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Statistical Fictions: Nineteenth-Century Narrative and the Probability of Change

DISSERTATION

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by

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VITA

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ABSTRACT OF THE DISSERTATION

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"Statistical Fictions: Nineteenth-Century Narrative and the Probability of Reform" explores the rise of statistically inflected narratives in the period spanning from 1826 to 1876. It interweaves nineteenth-century writings on mathematics and logic with novels and other works that rely on narrative to argue that mid-century statistical and probabilistic reasoning developed in dialogue with experiments in narrative form and projects of social reform. In statistical narratives, a range of literary forms such as science fiction, dialogue, detective fiction, and the realist novel provide the structures through which both authors and readers think through social problems involving populations. These narratives employ a particular version of statistical thinking that conceives of the world typologically rather than in temporal terms, and challenges the way that people were typically categorized into groups. By doing so, they expose how moralizing certain kinds of social forms, such as theories of character, allows prejudice to become incorporated into social structures and institutions.

This project focuses primarily on the work of four women—Mary Shelley, Florence Nightingale, Mary Elizabeth Braddon, and George Eliot—all of whom found in their literary

writing a way of both disseminating and criticizing the claims of contemporary science while reaching a broad and inclusive audience. At the same time, all four were interested in using that science to think through the possibilities and limits of self-determination and the power of literature to effect practical social change. They all sought limits to the power of such forces as evolution, heredity, and contagion to determine the lives of individuals, and they designed their innovative literary versions of statistical modeling to reduce suffering in what they regarded as a society in need of healing.

INTRODUCTION

In his *An Essay on the Principle of Population* (1798) Thomas Malthus discusses the nature of a population by describing the differences which characterize the individuals of that population.

> The great variety of combinations upon the dice, in a repeated succession of throws, appears to me not inaptly to represent the great variety of character that must necessarily exist in the world, supposing every individual to be formed what he is by that combination of impressions which he has received since his first existence. And this comparison will in some measure, show the absurdity of supposing that exceptions will ever become general rules; that extraordinary and unusual combinations will be frequent; or that the individual instances of great virtue which have appeared in all ages of the world, will ever prevail universally. (Malthus 114–15)

This passage introduces a few ideas that influenced probability theory at the beginning of the nineteenth century. By referencing combinations of dice, it draws on the early studies of probability designed to calculate the odds of throwing a given number. Rather than thinking about the dice or the numbers themselves, though, Malthus makes a direct comparison between the variety of outcomes and the variety of people in a given population. This comparison grows out of the assumption that the laws and patterns that one might use to understand and predict occurrences in the physical world would find a counterpart in the social and psychological aspects of human life. Early purveyors of probability saw great potential in extrapolating social laws based on what they knew about natural laws and their consistency. In his *Philosophical Essay on Probabilities* (1812), for example, Pierre-Simon Laplace uses very simple mathematical calculations to demonstrate the probabilistic laws that govern both planetary

motion and human behavior. He writes that probabilistic "analogy is based on the probability that similar things have the same kind of causes and produce the same effects. The more perfect the similarity, the greater the probability" (Laplace 114). For Malthus, the comparison between dice throws and people serves more as an analogy than as a calculation of the actual number of differences between individuals in a population. By concluding that his analogy demonstrates the absurdity of "supposing that exceptions will ever become general rules," Malthus advocates for statistical knowledge as a basis for developing and refining the prevailing philosophical and scientific views of the world.

Along these lines, Malthus envisions his *Essay* as giving a statistically reliable account of the world's population that accounts for individuals within the larger group. Catherine Gallagher has written that the "*Essay on the Principle of Population* radically reconceptualized the social organism" (Gallagher 36) by conceiving of the population as an interdependent network, or ecosystem, rather than as "a healthy particular body" (39). In his Preface, he offers an apology for the preliminary nature of his work, acknowledging that "the essay might, undoubtedly, have been rendered much more complete by a collection of a greater number of facts in elucidation of the general argument" (33). In fact, in later editions he supplemented the text with copious tables and statistical data to demonstrate that his theory of population could be taken as universal law. By doing so, Malthus' version of statistical knowledge not only accounts for uncertainty within scientific prediction but also leaves a space for individual variation.

Although Malthus published his *Essay* just prior to a rapid expansion of statistical methods which would have a profound influence on geology, medicine, economics, and most other scientific fields, his version of statistical thinking anticipates, in some ways, the cautiously

optimistic approach that other writers took as they responded to the new fascination with questions of probability and social statistics.

My dissertation explores the rise of statistically inflected narratives in the period spanning from 1826 to 1876. While the prevailing scholarship on probability in the Victorian novel centers on the relations between narrative and scientific formulations of chance, coincidence, and risk, my project redirects attention to the ways that many narratives offer an account of probabilistic thinking as a basis for sociality. These works, I argue, often used statistics as a language and a model for thinking about interconnection—thus, for example, viewed statistically, patterns of behavior remain constant from year to year, which implies a connection between otherwise distant individuals.

In *The Powers of Distance* (2001), Amanda Anderson writes that "feminist histories of science have asserted an intimate relation between the celebration of male rationality and the denigration of nature and femininity. Feminist studies of modernist aesthetics have shown that practices of detachment, denaturalization, and self-transformation are frequently gendered male and sharply counterposed to images of femininity as mired in nature or custom" (Anderson 25). In contrast to this and other gender-related stereotypes about science, I argue that novelistic examinations of scientific objectivity were often carried out by female authors during the nineteenth century, especially when they addressed concerns having to do with morality, health, and marriage. In my dissertation, I focus on works by Mary Shelley, Mary Elizabeth Braddon, Florence Nightingale, and George Eliot, all of whom expressed interest in the implications of statistical forms of world- and character-building. These authors responded to social problems in Victorian society which had pressing implications for political, social, and scientific practice.

By adopting the language of probability and statistics, nineteenth-century writers helped to solidify and shift that had taken both in the definition of probability itself and by extension in the way that people thought about the position of an individual within their social and physical environment. Historically, the word "probability" had been associated with opinion, personal belief, and being worthy of approval (from Latin *probabilis*). Barbara Shapiro has explained that during the seventeenth century, "mere probability" didn't have the status of either religious or mathematical certainty, instead being associated with accepting a second hand report (Shapiro 29). In *An Essay Concerning Human Understanding* (1689), Lock declared that "the highest degree of Probability, is, when the general consent of all Men, in all Ages, as far as it can be known, concurs with a Man's constant and never-failing Experience in like cases" (Locke IV.xvi.6). In this passage, Locke associates probability with consensus and with experience. By the mid-nineteenth century, the connotation having to do with testimony and authority had all but disappeared. In moving away from the testimony of authority, science demonstrated a new suspicion with regards to humanity's ability to perceive and accurately represent reality.

The fear that subjective representation would taint human understanding of nature spurred a move toward objective methods of study. In the book *Objectivity*, Lorraine Daston and Peter Galison describe "mechanical objectivity" in photography and atlas-making as a way to "protect images against subjective projections" (Daston and Galison 43). In a similar vein, early probabilists argued that using mathematical calculation, rather than personal perception, would help to avoid distorted assumptions. In his *Philosophical Essay on Probabilities* (1814) Pierre Simon Laplace warned that "probability based on daily experience, or exaggerated by fear or hope, affects us more than a larger probability that is only a simple result of calculation" (91). He was aware that people often resort to their own subjective experience to generate theories about

how the world works. Probability studies relied increasingly on what we now describe as the law of large numbers to avoid such erroneous predictions.

Lambert Adolphe Jacques Quetelet played a key role in incorporating statistical tables and data into the study of probability. In his *Treatise on Man* (1835) he outlines a method for studying the human body and behavior that relies on statistics, explaining that "in giving to my work the title of Social Physics, I have had no other aim than to collect, in a uniform order, the phenomena affecting man, nearly as physical science brings together the phenomena appertaining to the material world" (vii). Although making comparisons between the social and physical world wasn't new, Quetelet's work significantly influenced that of other scientists by establishing statistical analysis as the primary method for discovering laws that pertain to human sociality. His statistical tables allow for a side-by-side comparison between events and characteristics of different populations or between the same population across time. As statistics became incorporated as an essential part of scientific observation, science itself shifted away from claiming to discover absolute truth to claiming to produce statistical knowledge, meaning that while a given fact might be a correct description of a given population, it didn't necessarily pertain to individuals within that population.

In my dissertation, I analyze instances of what I describe as statistical thinking. Statistical thinking reflects an awareness of probability as a matter of calculation and emphasizes how individuals fit within the dynamics of the population to which they belong. My work responds, in some ways, to literary studies such as Emily Steinlight's *Populating the Novel* which argues that the new political paradigm developing in the nineteenth century relies on "a gross quantitative imbalance between biological life and the social order newly tasked with managing it" (Steinlight, *Populating the Novel: Literary Form and the Politics of Surplus Life* 3). Steinlight

examines the work of writers whose "literary techniques are organized around the formal principle of producing population in excess of material constraints" (3). Rather than focusing on how novelists portray populations, however, my work takes a closer look at individuals within those populations—how a person's character develops in relation to their environment and the group dynamics that surround them, and how they alternately conform to and resist the destiny that statistics would predict for them. Additionally, each of my chapters addresses the way that statistical thinking influences the forms in which these authors choose to write.

My project begins with Mary Shelley's 1826 novel *The Last Man,* which depicts the progress of a plague and is narrated by its sole survivor, Lionel Verney. I argue that Shelley's approach relies on her interpretation of Laplacian theories of probability, which understood nature as consistent and reliable in contrast to human frailty and variation. In the chapter, I explore how geology incorporated the methods of statistics in order to examine how *The Last Man* highlights ways that probabilism in its many forms can serve as a means for understanding the relationship between the human mind and the natural world. By modelling networks of interrelation, Shelley's apocalyptic fiction acknowledges the precarity of humanity in a broader, connected, natural world. It also celebrates the beauty of the individual human mind by presenting probabilistic reasoning as building a bridge between past and present, people and nature, and people of different origins.

My second chapter examines mid-century probability theories and the work of Florence Nightingale. I demonstrate that her philosophical reflections and her practical arguments for reform showcase the statistically inflected reasoning that she developed as a student of Adolphe Quetelet and John Stewart Mill. But one of the most striking features of Nightingale's work is the boldness of its generic experimentation. Her unpublished *Suggestions for Thought,* which

begins as a Socratic dialogue and contains the novella *Cassandra*, seeks a fictional mode capable of modeling the power of collectives to change institutions that will, in turn, redefine those collectives. Nightingale tries, in other words, to conceive the formal embodiment of a social world defined not by the tension Alex Wolloch describes as the "one vs. the many" but by the constant modification of group affiliations. Nightingale's experimentation with hybrid genres allows her to advocate for change in social policy while simultaneously offering a unique perspective on the disjunction between individual experience and larger social patterns.

In my third chapter, I find that Mary Elizabeth Braddon's 1860 novel *Lady Audley's Secret* responds to an anthropological model of criminality that developed in response to the work of statisticians like Quetelet, who collected information about the social and personal characteristics of criminals. Just as early-nineteenth-century phrenologists had sought to predict personality based on the contours of a person's skull, mid-century researchers looked for evidence of "born criminals," often accusing the poor of having natural criminal inclinations and higher chances for hereditary madness. In the novel, Lady Audley confesses to having inherited insanity from her mother, which she considers more damning than the actual crimes she has committed. She believes entirely that she has inherited a tendency to madness and violence; however, the book itself expresses doubt as to whether this is true, calling into question contemporary techniques for diagnosing and treating mental illness. The book's representation of Lady Audley as interchangeable with other women while the man who, like a detective, discovers her crime as eccentric and unique effectively exposes the limitations of statistical categories as tools for diagnosis. It also explores the degree to which a credible fiction—even one based on objective scientific methods—creates rather than describes the world.

My fourth chapter focuses on George Eliot's *Daniel Deronda* (1876). In the novel, as well as in many of her essays, Eliot addresses the limitations of probability theories and the notions of causality that people often find intuitive. In this chapter, I begin with a close reading of the initial gambling scene in order to argue that her resistance to the statistically-inflected stereotypes that people use to justify their beliefs stems in both from her study of Rousseau and from her understanding of the way that political and social institutions promote an unhealthy homogeneity. She uses the multiplot novel to great effect to examine how communities and subjects that are temporally or spatially distant can still exert a probabilistic influence over one another, often through heredity or inheritance. Thus, for example, while evolution appears as a matter of accrual, in which past generations exert unseen pressure on a single individual, probability leaves open the possibility for unpredictable results, especially when convention allows for personal choice.

Probability in Mary Shelley's *The Last Man*

Published in a time when practical research sought to combine objective observation with probabilistic models of interpretation, Mary Shelley's 1826 novel *The Last Man* imagines the degree to which a careful observer can both perceive and interpret the human mind using purportedly scientific methods in order to predict and interpret human action and its consequences. In addition to highlighting ways that an increasingly industrialized society interacts with nature, the novel addresses aspects of empirical methods of data collection, which in the early 19th century were gaining momentum as researchers sought to improve the rigor of existing scientific theories and to develop new technologies. Over the next several decades, statistical methods would influence the development of fields as disparate as geology, medicine, economics, and the social sciences. In his *History of Civilization* (1856), Henry Thomas Buckle would praise the parallels between natural and social laws, declaring that "in the march of society, an increasing perception of the regularity of nature destroys the doctrine of Chance, and replaces it by that of Necessary Connexion" and referencing both geological movement and the regularity of suicide from year to year as examples (Buckle 6). Buckle saw the development of probability and statistics as connected to progress and societal improvement. His work also exemplifies a strain of thought that celebrates a deterministic outlook—what some call statistical fatalism—which understands certain behaviors or outcomes as inevitable. Rather than fully embracing statistical probability as the key to predicting the future, Mary Shelley depicts a way that reinforces its value in an increasingly uncertain world while simultaneously preserving a sense of nature as inherently different from sociality. In this paper, I discuss the novel's engagement with probabilism as such, highlighting how probabilistic reasoning in its many

forms becomes a mode for understanding the relationship between humans and their physical and social surroundings. In *The Last Man*, references to probability often rely on social interconnectedness as fundamental to a successful society and a healthy world. In addition to responding to the social and scientific conditions of her time, this novel's emphasis of probability also allows Shelley to think critically about the novel as a genre that both represents and intervenes in the material world.

Equivalency versus Interconnectedness

The move towards objectivity through the gathering of statistics, whether that relates to changes in population or other kinds of social norms, requires a concept of equivalency. In other words, statistics only has the capacity to describe the world if individuals are treated as homogeneous. While Shelley resists a move towards complete depersonalization, it contemplates the relationship between standardization and the loss of identity. Unlike Daniel Defoe's *A Journal of the Plague Year*, which she relied on as a source of information about plagues and how they work, *The Last Man* does not alternate between statistical accounts of the number of deaths and shorter vignettes about victims of the spreading pestilence. Instead, the plague appears amidst a war and alongside commentary on democracy and its ideals, both of which hinge on concepts of equality and a collective identity.

In one of the earliest instances of the juxtaposition of democracy and disease, the narrator wonders whether England could "be content with the democratic style of America" (222), and suggests that "in a country where the imagination is empress of men's minds" (222) creativity and ingenuity will form a natural hierarchy that replaces the socially imposed hierarchy based on nobility and inherited rank. The narrator interrupts this rumination on politics to announce that "the plague had come to Athens [and] hundreds of English residents returned to their own

country" (223), lamenting that "while at any other time this disaster would have excited extreme compassion among us; but it was now passed over, while each mind was engaged by the coming controversy" (223). Not surprisingly, in their disagreement about the most natural and appropriate way to organize people within the body politic, the English fail to notice that the relationship between individuals within that body, hierarchy notwithstanding, will ultimately make them all equal through the spread of the plague.

Later, Raymond will remind his friends that "death and disease level all men" (244). Notably, the interconnectedness of humanity as seen through the lens of contagious illness implicates the structure of society itself. As Priscilla Wald reminds us, the nineteenth century saw a revival of anti-contagionism, or "the theory that filth (and miasma) generated disease" (*Contagious* 73). In this alternative model, it isn't the close contact between two people that spreads illness, but their shared presence in an unhealthy environment. Similarly, Anne McWhir has argued that Shelley "was no contagionist" and that her "emphasis on airborne transmission of plague is metaphorically as well as medically significant, especially given her novel's emphasis on the spread of words, ideas, and narratives" (24). I agree that many aspects of the novel seem to support an anti-contagionist model of transmission, but certain instances complicate this interpretation. In a pivotal scene of the novel, Verney walks into a room of his home and mistakenly trips over a black man "half clad, writhing under the agony of disease" (336). In the confusion of their entanglement, their faces close, the man's "death-laden" (337) breath infects Verney, who immediately contracts the plague. The disease may be airborn, but its transmission depends on close contact between men of different races. Verney's life-preserving immunity might be traced to his recovery from this chance encounter with a suffering black man. The role

of the plague as a levelling mechanism reflects ambivalence about hierarchies within society and the disparity between social and natural laws.

Shelley's frequent reference to ways that people become equal (politics, war, disease, death), make the logic of statistics implicit in her writing. For statistics to have meaning, equivalencies supersede individuals so that observations can be presented as a composite. Such statistical reasoning emphasizes relationships over individual achievement. While watching his son outside with other boys, Verney recognizes that in "losing our identity, that of which we are chiefly conscious, we glory in the continuity of our species" (230). This view of humanity at a distance provides him with a sense of solace. However, Verney's ability to value a collective view of society deteriorates as society becomes smaller. The unpredictable and rapid spread of the plague contributes to a shared sense of panic that lacks any redeeming qualities. The levelling effect of disease appears in the very syntax of the narrative when it says that "we were as a man who hears that his house is burning, and yet hurries through the streets, borne along by a lurking hope of a mistake, till he turns the corner, and sees his sheltering roof enveloped in flame" (235). By shifting from the plural "we" to the singular "man," the language of this line emphasizes the degree to which all of society becomes horrifically unified in their new circumstances. As the population dwindles, each life seems increasingly important, such that when a man dies in skirmish among the few survivors, Shelley writes that "the fate of the world seemed bound up in the death of this single man" (303). Now that humanity has become equal, the death of one is metaphorically the death of all. Thus, while *The Last Man* celebrates equality in certain moments, it also recognizes the loss of distinction as something worth mourning.

Natural Law versus Social Law

Recognizing the complexity of interconnectedness for Shelley makes her concern with human contingency in the face of environmental consistency even more apparent. Before the core narrative begins, an explorer—presumably Shelley herself—recounts a visit to Italy with a now-deceased companion in which they discover ancient writings that contain the story of Lionel Verney and his companions. During their journey, the two travelers sail through "translucent and shining waters of the calm sea" (3). These images of water, coupled with the note that "the atmosphere seemed more appropriate to early spring" (3), draw on myths of creation and renewal. Suddenly, society intrudes in the natural setting as the narrator looks down into the clear water and sees "fragments of old Roman villas, which were interlaced by seaweed" (3). In this scene, the Roman villas serve as emblems both of contemporary society and the history of modern culture.[1] The interrupted view of the primordial waters suggests that the narrative to come will situate human history within a much more expansive history of the earth.

