh-based Strong Programme in sociology of science, see esp. David Bloor, *Knowledge and Social Imagery*, (Chicago: University of Chicago, 1991 [1976]). Latour radicalizes this postulate by treating natural and social causalities equal in their requirement of an explanation. See esp. *We Have Never Been Modern*. 195
animal than most would like to admit); and finally, a genealogist’s affection for thinking history in terms of processes of contingent stabilization. For folks of a certain disposition and training, this can all add up to a skepticism that tries the patience and disables otherwise reliable conceptual moves (esp. foundationalist, axiological and transcendentalist critiques). It seems to me that there is little one can do to assuage such critical tastes for firm ground, order and escape without, in fact, perpetuating them (i.e. writing and publishing more versions of the same). On the other hand, the alternative fruits as I see them, are the fruits of the kind of constructivist cultural criticism performed in this study: they include (among other things) a multi-dimensional sociology of connection, articulation, and mediation that opens up onto, rather than proceeding from a foreclosure of, historical questions of the human and how it is that thinking happens.
Bibliography


197


Mears, Charles E. "Advertising That Appeals to the Senses the Coming Type." *Printer's Ink*, January 14, 1915, 132-35.


Robison, Linda M., David A. Sclar, Tracy L. Skaer and Richard S. Galin. "National


Schlink, Stuart Chase and F.J. Your Money's Worth; a Study in the Waste of the


Shyer, Walter A. Analytical Advertising. Detroit, 1912.


Skocpol, Theda. Diminished Democracy: From Membership to Management in


Toporowski, Jan. The End of Finance: Capital Market Inflation, Financial Derivatives


Biography

Heather Pilatic was born in 1976 in Neepawa, Manitoba. In 1998, she received her Bachelor of Arts in English and Women’s Studies from Pomona College in Claremont, California. In 2001, Heather entered the Literature Program at Duke University, where she completed her doctorate in 2008.