The scene also draws on early 19th century conceptions of geological development, which were in the process of shifting from a catastrophist narrative to one that accounted for earth's transformations as happening slowly and steadily. The 18th century had seen a renewed interest in the history of the earth, and one of the biggest debates of the time centered on the age of the earth. While the more traditional deluvialists relied heavily on a literal interpretation of the Biblical account of the flood, others had begun to embrace the possibility of a longer timeline

[1] Not only does the reference to Roman architecture reach back in time to a previous era, but it also alludes to the Georgian style, which had been so prevalent in 18th century England. These architectural relics also exemplify a sentiment from her May 1824 journal entry, in which Shelley writes "The Last Man! Yes I may well describe that solitary being's feelings, feeling myself as the last relic of a beloved race, my companions extinct before me." Having lost her mother, her husband Percy, and other members of her own family as well as those of her intellectual circle, Shelley would have been particularly attuned to changing social values and norms, which displaced those of previous generations. Even things that were relatively recent may have seemed like memories from a distant past when thought of in connection with the deceased.

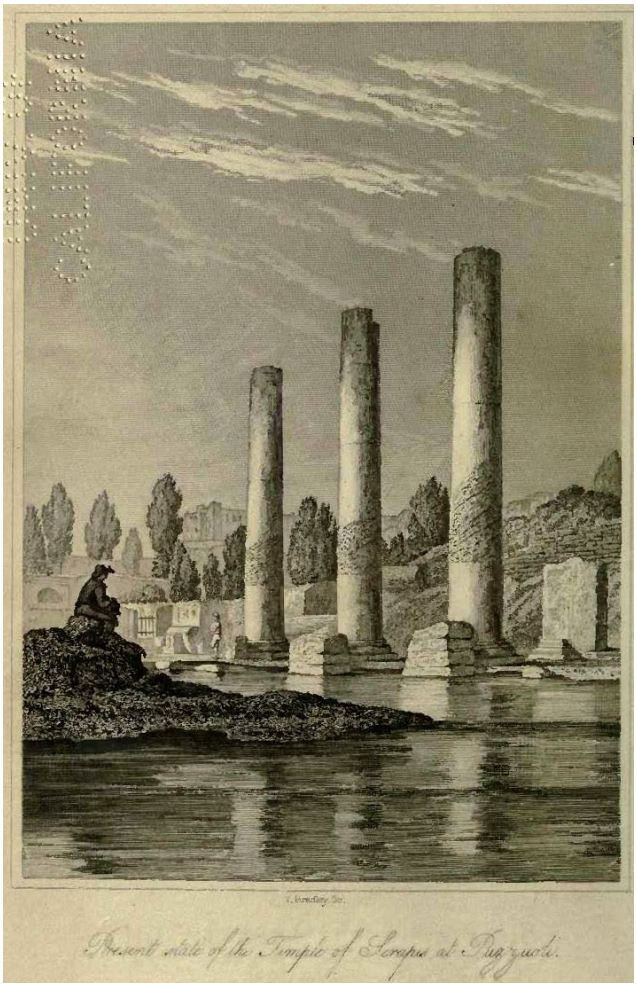
that emphasized gradual change and renewal. In 1755, Kant had published his *Universal Natural History and Theory of the Heavens,* which offered an explanation of the earth's development that did not depend on the Biblical account. Charles Lyell became well known for his argument in favor of "uniformitarianism," or the theory that the earth's surface shifted gradually over time, and carefully recorded data to demonstrate that the position of land in relationship to the sea varied over time, even without catastrophic flooding. Newer methods of study relied on statistical methods to make generalizations about the landscape and to trace changes in the environment. 19th century geologists collected samples of rock from different places around the globe. As they gathered rocks, they classified them into categories and drew conclusions about the entire population of rocks in a given location.

Both biblical literalist and empiricist thinkers perceived the earth in ways encompassed by the word "probability" as it had changed over time. In *The Emergence of Probability,* Ian Hacking explains that before the 1660s, the word probability was used to describe the approvability of an opinion. Something was probable because it had been attested to by an authority figure or an ancient source. Similarly, many considered the Biblical account of flooding and terrestrial change as probable because of the status of the Bible as a source of truth. Later, empiricists in geology and in other fields would collect data through observation and measurement of the natural world, privileging logic and consistency. This shift towards empirical methods of data collection echoes the linguistic shift in the use of the word "probability" that occurred at the turn of the eighteenth century. Over time, and alongside a "transformation from the study of books to the study of nature" (40-41), the word transitioned as well. As the testimony of nature itself become admissible as an authority, probability became tied to reason and evidence. Not surprisingly, then, as geological study moved toward observation and

evaluation of facts, as it did during the 1800s,[2] it also began to incorporate methods associated with statistics and the related probabilistic inference.

An 1820 drawing by Andrea de Jorio, which appeared in his *Ricerche sul Tempio di Serapide, in Puzzuoli,* beautifully exhibits the cyclical consistency of the natural laws that govern the earth. In this image, corrosion appears on the pillars as a result of volcanic activity that caused them to sink below sea level and subsequently rise above the water again. Fittingly, Lyell would use it as the frontispiece in his 1830 *Principles of Geology*, a widely influential book in which argued that current principles of geological change, such as erosion and volcanic activity, could be used to understand the past.

[2] The increasing importance of statistics to geology influenced Karl Earnst Adolf von Hoff, who won the Göttingen prize from the Royal Society of Sciences at Göttingen in 1822 for a book titled *History of the Natural Changes at the Earth's Surface That Are Attested by Tradition.* This book provided, as Martin Rudwick has written, "a historical *Statistik* of physical geophraphy" (*Worlds Before Adam* p 93). Rudwick explains that "In von Hoff's student days Johann Christoph Gatterer (1727-99), the then professor of history, had been famous for insisting that the scope of history should be enlarged to include 'statistical' data; and from the other side his colleague August Ludwig Schlözer (1735-1809) had urged the importance of giving *Statistik* a historical perspective. In Schlözer's pithy aphorism, 'history is ongoing statistics, statistics is stationary history.' This was the kind of 'statistics' that von Hoff had imbibed as a student." (93)



Similar to the changes that have taken place in the landscape of this illustration, Shelley's narrator describes Sibyl's Cave as having changed somewhat from Virgil's description as a result of "earthquake and volcano" but "the change was not wonderful, though the traces of ruin were effaced by time" (5). The only thing described as "catastrophic" in the cave, is the skeleton of a goat that probably fell into the cave "ages" (5) ago. By attributing these changes to the motions of the earth, Shelley draws on the competing geological narratives, leaving space for both.

The drawing also illustrates an interest in mediation and the role of the human mind that permeates the introduction of *The Last Man*, and that Shelley would continue to explore throughout the book. Like Shelley's narrator, who "lingers" and "wanders" (3) through the ruins, the figure in the foreground of de Jorio's drawing gazes contemplatively—almost wistfully—at

the ruins of a former civilization. It is as if nature itself has become an embodiment of destiny, casting a shadow over the forlorn observer. Although nature's sublimity dramatizes the fallibility of the individual, society nevertheless has left its mark. Thus, both this drawing and Shelley's novel seem to vacillate between a feeling for destiny and a place for contingency. The drawing exemplifies the relationship between society and the natural world again in the prominence of the water. Similar to the experience of Shelley's narrator, who looks into the water and sees the remnants of a previous civilization (the old Roman villas), an observer of this drawing looks at the water and sees the reflection of the ruined pillars. While these pillars embody the decay of society, their reflection also becomes a demonstration of the way that humans often look at nature and see their own values and systems reflected back, rather than seeing nature itself.

Geologists, along with other practitioners of the natural sciences, sought to limit the degree to which their own preconceptions determined observations that they made about nature. We see this anxiety about human intervention even in the aforementioned claim that volcanic activity had been the causal force behind rock formation, rather than water receding, first became known through the work of James Hutton, whose 1795 book *Theory of the Earth* describes the earth as undergoing cycles of decay and rebuilding. This book grew out of two 1785 lectures to the Royal Society of Edinburgh, in which he argues that we can only understand gradual changes to coastlines by following the "process that is performed within the limits of human observation" (297)[3]. In emphasizing human observation, Hutton draws attention to the limitations inherent in modes of interpretation that have traditionally been used to estimate the existence of the earth.

[3] In Hutton's second lecture, he addressed the age of the earth in more depth, recognizing that "a question naturally occurs with regard to time; what has been the space of time necessary for accomplishing this great work?" He emphasized the value of thinking about erosion in relation to this question, finally concluding that "As there is not in human observation proper means for measuring the waste of land up on the globe, it is hence inferred that we cannot estimate the duration of what we see at present, nor calculate the period at which it had begun; so that, with respect to human observation, this world has neither a beginning nor an end." (citation)

By estimating the age of the earth based on extrapolations from the Bible, people had vastly underestimated its age. Just as the desire for human preeminence had in previous centuries provided justification for positing the earth as the center of the universe, it had also influenced dating techniques by allowing for the assumption that humans had appeared relatively close to the world's beginning. In contrast, methods that emphasized statistical data collection enabled geologists to examine the earth itself and endowed the field with a more objective lens than religious perspectives allowed.

Instead of an appeal to past authority, Hutton's vast time scale, as exemplified by the statement that "we find no vestige of a beginning,—no prospect of an end" (304) of the earth, relied on careful observation of geological formations. As Archibald Geikie wrote in 1897, "In the whole of Hutton's doctrine, he vigorously guarded himself against the admission of any principle which could not be founded on observation. He made no assumptions. Every step in his deductions was based upon fact, and facts were so arranged as to yield naturally and inevitably the conclusions which he drew from them" (314-15). Hutton relied on the idea that changes in the earth would take place as a result of natural processes that currently operate in the same way that they did in the distant past. In contrast, many at the time speculated that there had been a series of catastrophic events, such as the Biblical flood, that accounted for current geological formations. Later, William Whewell would coin the terms uniformitarianism and catastrophism to describe these two competing narratives. Although uniformitarianism became the prevailing theory as a result of Lyell's *Principles of Geology* in 1830, the basic concept was well accepted much earlier than that and had gained traction among the public following John Playfair's 1802 book *A Huttonian Theory of the Earth*.

While Mary Shelley may not have read Playfair's book first-hand, she likely was familiar with the ideas. Recently, Michele Geric's article "Shelley's 'cancelled cycles': Huttonian Geomorphology and Catastrophe in *Prometheus Unbound*" traces Huttonian ideas in Percy Shelley's work. In her argument, she notes both the importance of cyclicality and of the idea that geological events happen in response to heat originating below the earth's surface (volcanic eruptions, for example). In this case, rock formations rise slowly over time opposed to geological change resulting from flooding and rapid water recession. In addition, Melissa Bailes' article "The Psychologization of Geological Catastrophe in Mary Shelley's *The Last Man*" provides extensive evidence that Mary and Percy Shelley were interested in advances in geology, and even owned books written by Georges Cuvier. Rather than demonstrating an ethical alignment with either of these contrasting points of view, Shelley's work demonstrates that she was interested both in exploring the ideas themselves and in drawing on both the scientific and biblical perspectives as avenues through which the human mind perceives the world.

Statistical Modeling and Literary Genres

If Shelley's introduction draws on a combination of human history and geological history (or deep time), it also sets itself up to demonstrate the triumph of an empirical investigation that relies on statistical data gathering. As Bailes has pointed out, even the cave expedition itself mirrors the exploratory work that contemporary geologists had done in caves (681). In the novel, Shelley's two explorers discover "leaves, bark, and other substances, [which] were traced with written characters" (5).[4] As before, nature acts as a preserver of cultural markers that designate a

[4] "Poetry degrades into (mere) writing, writing degrades into paper, paper degrades back into the stuff of trees. This is an illegible archive, a library where the books and shelves have reverted to their raw materials." (Timothy Morton, "The Dark Ecology of Elegy" *The Oxford Handbook of the Elegy* p 258). In this quote, Morton is talking about a line from Shelley's *Alastor* that says "mouldering bones…mouldering leaves." Morton goes on to suggest that because "intimacy is also a fundamental category of ecological thinking…*the ecological thought* is the thinking of the interconnectedness of all beings" (257). In this analysis, not only does Morton point out the relationship between nature and culture as cyclical, but also as essentially a story of melancholia. As in *Alastor* and the ecological elegies

human presence both in time and space. These Sibylline leaves, written in languages ranging from ancient Egyptian hieroglyphics to modern English, contain what Shelley describes as "poetic rhapsodies" (6) that depict the end of the world. They categorize the leaves both by their location and by their composition, even recognizing the limitations of this method. Rather than taking *all* of the leaves with them, the adventurers make "a hasty selection…whose writing one at least of us could understand" (6), a detail that reminds us that even the most careful observer will omit or overlook information due to natural and arbitrary constraints. Furthermore, in order to present her findings to the public, the narrator admits that she has "been obliged to add links and model the work into a consistent form" (6). In other words, this act of discovery becomes an act of symbolic or probabilistic modelling, similar to that which geologists, scientists, and even political economists might use, in which they collect information and arrange it in ways that allow them to describe and even make predictions about the world. In this way, Shelley's narrator adopts the scientific persona of the 19th century who, as Lorraine Daston describes in *Objectivity*, uses actual specimens from nature as her source of information. Shelley also draws on the scientific persona of an earlier era, in which natural philosophers developed "an idealized, perfected, or at least characteristic exemplar" (Daston 42) of the object that they were studying. In the past, this exemplar would have been designed as a universal or ideal image of the world that it represented. Within *The Last Man*, the story created from these leaves has more of the character of a probabilistic model; namely, that it isn't meant to offer a complete or perfected image, but rather to explore the affordances of a limited, human perspective.

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that Morton describes, Shelley's *The Last Man* mourns for a culture that hasn't been lost yet. But at the same time, perhaps the novel is also pointing out that we never actually had the kind of culture or humanity or knowledge that we imagined we had.

It is fitting that the story's narrator would translate, as it were, poetry from the natural world into novelistic form. Whereas lyric poetry of the early 19th century sought to showcase the consciousness of a single individual, the novel was better suited to represent a network of connections within a community. *The Last Man* combines aspects of the sentimental novel with those of realism. In his book *Probability and Literary Form*, Douglas Patey characterizes literary sentimentalism as responding to the philosophy of Hume by using "inferential procedures of interpretation" (220). In addition to emphasizing the "'naturalness' of natural signs," the sentimental novel takes "the view that much of probable inference happens in mental processes that are unconscious and immediate" (221). Although, according to Patey, these works share some of the didacticism of earlier forms (like *Joseph Andrews* and *Tom Jones*), they lean towards the new philosophical outlook that emphasizes "probable judgment" over morality (220). While Shelley's novel certainly contains some of the sentimental didacticism and an emphasis on an innate connection to nature (as I will discuss in more detail later in this essay), it also exhibits a realist impulse. As Roland Barthes has explained, the details that lend an air of plausibility to a novel create a "*referential illusion.*" In other words, the details of a text form a model of the real world, and "just when these details are reputed to *denote* the real directly, all that they do—without saying so—is *signify* it; Flaubert's barometer, Michelet's little dorre finally say nothing but this: *we are the real*" (*The Reality Effect* 148). In *The Last Man,* Shelley's close attention to cause and effect and her detailed descriptions repeatedly assert that, regardless of the likelihood that a plague could wipe out the entire population of the world, the novel's modelling of the earth and the human mind have real-world implications. Rather than claiming to represent what *is,* the novel examines the world by asking what *could be*. Predictions based on statistics and mathematical probability function in a similar way. While they do not claim to represent the

world as it actually is, they allow people to imagine different iterations of what could be, and make inferences about cause and effect. Because, like novels, models of probability such as statistical tables or equations that express possibilities are symbolic forms that represent and mediate networks of connection, they are inherently social. Thus, Shelley's critique of probability in its capacity to describe sociality with the same accuracy with which it describes natural laws serves also as a critique of the reliability of social and political structures.

Probabilistic modelling and its associated interpretation and critique of society would become embedded in the realist novel because of its particular engagement with concerns about social interconnectedness. During the late 18th and early 19th centuries, upheavals spurred widespread shifts in public opinion on sovereignty and social responsibility. Alongside these changes, and partially as a result of a newfound distrust of common sense, or commonly held perceptions, that arose after the French Revolution, as Lorraine Daston has argued in *Classical Probability in the Enlightenment*, mathematicians increasingly recognized the distinction between different types of probabilistic thinking. While these can be broken into several subcategories, the primary difference is between subjective and objective models of interpretation. Probability, in the various senses of the word, allowed people to narrativize the world by thinking about the relationship between distinct events.

The difference between types of probability is largely based on perspective. Subjective views of probability emphasize the role of the human mind as an interpretive entity by evaluating the value of different kinds of evidence and measuring likelihood in terms of degrees of certainty. When people judge an outcome as plausible, they exercise their capacity to think in terms of subjective probability. On the other hand, objective views of probability situate probability in the world itself. Today, we most often associate mathematical probability with

objective probability. According to Daston, it wasn't until the mid-nineteenth century that probabilists fully acknowledged clear-cut divisions between the two. Earlier thinkers often "slid from one interpretation to another with an ease that bewilders latter-day commentators" (*Classical Probability* 188). Mathematicians and philosophers alike saw objective and subjective probability as complementary. In his *Essay on Human Understanding*, for example, Locke describes the process by which a rational mind can use external observation to develop reasonable certainty. He suggests that "inquisitive and observing Men may, by strength of *Judgment*, penetrate farther, and on Probabilities taken from wary Observation, and Hints well laid together, often guess right at what Experience has not yet discovered to them" (IV.iv.13). While recognizing that probability exists in the material world, a penetrative mind can develop a reasonable approximation or prediction by selectively organizing the available information. In this way, objective and subjective probabilities can be described as Janus-faced. They offer two methods for arriving at the same conclusions.

Like Locke, Hume adopts a hybrid idea of probability when he considers human access to natural laws and the intricate relationship between cause and effect. He recognizes that people feel more certain about their beliefs as they observe repetition and resemblance in nature, but he denies the mind's ability to fully understand and therefore make predictions about natural law. Therefore, when he writes that "the course of nature may change, and that an object, seemingly like those which we have experienced, may be attended with different or contrary effects" (115), he differentiates between the laws that govern the world and the workings of the human mind. Nevertheless, he recognizes the necessity of acting according to custom that arises from observation, or according to a reasoned understanding about cause and effect. While emphasizing its imperfection, Hume simultaneously celebrates probabilistic reasoning as "an

operation of the soul" (123) both in its role as "the great guide of human life" (122) and in the way it brings personal satisfaction to those who "love the abstract sciences" (124). These descriptions color probability with an almost spiritual aspect. For Hume, the value of probabilism isn't in the degree to which it might enable an objective picture of reality, but as a philosophical practice that at once stretches the mind and responds to that impulse towards world-making so characteristic of the human mind.

While Hume saw limitations in probability as a method for understanding the material world, it wasn't long before others—mathematicians, economists, judges, and even government officials—became enamored with its affordances. By the early 1800s, a flurry of data collection in many different fields brought new prominence to objective forms of probability. In the natural and physical sciences, more precise forms of data collection emphasized the consistency of natural laws and called into question theories of the earth and stars that had been in place for centuries. In England and Europe, countries began to collect data about their citizens using censuses and other kids of statistical surveys. In response to this explosion of statistical and probabilistic interpretations of the world, Ian Hacking has described the nineteenth century as an era in which "a new type of law came into being, analogous to the laws of nature, but pertaining to people. These new laws were expressed in terms of probability" (*Taming of Chance* 1). While the 19th century wasn't the first time that people thought of humanity as subject to natural laws, it was a time in which technological and social change compelled them to think about the relationship between nature and society in new and different ways.

Statistical Thinking and Determinism

In framing *The Last Man* with an introduction that emphasizes reliance on both imaginative and scientific "flights through the immensity of nature and the mind of man" (6)

Shelley invites her audience to examine their beliefs about the human mind—beliefs that stemmed in great part from Lockean empiricism and the ideals of the Enlightenment, which assume that people can understand the world around them based on sensation and reflection. Even the famous French astronomer and polymath Pierre-Simon, marquis de Laplace's *Philosophical Essay on Probabilities*, published in 1812, relies heavily on this kind of logic. In his famous treatise, he imagines a being (which we now know as Laplace's demon) who for a single instant can know everything about the present state of the universe, positing that for such a being "nothing would be uncertain and the future, as the past, would be present to its eyes" (4). At its simplest level, probability is valuable because it should, theoretically, allow people to make predictions about the future, as long as they know enough about the present. Early forays into probability often relied on the presumption of a closed system as a way to ensure access to sufficient information. Likewise, throughout the 18th century preeminence was given to studies of equally likely cases, such as in game analysis and gambling prospects.

As do most natural philosophers of the time, Shelley often characterizes the world as an internally coherent system that works according to set laws, even if people don't know what they are. In what will come to be a recurring theme in the book, the narrator's father falls victim to chance and miscalculation. Both his departure from London and "his ill-fated marriage" (12) come as a result of "his craving for the usual diet of admiration, and more than all, the fiend of gambling, which fully possessed him, made his good resolutions transient, his promises vain" (10). By referring to his father's marriage as ill-fated, Lionel Verney invites us to consider the implications of a world-view that relies on fate or determinism. In spite of the resolution to change, his father's preoccupation with gambling draws attention to the all-encompassing trajectory of a life that he cannot fully understand or control. Rather than following in a similar

downward path, Verney believes that he and his sister have inherited the characteristics of his father that he deems superior. Even in lamenting the unfortunate circumstances that shaped the early years of his life, Verney still describes his sister as "full of noble feeling" (15) and himself as having been "born for something greater" (19). His insight into cause and effect comes as a result of having written the story as a kind of memoir. He knows what will happen to them because he writes after it has already happened. Yet, like Shelley's Frankenstein, who becomes an embodiment of the clash between an innocent nature and a cruel society, Lionel Verney's narration shouldn't be judged simply on its reliability, but on how it reveals both the beauty and limitations of humanity. While Verney seems at once to subscribe wholeheartedly to the deterministic perspective inherent in Laplace's writings on probability, his description of himself is also shaded by his own desire. By admitting the temporal and unfulfilled desire into a description of fate, he resists a completely deterministic perspective, which suggests that something beyond natural law may influence both his behavior and reasoning.

Like Laplace, Verney expresses his sense that causes can be traced if an observer has unmediated access to information about the "foreign circumstances" (Laplace 43) that surround an event. When Verney reflects on the events of his life, he acknowledges the limits of the "distorted perceptions" (Shelley 19) which characterized his youthful follies and alludes to "a stranger influence [which] came over the current of [his] fortunes, and changed their boisterous course to what was in comparison like the gentle meanderings of a meadow-encircling streamlet" (19). As in Shelley's introduction, the movement of time becomes exemplified by water. For Verney, its flow, whether torrential or meandering, moves always toward the same end. It isn't the final outcome that changes, but the course he follows to get there. The image of the stream takes a perspective on chance that relies on the objective probability model and allows him to

think about his fate deterministically. Thus, the product of thinking about fate in a Laplacean way admits a disjuncture between the present moment, in which Verney can't imagine what will happen, and the future when he can look back and imagine that his current situation was always meant to be. The complicated circumstances that govern his movement into the future are embodied by nature itself, which emphasizes that probabilistic thinking forms a map (albeit an imperfect one) of a future that already exists as an intuitive part of the natural world. The image of a flowing stream collapses Verney's problem with time—what will happen in a future that he can't predict—into one characterized by space, with the focus more on mapping his route than on predicting the outcome. Because water in this scene plays the role of both an active force as a predictor of the future and as a passive object for speculation, the anthropocentric hierarchy flattens, at least to an extent. This flattening depends on the degree to which the novel recognizes that humans operate within an internally coherent ecological system that they neither control nor have full cognitive access to through traditional reasoning power.

In the attempt to fully describe his local circumstances, Verney becomes almost like Laplace's demon, seeing in them already the seeds of his future as the last man on earth. The Laplacean undertones in Shelley's work suggest that the arbitrary arrangement of the Sibylline leaves described in the introduction are less important than the fact of their existence. Interpreting the future according to a spatial model rather than a temporal one resembles more closely the precision of a being that exists outside of time. From this perspective, when the introduction expresses regret for imperfect methods and then questions "whether this apology is necessary" (7), it acknowledges that human inadequacies attend any attempt to trace specific causes, and simultaneously gestures toward a more perfect formulation of probability which exists locally in nature and possibly in its connection to the imagination.

Throughout the novel, water repeatedly becomes a metaphorical vehicle for examining how a character's outcome participates in a higher or more complex ordering of events that doesn't completely rely on their individual will or intention. While characters are individuals at one level—it is their particularity that Verney is so insistent on, which is one reason that he gives the story of their lives for half of the novel before even mentioning the plague—at another level what is important about them is their participation in a system that is organized and orderly, if not predictable from a limited present-tense perspective. As an unpredictable and complex outgrowth of human emotion, love serves as a fitting theme for a discussion of the relative likelihood of various outcomes. Evadne's feeling for Raymond acts as a "tide of love [which] resumed its ancient flow, it deluged her soul with its tumultuous waves, and she gave herself up a prey to its uncontrollable power" (114). Despite having an apparently fulfilling marriage with Perdita, Raymond finds that "the tide of his own heart escaped his notice; and from that unthought of source arose the mighty torrent that overwhelmed his will, and carried to the oblivious sea, fame, hope, and happiness" (117). Notably, these images of water as "ancient" and "oblivious" situate emotion—which might otherwise be thought of as internal to an individual psyche—as both external and impersonal. Their power contrasts sharply with the relative tranquility of Raymond and Perdita's love, whose heart and soul "mingled, even as two mountain brooks that join in their descent" (130). Because fate (in the form of nature) has thrusted Evadne and Raymond together, their interaction has more to do with their position in a system than their will or self-interest.

Throughout the initial dissolution of Raymond and Perdita's relationship, not only does Verney describe their fate by using images of water, but he also emphasizes their own lack of agency regarding their plight with repeated references to gambling. While Perdita recognizes that

Raymond still feels a "tender affection" for her, she feels the loss of his ardent devotion. Rather than focusing on the particularity of his sister's sorrow, the narrator interrupts the story to give something of an aphorism: "Give a paltry prize to him who in some life-pending lottery has calculated on the possession of tens of thousands, and it will disappoint him more than a blank" (129). This move outward from the particular to the general expresses a moment of tension between different points of view. On one hand, the force of the narrative depends on the reader's investment in and empathy for individual characters. On the other hand, Shelley's overarching questions about how human life can fit into an orderly and predictable system depends on the ability to explain (if not predict) events by an appeal to general principles. The narrative gesture to classical probability reflects the tendency of 18th century probability studies to ruminate on questions of gambling and the lottery, and it reminds us both how infrequently gamblers successfully use the laws of probability to guide their bets, and how often they are blinded by misplaced confidence. Likewise, Perdita takes a gamble by giving Raymond an ultimatum. He must choose between her and the office of Protector. Thus, "having cast her fate upon a die, and feeling secure of winning, she…now [rises] superior to humanity, and seem[s] in calm power, to arrest with her finger, the wheel of destiny" (131). When finally the certainty of Raymond's infidelity becomes unmistakable to Perdita, "her exultation [is] as cold as a water quenched ember" (137). By alternating between local description and statements about general principles, between comparisons to gambling and comparisons to water, Shelley both highlights the limited perspective that attends a person in their daily life and imagines a stable world by appealing to nature as a source of order and a framework for understanding the flow of social interactions.

Nature as an Alternative to Statistical Probability

Because his perspective holds a primary place in *The Last Man,* Lionel Verney serves as an excellent case study for examining the relationship between nature and culture, or between the laws of the physical world and those that govern the human mind. Shelley's narrator describes himself as being raised in the wild before his introduction into civilization. Upon meeting Adrian, a rich young prince from London, Verney recounts his first lessons in literature and philosophy writing that "the trim and paled demesne of civilization, which [he] had before regarded from my wild jungle as inaccessible, had its wicket opened by [Adrian]; I stepped within, and felt, as I entered, that I trod my native soil" (27). In characterizing his state of mind as a wild jungle, Verney identifies himself as connected to the earth, a detail that recurs throughout the novel, often in connection with concerns about fate. He will later write that "on every leaf, on every small division of the universe…was imprinted the talisman of my existence" (62). This deep connection with the earth and its natural laws suggests that humans might unconsciously, and if seen from the proper perspective, follow patterns of behavior set forth not by their own agency but by a set of social laws under which individual choice loses its apparent vigor. That Verney's relationship to nature establishes him as an almost Edenic figure also endows him with characteristics appropriate to one who would outlive the destruction of society and become the last man—one who would appreciate the memory of society but whose relationship with the land would sustain him.

In contrast to the depth of his connection to the earth, Verney also has unique insight into the civilized world. Indeed, his introduction to the history of intellectual thought feels to him as though he treads his "native soil" (27), almost as if civilization could be as natural as nature itself. It isn't until he develops a friendship with Adrian and begins a course of study that he

"[begins] to be human" (29). It is both the companionship of a close friend (society in a social sense) and the meeting of minds that he finds in books (society as a socially constructed set of beliefs) that inducts him into a state of humanity. When reading poetry and natural philosophy open his mind to "a deeper meaning in all [he] saw, besides that which [his] eyes conveyed" (31), Verney experiences this as increasing his vision rather than a loss of his younger self. Thus, he begins to act as a liminal figure—one whose insight reflects the wisdom of nature and the experience of culture.

In contrast to Verney, Merrival relies on objective probability and statistical inference to think about the world. As an astronomer "learned as Laplace" who is "far too long sighted in his view of humanity to heed the casualties of the day, and lived in the midst of contagion unconscious of its existence" (289), Merrival might be thought of as an allegorical figure for scientific overreach. To put Shelley's critique in context, we must remember that probability models had yielded interesting and valuable insights into the study of the stars for centuries. They enabled astronomers to understand the position of the earth and the movement of heavenly bodies with precision. Yet observation on vast timescales is ill-fitted to dealing with the minutiae of day-to-day matters. In other words, it isn't always clear how general principles, especially those that refer to distant time and space, might impact individuals in the particularity of their lives. The limitations inherent in this kind of inference are now referred to as the problem of induction. Many scholars have taken Merrival's character as an example of the failure of probability and of scientific inquiry more generally.

However, we must remember that the ability to fully understand natural law and to use observation to generate predictions requires a law of large numbers, a concept proved by Jacob Bernoulli in 1713. At the time, Bernoulli's theory of probability relied on games of chance with

two equally likely outcomes. In small successions of coin tosses, for example, the ratio of heads to tails varied considerably, but as the number of tosses increased, the ratio approached 1:1. In an infinitely large sequence of coin tosses, half would be heads and half tails. In recognizing the importance of large data sets in probability, Merrival's failure to consider the dangers of the plague may seem more understandable. His training has enabled him to overlook small data sets. In the long-term view of the world, plagues, however deadly, do not completely wipe out humanity. In the words of Verney, "experience demonstrated that in a year or two pestilence would cease" (237). In a way, Shelley requires that her readers also follow the law of large numbers by overlooking the fact that in the midst of a pandemic, all of the major characters (Evadne, Raymond, Perdita, Idris, Clara, and Adrian) die from other things. This small data set, while significant to the novel, is not a statistically significant group. Therefore, what looked like a problem of induction is instead a problem of perspective. In what is sometimes called the availability bias, people interpret the world according to readily available information. In the absence of infinite observation, probability needs human interpretations that take a carefully considered view of the situation, and fallible humans need a concept of probability so that they may look beyond their own experience.

In the novel, Merrival serves less as an overly simplified characterization of outdated science than as another mind whose failure to predict the movement of the plague reflects the same limited perspective as that of other characters. He uses his typical mental models to evaluate an atypical situation and they fail. Therefore, when he feels "the system of universal nature which he had so long studied and adored, slide from under him" (305), he loses his will to inquire into the workings of universal law because his limited mental models of those laws failed to prepare him for the loss of his family, whom he had "loved with unapparent but intense

affection" (305). While he likely thought that his work required only a concept of probability as it inhered in the physical world, it was his degree of certainty about that world (an abstract version of subjective probability) that had sustained him all along.

That Shelley acknowledges the value and complexity of reasoning from a distance appears in the sympathetic descriptions of Merrival, in the carefully considered way the text deals with war and democracy, and in the organization and empirically minded judgment with which the book's interpreter arranges the Sibylline leaves in the novel's frame. Near the end of the novel, Verney bids farewell to what he sees as great in civilization, specifically including "the giant powers of man," "science," and "poetry and deep philosophy" (321). While his odes to scientific knowledge and power highlight their practicality, poetry and deep philosophy seem valuable for a different reason. Their usefulness arises from the way they allow the mind to work its way around an idea—adopting different perspectives to achieve a view of the world that is simultaneously particular and distant. In a way this is a fond farewell to Merrival, whose preoccupation with the stars lacked traditional usefulness, but exemplified a more expansive view of the human condition.

Unlike Merrival, who has trained himself to think statistically to a fault, Verney attempts to adopt a view of humanity at a distance to shield himself from the pain of loss and to make stronger predictions about the future. In a moment of desperation, he reframes his fear of loss by asking himself whether it is right to "read backwards the unchangeable laws of Necessity… who with busy fingers sittest ever weaving the indissoluble chain of events!" (399). While he wills himself to believe that the dwindling of human life on earth progresses in accordance with immutable natural laws, he cannot quite accept it. However challenging this distant view of humanity is in moments of crisis, other moments showcase the narrator's ability to navigate

statistical reasoning effectively. He contrasts his later wisdom with the drama of his youth by saying that "All events at the same time that they deeply interested me, arranged themselves in pictures before me. I gave the right place to every personage in the groupe, the just balance to every sentiment. This undercurrent of thought, often soothed me amidst distress, and even agony." (174) In Verney's vacillation between a belief in the necessity of a tightly woven social structure and the reliance on a more conventional idea of plausibility stemming from experience and particularity, he reveals an important concept—that probability and necessity often seem at odds with one another. In a world that relies on experience as the fountain from which to draw conceptions of the possible, there often arises a tension between events and the narrative that explains them.

The Probability of Survival

Verney attests to this tension in very clear terms after seeing a plague victim for the first time. He says, "at a distance from facts one draws conclusions which appear infallible, which yet when put to the test of reality, vanish like unreal dreams" (260), recognizing that most events in the world did not follow a simple causal chain. Hume famously wrote that we must not expect "that all men, in the same circumstances, will always act precisely in the same manner, without making any allowance for the diversity of characters, prejudices, and opinions. Such a uniformity in every particular, is found in no part of nature" (152). Not only does Hume draw attention to the way subjective perspectives influence a given response, but he also highlights the complexity with which situations are comprised, often as the interaction between multiple and even competing factors. As is the case with individual difference, nature has infinite variability. In *The Last Man*, however, it is human variability which may or may not correspond to that of nature in terms of its degree of predictability. Taking into consideration similar concerns, Laplace writes

that “natural phenomena are most often surrounded by so many foreign circumstances, and so many perturbing causes confound their influence, that it is very difficult to recognize them” and recommends “increasing the number of observations or experiences” (43). In other words, as data increases so does certainty. Aware that observations will always be limited, he goes on to develop a method for assessing the uncertainty inherent in probabilistic reasoning—what I have referred to as subjective probability.

Shelley’s sharpest critiques of probability relate to unfounded certainty based on faulty reasoning. Sometimes faulty reasoning arises from having a deterministic perspective. Finding parallels between natural and social law problematizes the concept of agency, which happens when physicians developed theories about suicide in the early 19th century. As England and France gathered statistical information about suicide rates and motives, there grew a debate about whether self-murder fell within the domain of medicine or of morality and religion. Medical authorities debated whether suicide *was* madness (and they tried to find it by dissecting brains to find abnormalities), or whether it was a consequence of madness. In the absence of modern approaches, in which we recognize that statistical laws are not causes of events but descriptions of events, certain proponents of early medical interventions wanted to establish the patterns of suicide as consistent with an overly systematic and deterministic interpretation of health. The question of determinism, as it influenced interpretations of suicide statistics, finds its way into *The Last Man* with Perdita’s suicide. Unlike Merrival, whose tragedy is that of longsightedness, Perdita represents a tragedy of shortsightedness.

In some ways, the book upholds determinism as the final cause for Perdita’s actions and subsequent death. It reiterates that Perdita’s natural disposition is melancholic, a characteristic associated with madness, and says that her desire to stay in Greece near the site of Raymond’s

grave "is not a matter of choice" (211). Verney describes her as "the ill-starred girl" (215), as if her death could have been foreseen if only one knew how to read the sky. Like Shakespeare's star-crossed lovers, whose fate is sealed by the hopelessness of their situation, the inevitability of Perdita's death is connected to the death of the man she loves—not only because he has died, but also because Raymond's fraught love affair with Evadne has created a rift in their relationship and has pulled Perdita into a chain of events beyond her control. Even Perdita's name, which is the Latin word for "lost," alludes to the inevitability of her situation. Her birth mirrors, in some ways, the humble, rural upbringing of Perdita, the lost princess of Shakespeare's *Winter's Tale*. But unlike the play the Perdita in Shelley's novel suffers a fate that even a reclaimed position in society cannot remedy. Perdita's death suggests that she is not situationally lost, but embodies loss itself. Her death reveals the full force of a deterministic universe, in which agency cannot change the trajectory of an individual.

Yet Perdita's death also challenges determinism, as it related to the statistical analysis of the day. Rather than being represented as a bout of madness, which would have supported the kind of deterministic thinking that led professionals to look for physical signs of deformity in the brain of an insane person, Perdita's suicide is the product of a kind of calculation and intention. Verney admits that "all this *appeared* to [him]…methodized madness" (212, emphasis added). While recognizing that his sister's determination to stay in Greece was well-reasoned, he realizes too late that it is not the product of a diseased mind. Instead, when Perdita dives unseen into the dark ocean, she enacts her previously stated resolve to return to Greece no matter what. She had clearly proclaimed that "force only can remove me. Be it so; drag me away—I return; confine me, imprison me, still I escape, and come here" (212). Rather than a physiological cause for Perdita's suicide, Shelley provides a spiritual cause. Perdita is so deeply connected to Raymond

that she cannot live without him. When Perdita both denies being mad and claims that she is "right" (212) to stay because "this cottage is built of [her] order" (210), she takes up the language of morality. Her actions are motivated by a spiritual devotion higher than natural law.

The moral and even religious undertones of her actions become further apparent when she awakes on the ship and finds that Verney has indeed dragged her away. Her uttered protest "You know not what you have done!" (214) mimics Christ's words, in reference to those who nail him to the cross, that "they know not what they do" (Luke 23:34). This reference to Christ not only reiterates the moral nature of Perdita's actions, but also alludes to the complicated relationship between agency and necessity. If the Bible presents Christ's death as necessary and predetermined, both a consequence of the actions of others and fully agential, then Perdita's suicide is similarly complex.

From a statistical perspective, she is at once within the classifications of statistical law, and outside of them. Her suicide could be attributed to love, which the early statistician Joseph Fourier listed among the most common causes of suicide. Fourier directed a widely circulated publication in France called *Recherches statistiques sur la ville de Paris et le détertemente de la Seine*, which ran from 1820-29 and gave annual statistics on crime and suicide. By classifying suicides by *causes* rather than *motives*, its results more easily fit into conceptions of a world convinced by deterministic causes. However, Shelley portrays Perdita's actions as arising from *motives*. Therefore, while her description of suicide fits within the statistical categories of its time, she also recognizes that individuals can vary greatly in their behavior. For example, in reflecting on his role in Perdita's death, Verney claims that "most people in [his] situation would have acted in the same manner" (212), but laments his decision, because it yielded a different result than expected. Unlike earlier statistical models, and even representations in the novel

genre, which highlighted the idea that given similar circumstances people tend to act in similar ways, *The Last Man* leaves space for human unpredictability and emphasizes departures from the norm.

If uncertainty and variation are essential elements of probabilistic knowledge, when Shelley picks up on the limitations of reason, she isn't identifying a problem originating in empiricism or probability per se. Rather, her focus is on how and why people follow the urge to figure out the world using the tools and frameworks they have available. While there are times that the novel seems to reach for natural law as a causal explanation for events, it recognizes that people don't always act in predictable ways. Verney highlights this difference when he writes that "man is a strange animal. We cannot calculate on his forces like that of an engine; and, though an impulse draw with a forty-horse power at what appears willing to yield to one, yet in contempt of calculation the movement is not effected" (159). Regardless of how precisely or carefully we calculate human outcomes, calculation alone does not produce the expected result.

In an effort to understand and calculate social trends in England, the Census Act of 1800 initiated the decennial collection information on the population. The census included information about the number of homes and families and the number of baptisms, marriages, and burials, which allowed the government to track the evolution of the population. London's population grew from 575,000 in 1700 to almost a million in 1800. Concerns about population growth had been spurred in great measure by Malthus's *An Essay on the Principle of Population*, and new statistical data appeared to support his theories. As this kind of data collection increased, so did concerns about how the information would be used. Charting population growth supported a narrative of progress. However, unlike laws in a legal setting, which supported the idea that

society could be controlled and regulated, recasting population growth as responsive to natural law meant that it might also cause instability.

In its initial account of the London of the future, *The Last Man* traces the limitations of reason and prediction, even as it appears to endorse a hopeful view of human ingenuity. In London, "the arts of life, and the discoveries of science had augmented in a ratio which left all calculation behind; food sprung up, so to say, spontaneously—machines existed to supply with facility every want of the population" (106). As if responding directly to the preoccupations and concerns of the 19th century, this 21st century depiction of London has banished the concerns related to Malthus's surplus population and many of the problems of economic production. This seems like one instance in which industrial innovation has successfully used theoretical models to predict and counteract forces that would harm the lower classes, both in relation to unsafe and excessive labor conditions and in ensuring the availability of food. Technology has rendered England "one scene of fertility and magnificence" (106). Ironically, when industrialization rather than sustainable agriculture becomes the domain in which England seeks fertility and growth, it fails to attend to its relationships within larger networks, both natural and societal. While England looks momentarily like a utopia, widespread poverty and war exist in other parts of the world, as exemplified by the ongoing war between Greece and Turkey. As Lauren Cameron has explained, Shelley seems to agree with the Malthusian skepticism about the possibility of progress, but argues for "the multiply determined nature of causes, [and] rejects the scientific and philosophical drive toward one simple principle" (195). Thus, by focusing solely on this single aspect of human welfare, the Lord Protectors of England fail to gain insight into the truth of their precarity. Within a short time, England's population will begin to dwindle, not by war or food scarcity, but by the plague.

Throughout the progression of the plague, Verney and other characters debate about how to predict and prepare for its eventual spread to England. For instance, when the narrator contemplates the implausibility of preventing catastrophe, he puzzles over how to predict its course when in one city "plague will die unproductive; in such another, nature has provided for it a plentiful harvest" (231). Notably, the language of this passage equates production and harvest—typical marks of human progress—with death and a failure of human ingenuity. In a reversal of the Malthusian fear of food scarcity, the plague, imbued with a human-like agency, is successful only when nature provides it with human bodies for its consumption. The horror of the passage only intensifies with the suggestion that "individuals may escape ninety-nine times, and received the death-blow at the hundredth" (231), as if the relationship between cause and effect is purely arbitrary. This is another example of the tension between objective and subjective probabilities. When these numbers are laid out statistically, there doesn't seem to be a contradiction between the ninety-nine and the one. From the perspective of someone looking for certainty and comfort, however, experience of the past has built up the expectation that people won't die, so that when someone does die it feels jarring. In other words, what looks like error from a human view, looks like truth to one who sees probability as built into nature. In contrast to the models that Laplace had referred to as "common sense reduced to a calculus" (Laplace 124), sound probabilistic judgment seems neither common nor sensical. When Verney pairs the language of productivity with the precision of statistics, he gives voice to a very common critique of statistics during the early decades of the 19th century, which is that "numbers were irrelevant to the kind of knowledge [they] claimed to produce" (Poovey 293). While numbers had the air of certainty and objectivity, probability repurposed them for matters that were social, moral, and inherently unpredictable at the level of the individual. Indeed, the counting of deaths

related to the plague only emphasizes the futility of the struggle to contain or avoid it because the conditions of its spread include factors that are otherwise invisible.

In the novel, as contagion spreads from one body to another, fear infects the minds of characters and influences their perception. As Verney leads a group of survivors in search of a better climate, unusual events seem like "ominous" signs and the company "dread[s] the future event enchained to them" (395). Responding to situational uncertainty, these characters interpret everything as causally related to that which they fear. In contrast to experience leading them to more accurate predictions, it spurs a hypersensitivity so that they lose all ability to think rationally. Uncertainty and the wish for a better idea of cause and effect in the world leads them to see causes everywhere. By highlighting moments of fear, Shelley reminds us that the tendency to weight feelings over objective data can makes the very calculation of subjective probability a dubious endeavor.

Like fear, desire affects characters' interpretation of their situation. In the words of the narrator, "the young are seldom in Elysium, for their desires, outstripping possibility, leave them as poor as a moneyless debtor. We are told by the wisest philosophers of the dangers of the world, the deceits of men, and the treason of our own hearts" (37). While Verney will go on to recount many instances of desire for love or power which clouds people's judgment, what is most telling about this passage is the progression from its warning about the dangers of the world, to those of society, and finally to those within the heart (or mind) of an individual. By separating these things, he draws attention to a similar problem in probability or any theoretical model used to tell a story about the world. The distance between the mind and its object means that it isn't always clear whether an interpretation reveals something about the structure of the world itself or of the human mind. Thus, when Verney later claims that "time and experience

have placed me on an height from which I can comprehend the part as a whole" (267) we must understand his narrative as one that mediates between his present perspective, and the past experiences that have contributed to that perspective, as opposed to being a "whole" picture of the workings of nature as they relate to society.

While many of Shelley's allusions to probability dramatize the helplessness of human reason in its capacity to fully connect with the world, she does leave an opening for a redemption of human reason and of probabilistic models. The uncertainty intrinsic to any prediction based on probability can become a space for fear, as it so often does throughout the novel. However, while showing the world in a downward spiral, the novel also celebrates the moments in which people find meaning in spite of circumstance. In one instance, Verney does this through an appeal to the practical wisdom of Ecclesiastes. "Vain was all philosophical reasoning—vain all fortitude—vain, vain, a reliance on probable good" (248). This language appears to disparage the attempt to use probability, as a subset of philosophical reasoning, to understand or respond to the world, particularly if it engenders hope for the future. Verney continues by lamenting that even if he "heap[s] high the scale with logic, courage, and resignation" (248) a single fear outweighs them all. Both the repetition of the word "vain" and the sentiment mirror the biblical verse "vanity of vanities; all is vanity" (Ecclesiastes 1: 1). This chapter of Ecclesiastes asks questions similar to those of Lionel Verney. "What profit hath a man of his labour which he taketh under the sun? … For in much wisdom is much grief: and he that increaseth knowledge increaseth sorrow" (Ecclesiastes 1:2, 18). By invoking this book of the Bible, which follows the tradition of other wisdom literature in offering practical suggestions for navigating the world, Shelley's novel also shows its investment not in discrediting probability and human effort, but in understanding how human knowledge and social practices can contribute to a meaningful life given the inevitability

of death and the unpredictability of life. When Verney expresses his frustration at failing to "foresee" (248) the plague's arrival in London, it is a reiteration of the idea that the logic of probability offers valuable insight, but that fear and desire can make such insight inaccessible. While knowing that the plague would eventually come may not change the future, it would allow people the opportunity to change their mental disposition toward the inevitable.

For Verney, fear and hope become entwined as he settles in Rome and imagines finding a companion. His glimmer of hope allows him to wish for someone to share his experiences with, although he expresses no desire to repopulate the earth or being a new human civilization. By choosing to "build on…this vague possibility" (463), he chooses to leave inscriptions that testify to his presence in surrounding towns and villages. Having observed that thinking on the past is like "medicine" (462) he will later decide to write a book of his experiences to an unknown and unpredicted audience. The principles of subjective probability prohibit complete confidence in Verney's belief that he is alone in the world. However, his humanity is what converts this tiny sliver of uncertainty into a hopeful burst of activity. When he admits that he "no longer *guess[es]* at [his] state or [his] prospects" (467), he has decided to suspend the faculty to predict and interpret the world on a large scale and instead chosen to limit his response to immediate circumstance.

By choosing to embark on a maritime voyage, Verney resolves himself to an unknown fate and again references water both as an embodiment of natural law and as a metaphorical image of a force that influences destiny. His orientation to water has shifted throughout the book. Having seen the death of so many, Verney at first "object[s] to the dangers of the ocean" (439), straining to grasp whatever degree of agency he has. Yet the ocean calls to him. He writes that "I was myself an excellent swimmer—the very sight of the sea was wont to raise in me such

sensations, as a huntsman experiences, when he hears a pack of hounds in full cry; I loved to feel the waves wrap me and strive to overpower me; while I, lord of myself, moved this way or that, in spite of their angry buffetings." (442-43) In the sea, he sees the intricate interplay between acceptance and agency, between determinism and determination, and between probability and possibility. Individuals often find themselves subject to natural law but that doesn't mean that their future is predictable according to probabilistic models.

Conclusion

While probabilistic modelling plays a prominent role in *The Last Man,* it yields insight not only for the reader seeking wisdom to understand or react to their own situation, but also provides insight into the influence and reflective capacity that narrative has in the material world. The fact that someone finds Verney's story—the prophecy written on the Sibylline leaves—means that he has, in a sense, found a companion through writing. Its status as both an ancient prophecy and a relic of a ruined civilization suggests that Mary Shelley was thinking about the connection between the past, present, and future as proceeding circuitously. Like a statistical model, which allows people to think forward in time (as they would with predictions about the progression of disease) or backward in time (as they would with geological observation), a novel's power comes not merely because it describes the world, but because it produces ideas that transcend boundaries, both social and temporal.

Fiction shares the impulse that objective and subjective modes of probability have towards describing the world and understanding the mind. In his *Poetics,* Aristotle explains that "representation comes naturally to human beings from childhood, and so does the universal pleasure from representations" (1448b15-20). Similarly, Shelley's narrator describes his development as happening through representation. During his childhood, this starts with

observation of and integration with the physical environment. Verney begins his account by describing himself as "a native of a sea-surrounded nook," and goes on to reflect on how "true it is, that man's mind alone was the creator of all that was good or great to man, and that Nature herself was only his first minister" (9). By identifying himself with the landscape, Verney recognizes the role of experience and observation in building both his character and his values. His narratorial impulse to imitate nature occurs throughout the novel, with many key events being described as reflecting and responding to the movement of water or of other natural phenomena. Notably, Verney does not claim that "all that was good or great to man" is universally great in the world beyond its importance for humanity, but instead reminds the reader that human understanding is built upon mental representations. As a young adult, Verney also comes into himself through representation, as it were. When Adrian introduces Verney to the "civilized" world of philosophical knowledge, he describes his delight:

> Startled and enchanted by [his] sudden extension of vision when the curtain, which had been drawn before the intellectual world, was withdrawn, and I saw the universe, not only as it presented itself to my outward senses, but as it has appeared to the wisest among men. Poetry and its creations, philosophy and its researches and classifications, alike awoke the sleeping ideas in my mind (31).

Aristotle describes a similar experience when he writes that "people like seeing images, because as they look at them they understand and work out what each item is" (1448b15-20). It is the process of mental modelling that feels both "native" and exhilarating. Once Verney has learned through representation, he becomes a poet in the Aristotelian sense. Verney, like Aristotle's poet who "like a painter or any other image-maker, is engaged in representation" (*Poetics* 1460b10-

15) finally feels moved to write the history of the plague, or at least its progression from his own perspective.

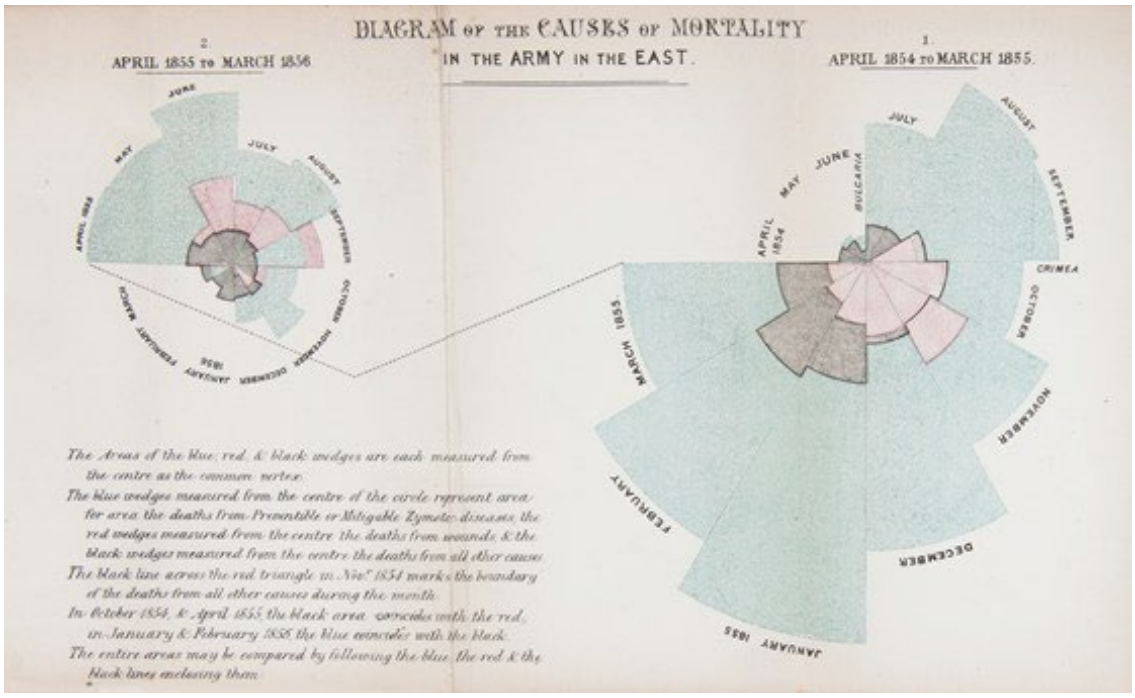
Mimesis not only is a natural human desire, but one that defines both how we think about literature and science. To repeat Verney's experience as quoted above, his sleeping mind was awoken both by poetry, and by "philosophy and its researches and classifications" (31). Statistics, as an essentially mimetic enterprise, seeks to develop mimetic models of the world based on quantitative observation. However, every model of the world has its limitations even, as Shelley demonstrates, models based on objectivity and mathematical reasoning. In some cases, forms of imitation can even become dangerous. In statistical modeling, this can happen when incomplete information about the world or about people makes correlation look like causation, or when people use statistical information to support unethical or untenable policies. In her description of the plague, Shelley explores the relationship between nature and human understanding of it, as exemplified by recurring appeals to universal natural laws and the disconcerting way that the pandemic seems to break them. As a motif, the contagious nature of the plague takes on the characteristics of representation gone awry. Each time the disease replicates itself in another human carrier, it adds another link to a chain of dangerous or ill-fated imitations. The communicable nature of the disease departs from the kind of poetic representation that Shelley often celebrates, in which imitation of nature and the sharing of linguistic representations elevates the human mind. In the novel, *The Last Man*, probability and contagion remind us that narrative imitation and transmission have a dual nature comprised both of beauty and of horror.

Shelley's interest in statistics and the "mind of man" (6) is more than an abstract interest in epistemology. Rather, she is concerned with how knowledge of natural laws can help navigate

the complexities of the social and political world and, more particularly, the world of individuals whose lives depart from their expectations. By adopting both objective and subjective probabilities to illustrate the unpredictability of the physical world and the limited nature of the mind, often combining them in ways characteristic of enlightenment philosophy, she explores how probabilism at once locates society within nature and outside of nature. In doing so, she responds ideas about scientific innovation and political economy circulating among her contemporaries. She offers a narrative of humans whose position is as precarious as that of other species within an ecological system that is both resilient and active. And she explores how the narrativization, whether through fiction or statistical interpretation, allows people to find meaning and direction, whether perceived chains of cause and effect offer a true representation of the physical world.

"The Voice of One Crying in the Crowd": Florence Nightingale and Statistical Narrative

"Whenever I am infuriated, I revenge myself with a new diagram," Florence Nightingale wrote in an 1857 letter to secretary of state Sidney Herbert. Her assurance regarding the power of the diagram arose just as much from her interest in narrative as it did from her statistical expertise. Most people think of Nightingale as the first modern nurse—a woman who influenced healthcare both by advocating for better sanitation and by opening doors for other women to join the profession. But, as Mary Poovey has written, "her accomplishments in the Crimea and in nursing were not her only or even her primary interests" (*Uneven Developments* 165). Her investment in the relationship between statistics and narrative come together in *England and Her Soldiers*, which Nightingale and Harriet Martineau worked on together, illustrating the need for sanitary reform by straddling the line between fiction and non-fiction, between data and narrative. The preface self-consciously alludes to the book's unique combination of descriptive and persuasive techniques, stating that "this book is not a work of invention. It is no fancy-piece, but 'an over true tale,' as it would be easy to show" (vi). Nightingale's polar area graphs, or rose diagrams as they are often called, were printed inside the front and back covers and bookended the narrative. These charts arrange data by allocating larger slices of the pie, as it were, to larger numbers. As explained in the picture below, the blue areas represent deaths from disease whereas red represents deaths from combat. The chart on the right shows a much higher rate of illness-related death from 1854 to 1855 as compared to the year after Nightingale implemented handwashing and other hygiene-related practices in the military hospital.



Florence Nightingale's 'Rose Diagram': a statistical graphic illustrating the causes of mortality in the army.

Her novel way of representing numbers using graphics became one of the earliest statistical diagrams in Victorian Britain created for the general public and offered an imposing companion to Martineau's account.[5] One scholar has described the rose diagrams as "a picture with enough power to change the world" (Harford 207). The power of these diagrams lies partly in their ability to illustrate the unnecessary loss of soldiers and dramatize the devaluation of these individuals in light of the remarkable lack of care afforded by the British army as an institution that sees itself as dealing in quantities rather than in the lives of young men. In other words, as a standalone artifact, the rose diagrams seem to perform the impartial and depersonalized role that we often associate with statistics. They appear to operate from a point of view that effectively

[5] For a more detailed account of how Nightingale developed her diagrams and their rhetorical argumentation, see Lee Brasseur's "Florence Nightingale's Visual Rhetoric in the Rose Diagrams" (2005) in *Technical Communication Quarterly.*

excludes individual perspectives. However, an essential and often-overlooked aspect of this visual model is that it was produced within the context of a dialogue between Nightingale and Martineau and circulated in such a way as to lament that those who would most have benefitted from participation in a group have become its casualties. Combining the rose diagrams with narrative also argues that statistical populations, such as barracks full of soldiers, are made up of individuals whose pain can be alleviated by changes in state policy. For Nightingale, the diagram is as much a part of the narrative as the vignettes of suffering soldiers that appear throughout *England and Her Soldiers* because she understands statistics as valuable for opening space for individual points of view and guiding the kinds of reform that would benefit people in their particularity.

This paper will focus on how Nightingale's philosophical treatise, *Suggestions for Thought* harnesses a type of statistical storytelling similar to that of her rose diagrams. Her writing relies on seeing the relation of the individual to the aggregate as essentially dialogic, such that constant interactions between individual, society, and institution constantly change all three. The broader implications of this dialogism, coupled with Nightingale's commitment to reform, shape *Suggestions* by positioning the text as a conversation with the reader and by generating characters whose interactions model the personal and social revision that she sees as inherent to statistics.

While Nightingale drafted most of *Suggestions* in 1853, she revised it extensively after becoming a nurse in the Crimean war and in the following decades. The book is composed of three volumes and experiments with several genres and perspectives. While volume one takes the form of a dialogue, the remainder of *Suggestions* contains shorter dialogues, essays, and sermons, with the book's most famous piece, "Cassandra," appearing in volume two.

Nightingale's emphasis on gathering various perspectives found its realization in the book's print history. Although she never made *Suggestions* available to the public during her lifetime, she had several copies of her work printed on half-sheets with room for readers to write their comments—literally asking them to participate in the conversation. Nightingale sent copies to several people, including J. S. Mill, whose comments influenced subsequent revisions of the manuscript's language and conceptual framework. We might see this emphasis on multivocality as exemplary of a probabilistic approach because it includes multiple perspectives without foreclosing the possibility of future revision. We can surmise that Nightingale wanted to or perhaps intended to revise *Suggestions*, not only because she reached out to others for feedback, but also because she kept both her drafts and comments from reviewers for the rest of her life and corresponded occasionally with others about the possibility of publishing.[6] Because Nightingale did not rely on writing for financial independence, she also had the luxury to postpone publication indefinitely as she continued to develop her ideas. Ultimately, she delayed revision on *Suggestions* even as she dedicated time to fighting for reform in sanitation through writing and other practical means. However, as I have mentioned before, revision represents an important step in Nightingale's overall project for reform. A reliance on statistics requires a willingness to shift one's preconceptions with the gathering of further (ideally *many*) observations.

Putting the Individual and Aggregate into Dialogue

Lynn McDonald's compilation of the "Cassandra" materials puts Nightingale's two drafts into dialogue with one another. The original handwritten manuscript reads more like a novella,

[6] Lynn McDonald has discussed this in more detail, explaining that "To Sir John McNeill she seems to have seriously contemplated publication after her death. [. . .] Yet she continued to explore publication with Jowett, who certainly encouraged it, albeit with revisions. He offered, more than once, to undertake some form of publication by recasting the work." (Introduction to *Suggestions for Thought* p. 53)

whereas the revised and printed version follows more closely the argumentative conventions of an essay. The first draft begins as a solitary lament of a young Italian woman named Nofariari, but quickly moves into a conversation between the heroine and her brother about why the position of women in society causes her great pain. As a sympathetic listener, her brother responds in ways that encourage Nofariari to flesh out her ideas. In this way, the desire to improve her argument permeates the narrative and highlights one way that dialogue promotes the revision and refinement of ideas. Both versions of *Cassandra* begin with the epigraph "The voice of one crying in the *crowd,*" and discuss the oppression of women; I will focus primarily on the manuscript because it more clearly illustrates the plight of the "one."

Nightingale's early draft both emphasizes the loneliness of the protagonist and dramatizes her subjection to societal norms. In the first scene, Nofariari paces before a palace in the Palladian style and murmurs "I, I alone am" (547). For Nightingale, when an individual holds a valued position, the time that they spend alone actually connects them to the group because it serves as an opportunity to develop their intellect in ways that will benefit society. Nofariari's loneliness, on the other hand, separates her from society because women "have accustomed themselves to consider intellectual occupation as a merely selfish amusement, which it is their 'duty' to give up for every trifler more selfish than themselves" (558). She also contrasts male and female time, explaining that because men earn money with their time and women don't, women are treated as if their "time is of no value" (561). Thus, when Nightingale critiques the "young maidens of the 'higher toned classes,'" for their tendency to need "a companion for every thought," she is pointing out that because women lack integration into the intellectual world available to men, they seek a paler version of companionship in their chatter, which amounts to the appearance of participation in a group without the substance or power inherent to masculine

forms of social life. They also lack the opportunity to progress. In this way, the novel's early version condemns social and political institutions by depicting a woman at variance with the very norms which many hold up as sources of protection and satisfaction.

The Palladian design where Nofariari stands proves an appropriate backdrop for her situation. The Palladian style borrowed design elements from classical Greek and Roman architecture and featured tall columns and a symmetrical façade. While this style vacillated in popularity throughout the 17th and 18th centuries, by the late 19th century the English Palladian villa had become a place to show off art to other members of one's own rank (rather than make a display of cross-rank affiliation, as in the older Baroque style).

Wansted House, plate from Vitruvius Britannicus; or, The British architect, Vol. 1, by Colen Campbell, 1731, London. Museum no. L.4058-1961. © Victoria and Albert Museum, London

That Nofariari stands outside of the building parallels the degree to which she and other women are left out of conversations by those who hold power and authority within their social class. As she will later explain, women also find themselves without the shelter of institutions. Notably,

within a few lines the protagonist finds her way to a more natural space—a glassy dark pond surrounded by pine trees and inhabited by swans. She begins to pray, lamenting her status as an outsider in prayer saying, "I have rejected the companionship of my race" and questioning "why didst Thou create us with passion, intellect, moral activity—these three—and place us in a state of society where no one of the three can be exercised" (548). This monologue draws attention to Nofariari's individual suffering and separation from her race while simultaneously suggesting her authority to speak for all women. There is a certain irony in Nofariari's positioning in this scene and her prayer. While she claims the role of a spokesperson or an intermediary between women and an all-powerful God, she also acknowledges that in society she lacks a voice. Also, at this early point in the story, we assume that we are reading the tale from the perspective of a third-person narrative. It will come as a shock, then, that at the end of the story, we learn that her brother Fariseo narrates her tale. He interjects with a confession: "I am the brother of poor Nofariari and I tell her story as she told it me, one day when I blamed her for not finding her happiness in life as I and her contemporaries have done" (591). Unlike his sister, Fariseo has a voice in society. The novel—even in speaking out against systemic oppression—betrays a lack of hope for women partly because it turns out that Nofariari doesn't speak on behalf of her gender after all. Even her innermost thoughts and fears are mediated by a male narrator, who has both a voice in society and the opportunities denied to women. She also lacks the opportunity to progress. In this way, the novel's early version condemns social and political institutions by depicting a woman at variance with the very norms which many (including her brother at one point) hold up as sources of protection and satisfaction.

The rigidity and structure of the Palladian home also mirrors one of Nightingale's most poignant critiques of family life. She describes the family as "[using] people, not for what they

are, nor for what they are intended to be, but for what it wants them for—for its own uses" and decries the degree to which it "has *destroyed* the individual life" (568). Her concerns here illustrate a principle that she discusses at length in *Suggestions* volume one, in which she condemns sacrificing the one for the many, and writing "that which is good for all is essentially good for each. That which is bad for one is bad for all. It would, therefore, be bad for all, a loss to all, that any individual nature were put out of existence, for each individual nature has a capability of contributing to the whole, in a way that no other nature can" (139). While some may take Nightingale's misgivings about the domestic world as a classic feminist response to oppression, we should also notice that her criticism centers on the problematic subsuming of the individual into a group—the sacrificing of personal needs and talents in favor of an organization that claims to help its members but offers in return a hollow title. Therefore, the biggest problem with upper-class family life, particularly for women, is that it exacts sacrifice from its members without returning opportunities for intellectual or moral growth.

The desire for institutions that support rather than vampirically drawing life from individuals, which will feature prominently in Nightingale's later work in military sanitation, appears in an early form in *Cassandra* and its discussion of family life. The novella doesn't specifically address civic organizations, but Nofariari does observe that she is "struck with the power of the organizations about [her], not with their want of it" (555). Yet she also connects the deterioration of "great and fine organizations" to "girls and boys of seventeen before whose noble ambitions, heroic dreams, and rich endowments I bow my head" whose potential withers before they are thirty because institutions fail to support their dreams. By acknowledging the reciprocal influence between people and establishments, Nightingale advocates for a society in which strong organizations develop in response to acknowledging and prioritizing the needs and

talents of their members so that all may progress together. She also uses family life as an example of one way in which individuals suffer at the hand of groups and institutions. She describes the family as "[using] people, not for what they are, nor for what they are intended to be, but for what it wants them for—for its own uses" and decries the degree to which it "has *destroyed* the individual life" (568). Her concerns here illustrate a principle that she discusses at length in the first volume of *Suggestions*, in which she condemns sacrificing the one for the many, and writes "that which is good for all is essentially good for each. That which is bad for one is bad for all. It would, therefore, be bad for all, a loss to all, that any individual nature were put out of existence, for each individual nature has a capability of contributing to the whole, in a way that no other nature can" (139). Nightingale's criticism centers on the problematic subsuming of the individual into a group—the sacrificing of personal needs and talents in favor of an organization that claims to help its members but offers in return a hollow title. Therefore, the biggest problem with upper-class family life, particularly for women, is that it exacts sacrifice from its members without returning opportunities for intellectual or moral growth.

Nightingale's attentiveness to the power of group dynamics over an individual reflects the statistically inflected thinking that characterized many aspects of her work and life, including her response to her role as a woman in Victorian society. Scholars often discuss her writing and her practical work as a nurse in the context of expanding women's rights during the nineteenth century. For example, Chieko Ichikaway describes Nightingale's writing as both a kind of resistance and a "palliative remedy for [the] mental deprivation" she experienced as an upper-middle class Victorian woman. She also took on a socially acceptable role as "moral guardian" for the nation (88-89). Both Evelyn Pugh and Alison Booth remind us that, in spite of the fact that many biographers have represented Nightingale as an icon or a metaphor—either a feminist

pioneer or a repressed Victorian woman (as Virginia Woolf suggests in "A Room of One's Own")—Nightingale herself was ambivalent about how she wished to participate in the fight for gender equality, choosing to focus her energy on improving sanitation and supporting healthcare reform rather than participating in larger scale efforts for equality through suffrage.[7] Despite choices that reflected a hesitancy to engage more actively in political efforts for women's rights, her status as an upper-class nurse took on a life of its own for journalists and biographers. It is their portrayal of her as an icon rather than as an individual with unique characteristics and opportunities that has led Booth to observe that "in spite of Nightingale's avid imperialism, elitism, and general dislike of women of any class, her story will continue to be generative for the aspirations of girls and women" (97). There is an ironic suitability in the way biographers have replaced the memory of Nightingale as a person with a figure—nicknamed the Lady with the Lamp—that stands in for a broader segment of society, or even an entire social movement. The collapse of the singular and aggregate is fitting, given her own thought on the relationship between the two.

[7] When Mill read a draft of *Suggestions for Thought*, the sentiments expressed in "Cassandra" were part of why he emphatically encouraged Nightingale to publish the book. His own essay, *The Subjection of Women* (1869), draws on aspects of her experience. It also describes the limitations placed on women when they are seen as individuals—subservient to their husbands—rather than as a group. Nightingale did not completely share the vision that Mill had for the method by which women should challenge their role. Mill believed that for women to gain access to the public world, they needed to be seen not merely as individuals with unique situations, but also in relation to a group that shared a set of experiences and abilities. In 1865, he organized the Kensington Society and circulated a petition in favor of women's suffrage. From his perspective, the right to vote would give women collective power in society, and the fastest way to suffrage was through careful organizing. Nightingale, on the other hand, understood the shift in women's role to be contingent first upon individuals gaining autonomy. In her response to Mill's invitation for her to join the Society in 1867, she wrote "That women should have the suffrage, I think no one can be more deeply convinced than I. It is so important for a woman to be a 'person,' as you say," but she goes on to decline his invitation, explaining that "there are evils which press much more hardly on women than the want of the suffrage" and giving the example of laws that prohibited a married woman from owning property (excerpt from August 11 letter to Mill, printed in Cook's 1913 biography). Recently, Susan Hogan has pointed out that "Nightingale was not against women doctors, nor was she anti-Suffrage, but from her vantage point, those things looked unachievable" (925).

The Dialogue between Reader and Data

By discussing the modification of gender roles, *Cassandra* parallels the invitation of the larger work *Suggestions for Thought*, which imagines truth-seeking as a constant revision of belief. When she begins *Suggestions* with an invitation for her "fellow searchers" to join her in seeking truth, Nightingale equates truth not merely with beliefs, but with a set of practices that would allow mankind to "judge of the nature of God" and to pursue "the destination of man" (59). Her invitation emphasizes the dialogue between individuals and the sources of information that might influence their thinking. In doing so, she situates the responsibility of discernment within the personal rather than the public sphere, declaring that "we are not left without authority" but that "the Spirit of Truth will be our authority" (59). Along a similar vein, MS begins her exchange with JA in volume 1 of *Suggestions* by defining "belief." She points out that while people occasionally use the word to emphasize a strong conviction, they also use it to emphasize their *lack* of certainty, as when someone speculating on the location of a friend says, "I believe he is in London" (61). In Nightingale's notes, she also writes that "the lover of truth is an *unaccommodating* being. [. . .] He must think for himself, within the range of his own faculties; he cannot accept the opinion and authority of others unless he has proven them" (*Society* 649). Both in her invitation in the introduction to *Suggestions* and within the text itself, Nightingale makes it clear that she values gathering and responding to evidence above achieving certainty.

These discussions about the nature of certainty respond to a shift that occurred during the nineteenth century first in scientific and then in public discourse. In their book *Objectivity,* Lorraine Daston and Peter Galison give an account of the way scientists were increasingly concerned about subjective distortion. When "willful interventions…had come to be seen as the

most dangerous aspects of subjectivity" (121), practitioners of the natural sciences turned to mechanical reproductions, including photographs, of individual species rather than the idealized "exemplar of a species" (42) that featured so prominently in scientific representation in the late eighteenth- and early nineteenth centuries. Those who studied probability and statistics were equally as wary of subjective interpretations of their data. Laplace himself wrote in his *Philosophical Essay on Probabilities* (1814) that "probability theory depends on such delicate considerations that it is not surprising that, with the same data, two people will arrive at different results, especially in very complicated questions" (5-6). Of course, in this instance Laplace was referring to instances of limited information, as in a series of coin tosses. In contrast, by the mid-nineteenth century statisticians had established systems of widespread data collection, such as the census. An avid reader of scientific publications, Nightingale shared the desire for the wider view afforded by increased data collection. Her invitation for readers of *Suggestions* to use their experience and insight to evaluate her claims responds to the statistical impulse to incorporate additional information in coming to any conclusion but recognizes the process of an individual examining a data set as generative, not the least because their singular perspective holds value.

Nightingale's emphasis on information collecting and concern about subjective approaches to belief shifted over time and as she grew as a statistician. As a child, she had craved "the kind of certainty she believed that only mathematics could provide" (Bostridge 70); as a young adult, she developed some of her most important ideas in response to the work of the Belgian statistician Adolphe Quetelet.[8] In his *Treatise on Man* Quetelet emphasized gathering

[8] His best-known work, *Physique Sociale* (1835) was translated into English and published as *A Treatise on Man and the Development of His Faculties* in 1842. Nightingale studied his 1835 book and was also familiar with his *Système Social* (1848) and *Anthropomètrie* (1870). As the first woman inducted into the London Statistical Society in 1858, she met Quetelet when he was chair of the International Statistical Congress in London in 1860 and they remained in contact until his death.

large quantities of data[9] and finding their mean to control for variation in a population. This new statistical view of human behavior, now called his theory of the "average man,"[10] differed from previous models, which imagined probability as a calculation of certainty. In other words, whereas others saw probability as a feature of the mind, he saw it as a feature of the world. Quetelet justifies his work with averages by explaining their usefulness, arguing that "by examining [the laws] too closely, it becomes impossible to apprehend them correctly, and the observer sees only individual peculiarities, which are infinite" (*Treatise* 5). From this perspective, working with large numbers and learning about the tendencies of populations allows people to make decisions based on probabilities instead of puzzling over individual peculiarities. Nightingale was clearly enamored with the kind of regularity that Quetelet's statistics find in the world. In her essay "In Memoriam," which she dedicates to Quetelet after his death, Nightingale recounts his description of a world in which human behavior can be "*calculated* beforehand" by those who understand the workings of natural law (46). She explains further that "the 'law' is: given such and such a state of society there will be such and such an amount of crime, of accidents, of letters posted without and address, of marriages, normal and abnormal, etc." and that these may be predicted with "the utmost possible exactitude, to a fraction, in fact" (48). She also explains that "a law does not 'govern' or 'subordinate,' does not compel people to commit crime or suicide. [. . .] It simply reduces to calculation observed facts" (47). Carefully differentiating between statistical law and personal choice, she acknowledges that myriad causes

[9] In doing this, Quetelet was incorporating the law of large numbers into his research. This law originated in Bernoulli's *Ars Conjectandi*, in which he theorized that as a number of coin tosses approached infinity, the observed instances of heads vs tales would converge at ½, and it had been an important aspect of statistical data collection for more than a century.

[10] Quetelet's assumption that measurements of human physical proportions, such as the girth of the average soldier, would fall along a normal distribution (or a bell curve) came from his familiarity with the law of errors in astronomy, which was based on the occurrence of error in measuring the movement of celestial bodies. Because imprecise instruments naturally led to erroneous measurements, astronomers could eliminate outliers, assuming that the mean measurement would be closest to correct.

affect the way people act. The childlike wish for certainty shifts into a commitment to accumulating more and more data and ever refining. Thus, in *Suggestions* Nightingale never arrives at ultimate truth, opting instead to focus on collecting perspectives. For her, the best method follows a continuous progression—never ending, but moving ever closer to the answer.

Nightingale acknowledged that Quetelet's theory of the average man would be useful for examining factors that contribute to social regularity, but her marginal annotations in the second edition of Queletelet's *Physique Sociale* (1869) demonstrate her hesitation to fully accept a deterministic view. For example, when Quetelet discusses the probability of an event (like the sunrise) recurring, Nightingale differentiates between probabilities and causes by writing, "Not causes but *tendencies working* through *opportunities*" (*Society* 19).[11] This comment reflects Nightingale's careful approach to the concept of necessity. By acknowledging the relationship between tendencies and opportunities, she emphasizes the complex network of factors that contribute to human action, and she resists one common 19th-century criticism of statistics—that is, the fear that statistical approaches revealed a world that was purely deterministic. While the terms "causation" and "tendencies" accentuate ways that people act in accordance with certain laws that govern human behavior, "opportunities" allows for societal change that would facilitate individual improvement. Although Nightingale shared Quetelet's dedication to discovering laws that governed human behavior, she was also invested in creating opportunities for individual improvement that would, over time, improve society.

While Nightingale recognizes that individual choice is often influenced by a combination of biological and environmental factors outside of the control of an individual, she sees improvement as arising from larger institutions which can discover and make changes to the

[11] Quetelet also recognized that there were many potential sources of variation in human subjects, but referred to them as "accidental causes."

political and economic environment. However, a commitment to individual progress drives her advocacy efforts, and she recognizes that both the interpretation of data collection and decisions about how to implement change require thoughtfulness and a readiness to revise and refine our preconceptions. Whereas politicians and statisticians during her time saw statistics primarily as a system of information-gathering and categorization, Nightingale envisioned a version of statistics that would positively impact policy. In a letter to Benjamin Jowett, she writes, "What we want first is not so much an accumulation of facts (i.e. not at present) but to teach the men who are to govern the country what are the USES of facts, of statistics" (*On Society* 110). By using statistics properly, she argued, those with the power to do so could improve institutions in ways that benefitted those who lacked this power.

Character Types in Dialogue

Nightingale's societal reimagining develops out of a combination of her interest in character and her understanding of how statistics describe the aggregate without overdetermining the individual. We see this several times in *Cassandra* when Nofariari compares life to fiction. Early in the narrative, Nofariari asks, "what are novels?" concluding that novels are built around a set of circumstances that bring together and "call out the high feelings and thought" of a group of characters. Additionally, "the heroine has generally no family ties, but (almost *invariably* no mother) or, if she has, these do not interfere with her entire independence" (552). This description of novelistic convention relies on a statistical vision of character in relation to a group, in which a set of circumstances determine the category or set to which an individual belongs while still allowing space for variation among members of that set. She also differentiates between primary and secondary characters:

> If I had been a hero, I should not need to tell my story, for then all the world would have read it in the mission I should have fulfilled. It is because I am a commonplace everyday character that I tell my tale, because it is the sample of hundreds of lives (or rather deaths) of persons who cannot fight with society, or who, unsupported by the sympathies about them, give up their own destiny as not worth the fierce and continued struggle necessary to accomplish them. (570)

In this figuration, secondary or "commonplace" characters function like statistics themselves. They become meaningful only in the aggregate, unlike heroes, whose departure from the norm makes them memorable outliers worthy of novelistic or legendary status. By telling her own story, Nofariari insists on the individuality and the worth of those hundreds of women whom she represents.

She also longs for "a type," or an exemplar, "that such a one might be a discoverer through her intellect, such another through her art, a third through her moral power" (556). This use of the word 'type' combines the status of statistical categorization with the notion of a character type in the fictional sense—a generic production of an average or commonplace person. Nightingale recognizes that for such a type to exist, it must initially grow out of a hero's tale. By wishing for a woman "who will resume, in her own person, all the sufferings of her race . . . [who] will be the Savior of her race" (584), Nightingale contemplates again the capacity of the one to speak for, intercede for, and represent the many. Here, Nightingale's savior gains significance not because she sacrifices her needs or will on behalf of the larger population, as some interpretations of a religious savior might suggest, but because in demanding a place in society and the ability to reach her potential she releases others from the oppressive sacrifice that a more powerful segment of the population would subject them to. Certainly, Nightingale's

understanding of a hero or heroine responds to her interpretation of modern statistics and demonstrates a nuanced awareness of the subtleties of novelistic character. In *The Industrial Reformation of English Fiction* Gallagher explains that the industrial novel often relies on flat characters to demonstrate that "universal laws were the primary reality and that daily experience was merely a manifestation of these laws" (58). Like authors of such novels, including Martineau, Nightingale is invested in examining how universal laws, or rather social frameworks, influence individuals. When she develops the concept of the female savior, she recognizes that the woman who engages in society through intellectual pursuits might emerge as unique—a hero—but later become typified so that future women can adopt her persona or values as part of their own character.

In some ways, Nightingale creates Nofariari's heroine by revising the story into the more essayistic version of *Cassandra.* The changes—begun after her work in Crimea—demonstrate a rethinking of the affordances of narrative convention and the authoritative voice of one who feels more confident in her ability to speak for the *average woman*. From the first to the second draft, Nightingale changes several passages from first to third person, and generalizes her despair as one that all (or most) women experience instead of representing Nofariari as unique. Both iterations declare that "the progressive world is necessarily divided into two classes—those who take the best of what there is and enjoy it—those who wish for something better and try to create it" (554). However, while the manuscript leans more toward wishing for something better, the revised essay speaks with the authority of one with confidence in the possibility of change.[12]

Nightingale's method of representing different perspectives plays out in interesting ways in volume one of *Suggestions,* taking on a statistical resonance insofar as each character is

[12] In some ways, characterizations of Nightingale as a feminist reformer and the Lady with the Lamp make her out to be the very kind of redeemer wished for in *Cassandra*.

established as a type or member of a category rather than as an individual. Formally, most of volume one is a dialogue, with MS as the primary speaker conversing with JA (Jacob Abbott), St Ig (Ignatius of Loyola), and HM (Harriet Martineau). Whereas the text specifies the names to which the other abbreviations correspond, it doesn't give MS a name. Scholars have speculated that MS stands for Mary Smith, Nightingale's aunt, who espoused many of the radical ideas that appear in the text. For this reason, I will refer to MS using female pronouns. Nightingale bases JA on former professor of mathematics, author, and pastor, Jacob Abbott. However, rather than quoting his writing or unique opinions, which she was familiar with, she has his character speak from the perspective of conventional Christianity.[13] By giving the interlocutors in volume one initials of real people while fictionalizing their words and opinions, the text inhabits a probabilistic space similar to that of a novel: it represents what might be without adhering strictly to what actually has been. In fact, McDonald mentions that when Nightingale sent her manuscripts to be printed, she included the Latin saying, "Non quaeras, quis hoc dixerit, sed quid dicitur attende,"--"don't be concerned about who said something but pay attention to what is said" (57). At times, the various voices don't exhibit enough identifiable attributes to function as characters at all. In the third conversation, MS, JA, and St Ig discuss how individuals come to their own beliefs about truth. Rather than each character imparting their own perspective, the three participate in a rapid exchange, finishing one another's sentences at times, such that their collective ideas form a coherent explanation:

> [JA:] Let us suppose that we give up the usual means of receiving truth from church or book, [MS:] and that we seek it from God through our own faculties, including the

[13] McDonald has explained that Abbott's work influenced Nightingale's beliefs, particularly his 1834 *Corner-stone, or, A Familiar Illustration of the Principles of Christian Truth*, and his 1836 *The Way to Do Good, or, The Christian Character Mature*.

> spiritual, the affectional, the intellectual and the physical, and including what these can receive from God by means of the same faculties in mankind as well as in our individual selves. [. . .] [St Ig:] But each man individually is to be called upon to make out *what* his faculties can accept as true of the exercise of other men's faculties [MS:] And here is, in reality, no difference from the present state of things in one sense, though in another there is such an essential difference—for now every man in reality decides for himself. (98)

In contrast to other sections, in which a single character (often MS) will have paragraphs or even pages of monologue, the consensus on this issue comes not because one character has thoroughly argued his or her point, but because they have combined their voices. Interestingly, the multivocality here mimics the way MS has previously described acting "on the impression of our senses"—"we test their conclusions by comparing them with those of mankind" (96). In this way Nightingale seems less concerned with people in their specificity than she is with ideas as they develop in dialogue. The characters, then, don't always mediate between the individual and the species, but offer a statistical version of social relations in which representing the ideas of a particular person is less important than amassing those ideas in the aggregate.

The characters in Nightingale's writing allow her to examine what Lukács has described as "a peculiar synthesis which organically binds together the general and the particular both in characters and situations" (6). However, her approach to character development differs from what we see in most post-Romantic realist novels. Dierdre Lynch contrasts eighteenth-century types, which emphasize the connectedness of individuals to society, with the new Romantic ideal in which a sense of the particularity of characters becomes both a measure of the novel's success and of the reader's intellectual prowess. Ian Duncan has described novelistic treatment of human nature in the nineteenth century as "a relation between the history of individual persons (the

traditional subject of the novel) and the history of the species (the contentious subject of the new anthropology)" (2-3). By thinking of the individual as having developed in response to an evolving species, we focus particularly on the degree to which individual traits develop in response to their hereditary and social predecessors. We might expect, given her status as a statistician and her desire to uncover universal social laws, that Nightingale would deal primarily in types as eighteenth-century writers do, or that she would use her characters to highlight the power of the group over an individual. However, while she is interested in how individuals are influenced by their social positioning, Nightingale is more preoccupied with how an individual might participate within a community to effect change. In her writing, Nightingale focuses not on one woman in her particularity, nor on women as a generic category; rather, her characters help to develop a model of agency that is under constant revision within the aggregate.

Dialogue as a Form

The formal characteristics of dialogue allow Nightingale to model that revision in a particularly striking way. Dialogue provides her characters with the opportunity to express different perspectives and the flexibility to follow arguments to their logical end. Structurally, the first three dialogues of volume one follow a Socratic pattern. MS and JA converse in dialogue one. IG joins them for dialogue two. HM comes in for a third dialogue in which all four of them participate. By expanding the conversation in this way, the text demonstrates a process of individuals discovering their own ideas and refining them by participating in a group. Regardless of the character to whom MS speaks, the dialogue builds on itself in such a way that each new concept arises from and implies acceptance of the previous one. Its logic, then, suggests that the movement of the text creates an ideal reader progressing toward an increasingly obvious set of truths.

In his book *Probability and Literary Form*, Douglas Patey questions assumptions about the dialogue as a "vehicle of probable argument" because numerous writers—Galileo, for example—use dialogue precisely to "[conceal] claims to certainty" (173-74), acting as if they are simply exploring ideas when they are actually making a carefully crafted argument. He cautions us against naïvely associating the dialogue form with probabilistic induction, emphasizing instead an attention to "the kinds of inferential relations that hold works together and give them their character" (174). For Patey, reading with an eye trained towards probability prompts us to examine the epistemic status of a piece of writing, but also requires us to think critically about the relationship between the literary world and its external referent. Occasionally, Nightingale's dialogue exhibits the characteristics Patey points out in dialogues like Galileo's, which use dialogue as a rhetorical shield but nevertheless intend to convince their audience of a specific set of principles. As a worst-case scenario, a dialogue following this structure could lead to a set of conclusions that appear to be logically supported within the world of the text but fail to describe the external world because they lack the complexity to account for aspects of lived experience.

Unlike traditional Socratic dialogues, Nightingale's work often depicts characters working together to develop an idea or answer a question. Although MS would seem to function as the guiding, Socratic figure in these dialogues her role shifts depending on the stance of her conversant. When MS argues that conceiving of a perfect God requires a formally educated mind, JA disagrees in a way that recognizes an important nuance. MS says that "it required cultivation, development to conceive the idea of perfection, and . . . the higher all the faculties of an individual, as also of a nation, have been, the higher has been his conception of God, the nearer perfection" (70). In response, JA points out an error in her logic—reminding her "that some of the those called the most highly cultivated of the human race, Descartes, Laplace,

Hume, have not been able to conceive of a God at all" (70). This pushes MS to refine her definition of the word "cultivated" by contrasting intellectual and moral cultivation. Though MS seems ready to concede the point, JA pursues the idea further, suggesting that even an innocent and moral person "would have had a still truer [conception of diety] if he had known all that Laplace could have told him" (71). Together they arrive at the conclusion that "the more highly man's moral, intellectual and spiritual faculties are cultivated, the more nearly will he approach a true conception of God. [. . .] A harmonious development of all these faculties would give us a truer still" (71). What's more, there are times in the text in which MS struggles to answer one of her own questions and another character offers a solution. This happens when MS gets stuck on whether God's individual will is inherently connected to natural law. After asking whether it is important to inquire into "the *willer,* the purpose of these laws?" she goes silent, and JA begins a three-page monologue in which he analyzes the aspects of her argument that have led her into confusion on this issue and offers an alternate interpretation of the issue. Cooperative dialogue allows Nightingale to explore the affordances of this form for thinking through challenging moral or intellectual issues while experimenting with the role of characters as participants in a group.

While several passages demonstrate cooperation, there are also times in which characters disagree completely. For example, while Nightingale's manuscript version of *Suggestions* includes many instances of disagreement between characters, moments of discord are often removed from the printed version. Her edits make the text more cooperative, less polarizing, more invested in learning and growth over proving that a single idea is *right*. In an omitted portion, JA challenges MS to clarify her beliefs about the Bible, observing that "sometimes you quote it in the way of authority and sometimes in the way of contempt—I cannot tell what you

believe" (75). Although Nightingale has removed this critique from the printed version, she leaves MS's response. In another omitted passage, JA criticizes certain aspects of MS's method. At one point, he calls her obsession with understanding law "dreary rationalism" (166), and then declares that he "cannot admit [her] definition" of "God and Law [as] the same thing" (167). This kind of editing emphasizes the degree to which the original text departs from Socratic dialogue, both because the participants are represented as equally insightful (as opposed to MS always having the upper hand) and because the role of the secondary characters is not to be proven wrong, but to provide MS additional insight through critical questioning and discussion. In these moments, the interlocutors model a relationship with MS that Nightingale has encouraged her readers to have with the text itself.

In addition to the invitation to search for truth that appears in the introduction to *Suggestions,* the book encourages readers to test the veracity of general principles by repeatedly praising the value of personal experience. Early in the text, JA argues that religious mysteries "may be shown, not by mathematical proof, but by such a strong presumptive evidence [. . .] that man may live and feel in accordance with the fact, as with much else not mathematically provable" (64). The phrase "presumptive evidence" both emphasizes an inductive response to sensory experience and draws on an empirical approach to learning. Likewise, MS idealizes "a Baconian way" and praises the way that someone studying physics bases their "assertions and conjectures [. . .] on phenomena recognized by man's senses" (85). In addition to praising sense experience in the search for truth, the text advocates for testing generalities through application to individual experience. When MS claims that "*in* his wrong, not *for* his wrong, [a man] will suffer till his evil becomes good," JA counters by invoking "everyday experience" in which "we see the selfish man enjoying, the good man suffering, the criminal infinitely happier than the

philanthropist" (171). MS holds her ground on the matter, pointing out that "insensibility to privation is not happiness" and going on to give medical analogies as evidence: "any pain is better than paralysis, inflammation is more hopeful than mortification" (171). In this case, JA does not ultimately accept MS's claims and the argument continues to develop nuance in the next section, which addresses philosophical necessity. By intermingling probabilistic argumentation with examples of how general truths might apply to particular cases, Nightingale's writing follows an impulse commonly associated with fiction by incorporating both an intellectual openness within her stated intent to seek truth, and an emphasis on readerly participation in examining the way truths are applied to individual life.

The multiplicity of voices and openness to contradiction make *Suggestions* much more than a covert monologue. In this work, Nightingale's interest in the relationship between the one and the many—a fascination related to her dedicated study of probability—becomes palpable. By drawing attention to the difference between "what we can know positively and what we can only conjecture empirically," the book displays a preoccupation with the value of probabilistic inference (67). Yet, unlike Galileo, who used dialogues to propagate his already-formed conclusions about the heliocentric universe, Nightingale's dialogue emphasizes a genuine interest in developing her theories through logic and collaboration. In its dedication, the book frames its mission as an attempt, not to declare, but to seek after truth, inviting "artizans," or members of the working class, to decide for themselves whether its claims ring true. While some scholars are skeptical about whether this audience would have maintained interest in reading a philosophical tract like this, Nightingale's invitation represents a democratic approach that responds to an impulse among working-class readers, which motivated many to seek intellectual improvement as a step toward economic independence. Likely, Nightingale saw her writing not

only as building a bridge between classes that shared political interests, but also as taking part in a genre of scientific writing that valued the exchange of ideas and perspectives. In describing the communal aspect of the dialogue, James A. Secord writes that this form "made it possible to recreate the experience of participating in scientific conversation, debate, and discourse" (43). In the dedication Nightingale goes on to emphasize her departure from traditional forms of authority, which reflects an approach to truth that Mikhail Bakhtin will later describe when he writes that "truth is not born nor is it to be found inside the head of an individual person, it is born between people collectively searching for truth, in the process of their dialogic interaction" (110). With its reliance on the dialogue form, *Suggestions* experiments with aggregation by creating a space dedicated to the exchange of ideas and allows for a collection of data from different interlocutors that will then produce a kind of refined knowledge.

Dialoguing about Scientific and Social Reform

Nightingale's values, her reform efforts, and her statistical approach occurred in dialogue with the work of many other scientists and reformers of her time. She often revised her own beliefs as she gained additional insight. For example, her careful approach to evidence and her concerns about how to interpret aggregate data mediated her reaction to Darwin's work on the evolution of species and Galton's work on heredity. In an 1847 letter to Margaret Verney, Nightingale criticizes aspects of evolutionary theory, arguing that "there is a gap between the most sagacious monkey and man, which no link can bridge, and which must always be jumped over. Dr Engledue is himself an instance of it, for he is an example of the *progression* of the human race, a progress we never see in animals" (*Society* 654). Although at face value Nightingale's resistance to the gap she saw between animals and humans appears to be a moralist critique of Darwin, a closer look reveals a more scientifically-minded concern based on her

understanding of the law of large numbers. Even Darwin himself had expressed dismay that he had needed to publish his book so quickly and without further data collection. To Nightingale's credit, her position softened as research that supported evolutionary theories grew. However, even if there are elements of Darwin himself that she criticized, she was invested in the fluidity of personhood. With relation to Galton's law of ancestral heredity, Nightingale ruminated on the complexity inherent in attempting to make predictions about genetic inheritance, writing in her notes that "we know generally that races deteriorate in close town life, in unsunned valleys, by marrying in and in. But in particular instances we scarcely know anything [. . .]. Then there is the whole chapter of accidents, no, or circumstances, of the influence of which we know so little" (*Suggestions* 656-57).[14] Clearly, she believed in the possibility of evolutionary progress in the case of humans, and studied how it might work, but Nightingale had misgivings about whether people could gather enough data to trace the exact process of change and how we might differentiate between biological and social influences that affected a person's interests and choices. Her conviction that social changes were easier to implement and track contributed to the decision to devote her time to advocating for sanitary change.

When her writing justifies the study of natural law to understand and improve society, Nightingale's perspective leans heavily toward a deterministic conception of both societal and individual progress. In *Suggestions*, she goes as far as to say "we must study that which is, always with this comprehensive view, that it is ever a development from a past towards a determinate future, existing in and determined by the thought of the righteous God" (141-42). She goes on to explain that human uncertainty with regard to what *is* and what shall be is merely

[14] Galton read his essay "Blood-Relationship" to the Royal Society June 13, 1872, and it was published in *Nature* on June 27, 1872 (pp. 173-76). In this essay, he describes his discovery that people have 256 ancestors in seven generations.

a symptom of limited perspective, an opinion that bears considerable similarity to Laplace's demon, which I have discussed in more detail in a previous chapter.[15] In her drafts of *Suggestions*, then, Nightingale's injunction to study and reason hinges on the idea that certainty exists but that humans lack, in many respects, the capacity to access it. When she insists on the importance of gaining knowledge it is not because knowledge allows people to make better choices, but because in understanding God's laws they learn to "will truly," meaning that they find true satisfaction in living according to their innate characteristics (123). Nightingale compares personal attributes to the laws of gravity with the example of a sparrow that "falls to the ground, not because God has decreed that the sparrow shall fall from that tree, but because God has willed that attraction should be a property, an essential of matter" (113). Thus, each person has a different set of desires predicated upon God's having placed them "in constant coexistence with such organizations and such circumstances" at birth, but regardless of their current level of virtue they are all progressing toward a state of absolute goodness. (113) She reiterates this idea by saying that "it is true, we are predestinarians, each in his own sense" (162). Later, MS argues that "to every man there are conceivable volitions which are impossible to him. The uneducated thief could not will to be a man of cultivation and refinement, He could not even wish it" (282). She sees people as limited by their own nature. Thus, whether or not they are capable of conceiving of a change in their habits or circumstances, their capabilities are already determined by external circumstance. While she recognizes that there is variation among individuals, and a difference between personal and societal progress, she considers both a result of natural law that is discoverable with careful observation and astute reasoning.

[15] In *A Philosophical Essay on Probabilities*, Laplace imagines a being (which we now know as Laplace's demon) who for a single instant can know everything about the present state of the universe, positing that for such a being "nothing would be uncertain and the future, as the past, would be present to its eyes" (4).

As she responded to later scientific and mathematical advances, Nightingale developed a more nuanced, though still decidedly deterministic perspective on the relationship between knowledge and the will. Nightingale modified her views partially in response to Quetelet's work and discusses this more in depth in *In Memoriam*.[16] When she discusses the relationship between chance and social policy, she draws some of her ideas from Plato's *Laws.* In book four of this dialogue, the Athenian draws attention to the influence of chance (tyche) when he writes that "there are chances and accidents of various kinds, happening in various ways, which make all our laws for us. It might be the violence of war which turns our political arrangements upside down and changes our laws, or it might be the despair born of dire poverty. Often, it is disease—and attacks of plague—which compel change…" (4.709a). While recognizing that chance and God control many aspects of world, he contends that skill and art (technē) allow humans the agency to respond to unpredictable occurrences in the world. As a kind of technē that Plato has addressed in *The Republic* and other works, statecraft is the method by which lawmakers should develop policies that contribute to the promotion of human goodness. In her essay "In Memoriam," Nightingale depicts a similarly deterministic world, in which human behavior can be "*calculated* beforehand" by those who understand the workings of natural law (46). She explains further that "the 'law' is: given such and such a state of society there will be such and such an amount of crime, of accidents, of letters posted without and address, of marriages, normal and abnormal, etc." and that these may be predicted with "the utmost possible exactitude, to a fraction, in fact" (48). In her conception of the world, Nightingale shares Plato's recognition that people are beset by events outside of their control and that their agency is contingent upon

[16] Lynn McDonald points out the fact that Nightingale revised her thinking about determinism in her introduction to *Suggestions* (49), and speculates that this significant change contributed to her decision not to publish the work because it would have required such a substantial revision.

the societal condition in which they find themselves. In other words, because individuals are formed in society, they are at least partially created by that society. She goes beyond Plato, however, in her reliance on math and the hope it provides for ensuring goodness in the world. Her emphasis on calculation, exactitude, and fact elevates mathematics to the level of the divine. Correct statistical reasoning endows humans with a prophetic ability to see the future. However, unlike Plato, who sees there being final truths, Nightingale never gets to an ultimate truth because of her commitment to accumulating more data and refining. For her, the method follows a continuous cycle—never ending, but moving ever closer to the answer. This statistical approach allows its practitioners to gradually understand "what the social condition is which produces a harvest" (48). By comparing human behavior to a harvest, Nightingale suggests that individual action, far from being capricious or unique, follows a kind of natural law that humans cannot access by observing individual cases. Rather, it is by gathering large quantities of data, we can understand why people behave the way they do. Therefore, when she says that "many of these circumstances cannot be altered by persons; they can only be altered by nations and governments," she accepts Plato's assertion that technē provides a space for human agency but adds a deterministic twist because of the underlying assumption that the right changes in society don't merely promote goodness in an abstract sense but predict and facilitate it through calculation.

While in her earlier years Nightingale focused on recognizing the laws that govern human nature, she later placed a much greater prominence on the possibility of changing human will and conduct. She no longer held firm to the belief that knowing God's laws should suffice for cultivating happiness in this life. In an 1872 letter to Mary Shore Smith, she writes the following:

> When Emerson goes into a rapture over the 'feast of law,' I go into a rage. It is as if I had gone into a rapture over 'there is sanitary law' all these nineteen years and left all India, all the Crimea, all the British Army at home, all the American Army to die of fever and cholera. People who go on about 'God governing law,' or 'the moral world being all law,' etc. without finding out or attempting to find out the laws which are to save us, but stopping at the formula, also seem to be to be leaving the world to die of (moral) fever and cholera. (McDonald, *Suggestions* 51)

While I don't claim that her previous writing merely went into a rapture over the fact that laws exist, by the 1870s she certainly intensified the claims she made about the practicality of data and research. In her later writings, she also expanded her conception of agency by demanding that people act on their knowledge by changing civil institutions and advocating for better education, sanitation, and shelter for the poor as a way to reduce criminality. When she promotes the study of statistics in "In Memoriam," Nightingale retains the preeminent role of religious philosophy which pervaded her juvenilia by gesturing to theodicy, or the problem of evil in this world. She doesn't claim outright that evil allows God to bring about his purposes, noting that Plato says that "there is no kingdom of *evil* in this world" (45). However, she discusses a problematic intuition—that "we seem to see, without being able to assert, that evil is to exist just so long and so much as is necessary to rouse us to find out which to change it all to good" (45). By suggesting that God allows evil in the world so that people will use their agency to improve society, she resists falling into a completely deterministic outlook. For Nightingale, God's role isn't to benevolently intervene in human life, but to create immutable laws; the discovery of these laws allows people to understand the degree to which their "*will* is *determined* by the 'Acting causes' of [the] 'social system.' Alter these and [their] will is altered" (59). Therefore,

the space for personal autonomy isn't necessarily in the choices they make on a daily basis, but in the ability to recognize statistical patterns and subsequently work as a group to make incremental changes so that the system as a whole shifts to produce more virtuous individuals. Similar to Plato's line of thought in *Laws*, which begins with the Athenian's query about whether god "should take credit for your legal arrangements" (1.624a), Nightingale's later theories rely on the notion that human agency, while limited, can allow humanity to improve over time.

By situating the concept of free will within a theological framework, Nightingale highlights her conception of God as loving but distant. In *Suggestions for Thought,* she characterizes God as both impersonal and providential. This perspective combines the rigor and concerns of statistical learning with her Christian faith and represents God as an architect of the world who, rather than intervening frequently in human affairs, governs through moral law, which people learn through research and observation and must apply carefully and systematically. She shares aspects of her conception of the divine with Harriet Martineau, who was a close family friend. Martineau's novels likewise consider the role of human agency, representing a "complete conflation of religious and social-economic determinism" (52), as Gallagher argues in *The Industrial Revolution of English Fiction*, insofar as her characters are products of their class structure. Martineau's novels provide neither justification nor divine intervention for the suffering of the poor. Like Martineau, Nightingale often explores individual limitations that result from external factors, and charges those with political and social power with the responsibility to change the structures and institutions that contribute to crime and indolence.

In this chapter, I began by describing how Nightingale's diagrams lent credibility and power to sanitary reform in the military. By exploring her collaborative project further, we can better understand how Nightingale and Martineau's shared values drove their understanding of

institutions and their role in serving individuals. In *England and Her Soldiers*, Martineau establishes the need for sanitary reform by straddling the line between fiction and non-fiction, between data and narrative. The preface self-consciously alludes to the book's unique combination of descriptive and persuasive techniques, stating that "this book is not a work of invention. It is no fancy-piece, but 'an over true tale,' as it would be easy to show" (vi). While Martineau's tales of the English military share some literary features of other fictional works, didacticism often overshadows aesthetic considerations. In one of the more broadly literary portions of the book, Martineau entreats her readers to imagine a quaint country town, "a quiet old-fashioned place, very well satisfied with itself, very dull (which it takes for gentility), and yet exceedingly proud if anybody born in it makes any noise in the world" (28). After painting a picture of the town's bucolic scenery and a few of its quirky citizens, she proposes that "the strongest young fellows [are] drawn off the land" (30) to seek their fortunes in the city. Of course, the departure from their bucolic upbringing brings unanticipated struggles—the dark reality of life in an urban industrial landscape. In a series of portraits, similar to those that she gives in her earlier work, *Illustrations of Political Economy*, she describes the conditions for a city clerk, a shopman, and a policeman before arriving at her primary subject, the soldier. She emphasizes the disjunction between the curate's promise of health and prosperity when he recruited these young men and their subsequent experience. Their clothes are "not as good as they are fine" and their barracks "show signs of crumbling in a quarter of a century, instead of standing for a thousand years like the dwellings of a mountain region" (36). Martineau's emphasis on the premature degradation of their raiment and quarters not only introduces two primary components of necessary sanitation reform, but also aligns the soldiers' environmental conditions with their decline in physical and mental welfare.

Not surprisingly, both Martineau and Nightingale shared a belief in the intrinsic value of pure air. For hundreds of years medical practitioners had assumed that unhealthy air caused illness. The miasma theory of disease would maintain its prominence until at least 1880, when early germ theories began to gain prominence. In fact, Nightingale's 1858 essay "Notes On Hospitals," she claims that an "abundance of pure air will prevent infection," making space, ventilation, and light a primary focus in her proposal for hospital reform (52). Likewise, *England and Her Soldiers* describes the "foul smells" surrounding barracks and the soldiers sleeping "close with the breath of many comrades" (38), highlighting the communal nature of disease. Rather than tracing the spread of illness from one person to another, and recognizing that the environment and the strength of the individual's immune system both affect the transmission of disease as we understand today, miasma theories emphasized the collective nature of disease. Prevention was not merely possible but guaranteed, given the right adjustments. Just as statistics allow us to think about how group dynamics affect individuals, when Nightingale and Martineau attribute infection to poor air quality, it serves both as evidence for the need to improve the physical and social environment and as an apt metaphor for the way in which people become manifestations of their surroundings, even despite their choices and intentions.

An important underpinning of both Nightingale and Martineau's approach to social reform is the assumption that the most effective way to help individuals is by looking at trends and patterns through a broader social lens. While *England and Her Soldiers* uses narrative to draw an emotional investment from its readers and to depict how horrific a given set of conditions are, statistics tell us how widespread they are. When Martineau exclaims that soldiers "die off fast—more than twice as fast as policemen," the phrase "die off" sets soldiers apart as if they were their own species, emphasizing the fear of their extinction if society doesn't make

significant changes (38-39). When she goes on to explore this claim in more detail, she does so by comparing the troops to a normative group: "foot soldiers in barracks at home have died at the rate of above twenty per thousand in a year, while men of the same age, of various ordinary occupations, and in a healthy situation, have died at the rate of only seven in a thousand" (39). This comparison not only speaks to the breadth of the problem, but also emphasizes that rather than seeing individuals as unique and disconnected, they should be understood in relation to one another—as participants in a social group with characteristics and patterns that can be observed and measured.

Conclusion

As exemplified in her many varied writings, Nightingale recognizes the important function of a social group and its influence on people. Her account of the soldiers in Crimea serves as a cautionary tale. Rather than empowering its members, the military has subordinated the needs of the individual to itself. By changing the group dynamics (via sanitary reform) Nightingale proposes elevating the needs of the individual. When we think about this in relation to her commitment to statistics, we might surmise that while she recognizes the value of aggregate information, she also exhibits a heightened awareness of the ways in which the people that can most benefit from participation in a group can become its casualties. In contrast to the concept of the average man, which some used to retroactively impose a set of norms onto a group that would otherwise be recognized as very diverse in nature, Nightingale fervently commits to elevating the cause of the individual so that institution and group reform preserve not only the value of the one, but also creates opportunities for individuals to progress through revised government action in response to gathered data.

All of Nightingale's distinctive statistical narratives rely on her careful thinking through of the way that individual experience depends on the social conditions in which people find themselves. Like her nursing, which yoked her commitment to helping individuals together with the data collection and management that would promote wider systemic change, her writing reflects a desire to describe the world with the precision she appreciates in mathematics and to reform it with the flexibility that allows her characters to refine their ideas through dialogue. Even across genres—the statistical diagram, the narrative, the essay, and the dialogue—the creation of characters allow her to navigate the relationship between the individual and the social in a way that satisfies the demands of a highly technical statistical method while exhibiting concerns over how social and economic factors influence individuals. Notably, the genres in which Nightingale chooses to work and the particular way that she navigates them all share a preoccupation with the moment of interchange, a meeting between the writer and the world or between an idea and its practical implementation. Similar to David Russell's description of tact in the essay as a way to "thicken the medium between people, to open a creatively neutral or virtual space" (4), Nightingale's essays and diagrams recognize that the reader approaches a text with a different perspective than the author and allow space for the mingling of ideas. In this way, their form reflects an ethic of care inherent to the kinds of acceptance and social progress that Nightingale discusses in her most personal writings.

Born Criminal: Statistical Characterization in M. E. Braddon's *Lady Audley's Secret*

"I think some people are born to be unlucky," Lucy Graham responds when Mrs. Dawson speculates about the possibility of Lucy's marriage to Sir Michael Audley (Braddon 14). In its very first chapter, Mary Elizabeth Braddon's *Lady Audley's Secret* (1860) thus embarks on an exploration of social positioning and such positioning's relation to individual destiny. Lucy Graham was born in poverty under the name of Helen Maldon, a birthright that she certainly considers unlucky. What's more, her choices throughout the novel hinge on the fact that she believes she has also inherited a propensity toward insanity. Therefore, it is within this early conversation that the first mention of madness appears in relation to the future Lady Audley when the narrator explains that "the simple Dawson would have thought it something more than madness in a penniless girl to reject such an offer" (14). Ironically, as it turns out, when Lucy accepts the "lucky" offer of marriage, she embarks on a path that will result in a systematic investigation that results in her confinement to a mental institution. These references to luck and fortune draw on conceptions of probability that had seeped into the public mind and into public policy during the 19th century. Whereas earlier novels, like Richardson's *Pamela* (1740) and even Austen's *Jane Eyre* (1847) depict virtuous young women who were born into poverty but marry into riches, this novel imagines how the storyline might play out if a poor young woman in mid-19th century London attempted to find her way into upper class society in a similar way. Not only, as the novel depicts, is that kind of class mobility improbable, but it is also affected by the other categories to which the young woman belongs. In addition to belonging to the category of the urban poor, the female protagonist of *Lady Audley's Secret* belongs to the category of madwomen. In this novel, Braddon uses a sociological model of insanity which developed in

response to the work of statisticians like James Kay Shuttleworth and Adolphe Quetelet. The way that Braddon portrays Lady Audley in relation to the descriptions of insanity used in statistical reports serves as one example of how she experiments with characterization. In an interview printed in 1888, Braddon describes this novel as a turning point for her because of its interest in "construction and character" (Hatton 28). In this paper, I will argue that the novel itself conceives characters statistically, wavering between types and idiosyncratic individuals in order to explore the mutual influence of inherited qualities, personal choices, and the categories to which a person belongs. Its representations of madness, categorization, and calculation rely on fictionalized types, and intervene in public debate about mental health in medical and legal contexts, and the implications of reasoning based on statistics and probability, finally exploring the degree to which a credible fiction—even one based on objective scientific methods—creates rather than describes the world.

Statistical Categories and Social Types

The assumption that people fall into traceable types contributed to the way early statisticians understood and performed their research. Early in the 19th century, Quetelet had begun to develop what he called a "social physics" because he recognized that personal characteristics, like the weight and height of individuals, as well as behaviors, such as crimes and suicides, fit a normal curve. Even though these things had traditionally been thought of as personal idiosyncrasies or choices, when they were tracked from year to year and from one population to another, they began to appear as characteristics of a group rather than isolated features of individuals. Because of this, statisticians began to organize data about the population of a given location based on categories like gender, race, and nationality so that by comparing different groups they could uncover, as it were, the social laws that lied beneath individual

behavior. One sociologist has argued that the many attempts throughout the nineteenth century to "give an orderly sense to social varieties" led to the emergence of sociology as we understand it today (Bayatrizi 29). It wasn't until after 1800 that statisticians began to gather data on the moral character of the population. In one of the earliest door-to-door surveys, Sir James Kay Shuttleworth gathered information on the cotton manufacturers in Manchester in 1832. His subsequently published pamphlet describes their poverty by using tables that demonstrate the extreme filthiness and disrepair of their living spaces.

District.	No. of houses inspected.	No. of houses reported as requiring whitewashing	No. of houses reported as requiring repair	No. of houses in which the soughs want-ed repair.	No. of houses damp.	No. of houses reported as ill ventilated.	No. of houses wanting privies.
1	850	399	128	112	177	70	326
2	2489	898	282	145	497	109	755
3	213	145	104	41	61	52	96
4	650	279	106	105	134	69	250
5	413	176	82	70	101	11	66
6	12	3	5	5			5
7	343	76	59	57	86	21	79
8	132	35	30	39	48	22	20
9	128	34	32	24	39	19	25
10	370	195	53	123	54	2	232
11							
12	113	33	23	27	24	16	52
13	757	218	44	108	146	54	177
14	481	74	13	83	68	7	138
Total ..	6951	2565	960	939	1435	452	2221

Kay Shuttleworth, *The Moral and Physical Condition of the Working Classes Employed in the Cotton Manufacture in Manchester* p. 18

Accompanying the table, he explains that the districts with the highest proportion of the poor (numbers 1, 2, 3, 4, 7, 10, 13, and 14) also have the worst conditions.

He adds to this information by arguing that that urban poverty is accompanied by moral degradation and a predisposition toward disease. At times, Kay's argument seems sympathetic to the suffering of the working poor. For example, he uses comparisons to machinery and to animals in ways that draws attention to how industrial labor can rob workers of their humanity, declaring that "the mathematical precision, the incessant motion, and the exhaustless power of the machine" which a laborer performs subjects him to "the prolonged labour of an animal" so that he is left with "neither moral dignity nor intellectual nor organic strength to resist the

seductions of appetite" (Kay Shuttleworth 10-11). However, he also attributes the uncleanliness demonstrated by the table above to what he describes as a lack of "self-respect, and of the love of domestic enjoyment" that they have learned from Irish immigrants (18).[17] Later, Kay differentiates between urban and rural environments because, as he sees it, while labor in both places might require similar hours and exertion, agricultural labor promotes wellness that isn't replicated in urban settings. What's more, by asserting that the wages, though meager, are enough to live on, he implies that the character of these laborers, rather than their environment, ultimately shapes their outcomes.

Kay's overall ethos draws from the appearance of objectivity generated by his statistical tables. The pamphlet purports to expose "evils" that beset the poor, and claims that "so far from being the necessary consequences of the manufacturing system, [they] have a remote or accidental origin, and might, *by judicious management*, be entirely removed" (Kay Shuttleworth 1). Yet his data doesn't fully account for the elements contributing to the physical and moral

DISTRICTS.	*Nov. Dec. Jan & Feb. of* 1827-8, 1828-9, 1829-30, 1830-31.							
NEWTOWN.	*Irish.*	*English.*	*Irish.*	*English.*	*Irish.*	*English.*	*Irish.*	*English.*
No. 2 & ½ No. 4	1559	6059	1490	5434	3911	8023	4051	9129
ANCOATS.								
No. 1 & ½ No. 4	1482	6701	2155	7158	2690	8022	3818	9027
CENTRAL.								
Nos. 5, 6, 9, 10, 11, 14, & ¼ No. 8	366	7422	532	7161	742	9668	909	10214
PORTLAND ST.								
Nos. 3, 7, 12, 13, and ¾ of No. 8.	264	6864	577	6974	1186	8591	1114	7580

Kay Shuttleworth, *The Moral and Physical Condition of the Working Classes Employed in the Cotton Manufacture in Manchester* p. 30

[17] Kay dedicates several of the early pages in this pamphlet to outlining the negative effects of Irish immigrants on the British. He writes that "Ireland has poured forth the most destitute of her hordes to supply the constantly increasing demand for labour" going on to argue that the Irish have taught the poor in England that "fatal secret of subsisting on what is barely necessary to life [so that] the labouring classes have ceased to entertain a laudable pride in furnishing their houses, and in multiplying the decent comforts which minister to happiness" (6-7).

degradation he observes. Instead, he traces population growth in the poorest districts, explaining that pauperism has increased in proportion to an increase of Irish settlers.

According to Lorraine Daston and Peter Galison, scientific objectivity in the modern sense "emerged in the mid-nineteenth century and in a matter of decades became established not only as a scientific norm but also as a set of practices" that became codified *circa* 1860 (27). For scientists, these practices often relied on mechanized data collection. Mary Poovy has also discussed the way that tables of data became associated with objectivity, particularly as they were used in accounting. She explains that numbers did not confer authority on bookkeeping because they weren't seen as objective notations before the 16th and 17th centuries the way they are today (Poovey 33–35). Poovey argues that double-entry bookkeeping conferred authority on numbers and tables, explaining that "the conventions of double-entry made the information recorded in the ledger proclaim not just the honesty of a single merchant, but the rectitude of a company" (35). By doing so, it "created a vehicle for producing public knowledge" (37). By the 19th century, tables had become associated with honesty, truth, and objectivity. By using tables, statisticians signified their commitment to honesty. They generally tried to limit bias by allowing their data to speak for itself as much as possible. However, personal impressions and social bias shaped the kind of information that people collected and how they divided people into categories. For example, Kay's report specifies that "in the absence of direct evidence, we are unwilling that any statements should rest on our personal testimony; but we again refer with confidence to that of an intelligent and impartial observer" (38). While Kay apparently adheres to the rigors of statistical objectivity, the kinds of data he has collected and the way he presents it guide so-called impartial readers to the conclusions which he has already drawn about the character of the poor in manufacturing communities.

Similarly, the well-known statistician Adolphe Quetelet defends the rigor of his science by promising to adhere to "those scientific principles which ought to guide the observer in all his investigations" and declaring his purpose: "not to defend systems or bolster up theories; I confine myself to the citation of facts, such as society presents to our view. If these facts be legitimately established, it follows that we must accept of and accommodate our reason to them" (vii). One of Quetelet's most important contributions was his concept of the average man, which acknowledged that "social physics never [could] pretend to discover laws which will verify themselves in every particular, in the case of isolated individuals" (x). By gathering large amounts of statistical data and organizing it into tables, the dedicated statistician could analyze the information using mathematical formulas that would help make predictions about how categories of people would behave.

In his early work Quetelet treats the average man as a useful fiction. However, as other scholars have pointed out, his later work "treated it as a genuine *type* representative of group membership, where the group ranges from the tribe, nation or race to humanity as a whole" (Jahoda 2). Ian Hacking has lamented the shift from believing in "statistical laws that were merely descriptive of large-scale regularities into laws of nature and society that dealt in underlying truths and causes" (108) because of the sinister way that those in positions of authority can use data to evaluate, condemn, and control undesirable populations by introducing reforms that regulate aspects of their environment and education in ways that appear progressive and benevolent while still enforcing the established order. Therefore, the seemingly innocuous concept of the average man, which allowed Quetelet to recognize physical and social patterns and preserve a distinction between a group and its constituents, along with other useful statistical concepts were, as Lawrence Goldman writes in *Victorians and Numbers*, "taken up and used by

eugenicists and Social Darwinists at the end of the century to try to achieve discriminatory social outcomes" (xxxiii).

The impulses we see in statistical studies of the British population influenced characterization in other kinds of writing as well. Some of the most widely read novelists during the mid-nineteenth century drew from Henry Mayhew's character sketches in his *London Labour and the London Poor*, which he wrote after conducting a series of interviews and statistical surveys during the 1840s. In ways that resemble Kay's study Kay, Mayhew classifies people in terms of their willingness to work. He breaks down the population of those that "derive their subsistence from the exertions of the rest" into three different categories, which include those with physical, intellectual, and moral defects (330). In the same vein, Braddon's magazine *Belgravia* often featured articles about "an infinity of types of people" in London (Palmer).[18] In her own writing, Braddon's experimentation with characters and the categories to which they belong responds to the social biases that drove statistical typing.

Generic Characterization

In *Lady Audley's Secret,* Braddon's treatment of character reflects her concern with the limitations and ambiguities that arise from the reductive understanding of social patterns that detectives, judges, and even doctors sometimes resorted to when they made judgements about a particular individual or case. Lady Audley acts as a figure of both mobility and interchangeability, testing the integrity of the categories in which she participates at a given moment. Many scholars have pointed out ways that Braddon's work encourages readers to question the reliability of social divisions. For example, Emily Allen draws attention to how

[18] In "Sensationalizing the City in Mary Elizabeth Braddon's *Belgravia,*" Beth Palmer argues that Braddon created the journal to open a window into the streets of London for female readers who wouldn't otherwise have the opportunity to fully experience the city. She cites articles by George Augustus Sala and W. S. Gilbert, who described the city both in terms of its people and its architecture.

Lady Audley's performance of femininity allows us to recognize "gender as a potentially fluid category" (Allen 406). Likewise, Emily Steinlight has pointed out that sensation novels often treat women as redundant, describing them as "a figure for mass population" (503). As a generic female character, for example, Lady Audley moves easily from one identity to another. Within each of her aliases (Helen Maldon, Helen Talboys, Lucy Graham, and Lady Audley), she exhibits the same personality characteristics but somehow still seems well-suited to her economic station. Lady Audley is repeatedly characterized as pretty, childish, and unthinking, but the way that people around her interpret these traits differs depending on how they understand her economic or social positioning. When she works as a governess for the Dawson family near Audley Court, people in the small town say that "it [is] part of her amiable and gentle nature always to be light-hearted, happy, and contented under any circumstances" (11). Having seen her at church and around town, the widower Sir Michael Audley "experience[s] a strong desire to be better acquainted with Mr Dawson's governess" and marries her within a short time. Although Sir Audley's nephew Robert is initially enchanted with the young Lady Audley, he quickly begins to suspect that she has something to do the disappearance of George Talboys. After Robert initiates his own investigation, he confronts her with his accusations, no longer finding her charming, even though she acts as she always has. He interprets Lady Audley's characteristic thoughtlessness as defiance, declaring that "womanly prevarication will not help [her]" (231). Once Robert (and the audience) become convinced that she has murdered her first husband, George, Lady Audley's previous simplicity and contentment begins to look like a mask for cunning and greed. Because Robert and other members of Victorian society expect women to act content and happy—feminine, in other words—when Helen/Lucy/Lady Audley behaves according to their expectations, it gives her the anonymity to transition smoothly from one

position to another. Once Robert (and the reader) develop different expectations about Lady Audley, we interpret feminine behaviors that initially appeared innocuous as devious. Although she hasn't changed, because she acts in generically feminine ways, she easily shifts from one category to another in the minds of those around her.

The novel also comments on how easily other women might stand in for Lady Audley. Addressing her maid, Phoebe Marks, for example, Lady Audley exclaims that "you *are* like me, and your features are very nice; it is only colour that you want" (54). Likewise, Matilda Plowson, the young woman who dies of consumption and is buried in Miss Maldon's place fits the description of a lovely young blond woman, although the text notes that the lock of hair that had been cut off after her death "seems smooth and straight" in contrast to the way that Helen's hair has "a rippling wave in it" (41). *The Spectator*'s review of the novel takes issue with Braddon's characterization because Lady Audley "leaves the impression, not of an evil woman, or a mad woman, or any definite kind of woman" (1197). The character's capacity to be substituted for others also makes her an appropriate representation of the way that Quetelet's average man concept could be used erroneously to explain and predict behavior in particular cases, and the way that a narrative could use a particular character to represent an entire class of people.

Lady Audley is not the only woman who is more recognizable by her position in society than by her personal attributes. As Robert traces Lady Audley's history by visiting the prior places she lived and worked, he meets several middle-class women, all of whom exhibit similar characteristics. When Robert visits a place that she had worked under the name of Lucy Graham, Mrs. Vincent's school for girls, he meets Miss Tonks, a woman who still teaches at the school and who eagerly shares her suspicions that Lucy has been hiding something about her past. Although Mrs. Vincent cannot remember many details about Lucy's arrival at the school, Tonks

accurately recalls the very day that Lucy arrived, even down to the fact it was a Tuesday. Although Tonks' surprisingly sharp memory could be treated as a particular feature of a dynamic character, the novel instead pays attention to the way that her value is determined by her willingness to stay in her place, describing her as "no age in particular, and looked as if she had never been younger, and would never grow older, but would remain forever working backwards and forwards in her narrow groove, like some self-feeding machine for the instruction of young ladies" (200). Mrs. Vincent refers to her as "invaluable" and "useful" (201, 202). This insistence on Tonks' mechanical qualities and usefulness, as well as the way that the novel associates her with numbers and dates demonstrates that she is, in a sense, a living statistical table. She stores information that can be interpreted and used by others with more agency and power in the world. Lady Audley's former landlord Mrs. Barkamb is described using similar language: "her mind [runs] in one narrow groove" (211). In addition to being characterized as generic, unchangeable characters, these women also demonstrate how the conditions of their employment shape their personalities and mental capacities. Although Tonks and Mrs. Barkamb play minor roles and Lady Audley occupies the center of the text, each woman is notable more for her position on a statistical table—the group to which she belongs—and for her usefulness (to Robert's investigation, in this case) than for her personal characteristics.

Braddon's generic characters set the stage for a critique of representation—both how people represent themselves and recognize others as representative of a larger group. We see this concern dramatized throughout the novel when, rather than seeing one another as individuals, characters seek to organize one another into categories. Sir Audley, for example, "looked at his nephew as a sample of a very large class of young men, and his daughter as a sample of an equally extensive class of feminine goods." (283). George Talboys gives a similar—and similarly

disturbing—description of Helen's relationship with her father when he claims that her father "was ready to sell my poor little girl to the highest bidder" (22). By objectifying their nearest relations in this way, both of men overlook the unique aspects of their personalities in favor of a distant, or a statistically minded gaze. Karl Marx, who also engaged deeply with issues of probability and statistics in his 1867 *Das Kapital*, expresses a similar concern about the way categorization has represented individuals as interchangeable on the labor market.

If the novel critiques the way that women—particularly those that come from impoverished urban backgrounds—are understood as interchangeable, and that their association with number casts them as definable primarily according to their statistically-traceable category, then George's father Harcourt Talboys serves as a dramatization of the error inherent to this way of defining others. Harcourt's inflexibility is his only defining characteristic. Compared first to the weather ("merciless to distress, and impregnable to the softening power of sunshine") then to the house, whose interior wainscot paneling "shone with the same uncompromising polish which was on every object within and without the redbrick mansion," and finally to his own "severe-looking" dressing gown, whose coloring "was almost the same as the cold grey of his eyes," Harcourt approaches other people with harshness and severity (158-60). Whereas Harcourt is compared to non-living objects, his home seems to come alive as Robert approaches. When the iron gate swings open upon Robert's entry, it is "caught by a great iron tooth planted in the ground, which snapped at the lowest bar of the gate, as if it wanted to bite" (158). When the flyman rings the brass-handled bell at the front door, it "flew back into its socket with an angry metallic snap, as if it had been insulted by the plebeian touch of the man's hand" (159). The personification of these objects endows them with human characteristics in a way that dramatizes their owner's lack of human warmth and moral character. Harcourt's home is also surrounded by

flower “beds that looked like problems in algebra,” which aligns him with an unrelentingly rigid mathematical perspective, in the sense that he sees only one possible solution to any matter of calculation (163). Like Gradgrind in Dickens’ *Hard Times* (1854), who is “ready to weigh and measure any parcel of human nature and tell you what it comes to” (8) Harcourt judges his son’s entire character based on a single act and “decline[s] to look at it from any other point of view” (163). In Harcourt, Braddon has created a unidimensional character who demonstrates what someone might look like if he were defined merely by his category. He is selfish, rigid in manner and judgment, and consistently fails to recognize his own shortcomings and others’ merits. Although he finally accepts his son by the end of the novel, he still seems reluctant. The narrator gives a brief look into Harcourt’s thought process by explaining that upon finding out that his son was alive in Australia, he “was fairly nonplussed. Junius Brutus had never been placed in a such a position as this, and seeing no way of getting out of this dilemma, by acting after his favourite model, Mr Talboys was fain to be natural for once in his life” and to forgive his son (369). By specifying that the change in opinion will happen only “once in his life,” the novel emphasizes that Harcourt’s disposition and the way that he relegates others to a single category remains constant, even if he makes an exception for his son. He is a great example of Forster’s “flat characters” which are easily recognizable and easily remembered because they are “not changed by circumstances” (Forster 68-69). Harcourt also exemplifies the severity of error we fall into when we make assumptions about a person based on a limited view of their traits. He is unable to form meaningful relationships with other people or understand their nuances.

In the novel Robert Audley and Harcourt Talboys act as foils for one another. While Robert has a “cool, calculating, frigid, and luminous intellect” (294), Harcourt is “sharp, frigid, and uncompromising” (158). In both cases, their frigidity is tied to a rigid valuing of their own

perception over a more complete understanding of the individuals with whom they interact. We see this in Robert's investigation of Lady Audley when he uses limited information to generate an entire characterization and history of her life which certainly contains aspects of the truth, but doesn't recognize the nuance of her character. Similarly, Harcourt's anger regarding his son's marriage to poverty-stricken Helen leads him to disown his son completely as if that single instance of disobedience characterized George's entire person. Both Robert and Harcourt mistake a part for the whole, relying more on what we might understand as generalized categories rather than seeing the complexity of the individuals with whom they interact.

Despite the flaws that Robert shares with Harcourt, however, the text offers a more complex view of Robert as a person, including his strengths. We see both his faults and his positive characteristics while witnessing him grow over the course of the book. We might think of the difference between Harcourt and Robert as the difference between flat and round characters. In contrast, Robert's engagement with the process of data collection seems to broaden his vision so that he learns to appreciate multiple perspectives. Even though he ultimately does condemn Lady Audley to the madhouse, for a fleeting moment Robert contemplates whether "the judges feel as [he does] now, when they put on the black cap and pass sentence of death upon some poor, shivering wretch who has never done them any wrong" (232). Some have criticized the novel's sympathy for Robert in the face of his condemnation of Lady Audley and Harcourt Talboys whose actions are similarly cold and cunning. Rachel Pallo has argued that Robert's transition from a "ne'er-do-well aristocrat with no ambitions or respect for societal expectations" to "a model citizen and embodiment of the social institutions he had heretofore rejected" mirrors the shifts that attend developing practices of law enforcement in the nineteenth-century (Pallo 466). Although we recognize Robert's impulse to uphold social hierarchies through discipline,

which is a key feature of the modern police detective, he still possesses certain redeeming qualities that differentiate him from Harcourt and from other unidimensional, generic characters in the text; namely, that Robert develops, at least to a degree, the ability to recognize multiple perspectives and to reevaluate his own. For example, although Robert successfully elicits a confession of guilt from Lady Audley, which results in her expulsion from his family and from society, the book explains that "it is not said that Robert Audley ever repented of having been the means of causing his aunt to end her days prematurely in a madhouse, charged with a crime of which she was innocent" (186). In this sentence, the narrator draws attention to Robert's troubling role in Lady Audley's incarceration. However, the phrase "it is not said" does not give us full view of Robert's mind, instead focusing on what others say about him. This is not a moment of free indirect discourse, and it hints at the lingering possibility of regret which Robert may hold so close that others fail to detect it. The ability to recognize a distinction between an individual and their participation in a given category is a key characteristic of conscientious statistical inference. While Braddon takes pains to expose the problem with taking a unidimensional view of an individual—essentially slotting them into a statistical category—she does so in a way that acknowledges the complexity of managing information and that approaches character development as equally complex.

Robert's character embodies much of what will, in time, become typical of the fictional detective. Although the phrase "detective fiction" doesn't appear in print until the 1880s, Braddon's detective certainly drew on the many detective characters circulating in British periodicals. She likely had read early speculative fiction by Edgar Allan Poe, as well, and her 1894 novel, *Thou Art the Man* evokes Poe's 1844 short story, with which it shares a title.[19]

[19] In Heather Worthington's *Key Concepts in Crime Fiction*, she gives a brief history of detectives in fiction, explaining that "the words 'detect' and 'detection' have been in circulation in English from the fifteenth century,

Throughout the novel, what we might consider Robert's character flaws from one perspective turn out to be the key for successful detective work. His "sly wit and quiet humour, under his listless, dawdling, indifferent, irresolute manner," endows him with both the charm and the leisure to pursue the case (Braddon 33). His lack of consideration for other people gives him the objectivity necessary to parse various pieces of evidence. And, as Braddon explains, "the lazy bent of his mind, which prevented him from thinking of half a dozen things at a time [. . .] made him remarkably clear-sighted upon any point to which he ever gave his attention to" (81). Therefore, he is the perfect detective to pursue a case based on what he describes as "circumstantial evidence" or "links of steel in the wonderful chain forged by the science of the detective officer" (107). The fact that Robert searches for circumstantial evidence as opposed to absolute proof attests to the way probability had influenced detective work and other investigatory endeavors. In William Kingdon Clifford's lecture "The Postulates of the Science of Space" (1873) he describes the previous era dominated by the tenets and methods inspired by Euclid's *Elements of Geometry* by explaining that "the aim of every scientific student of every subject was to bring his knowledge of that subject into a form as perfect as that which geometry had attained" (Clifford 354). In contrast, as probability developed in rigor and popularity during the 19th century, science shifted from demanding absolute knowledge to accepting probabilistic knowledge. In *Lady Audley's Secret*, we see this shift play out as Robert's chain of clues gives an approximate, but incomplete, version of Lady Audley's history. Robert can only assume that Lady Audley is guilty through logical inference, and his interpretation of the circumstances that

usually in the sense of discovering or finding out, but not necessarily connected with crime or criminality. The word 'detective', in contrast, only has its first outing four centuries later in an 1843 edition of Chambers' Journal: 'men have been recently selected to form a body called the "detective police"'. And according to R. F. Stewart, in … And Always a Detective, the phrase 'detective fiction' as the descriptor of a literary genre does not appear until 1886, when the Saturday Review published an account of the development of the genre called precisely 'Detective Fiction.'" (Worthington 36)

combined to give her the motive and opportunity to commit murder. Because Robert's interpretations rely on an incomplete version of her history, many of his inferences are based on generalizations about the type of person she must be, having come from a poor, urban upbringing. Although Robert doesn't do *real* statistical work, his process of detection is only possible because statistical methodologies had begun to change the way that people thought about truth and the way that they understood social behavior to follow predictable patterns.

While the traits that so closely resemble what today's readers might think of as the stereotypical detective, and likely helped to shape detective fiction, celebrate objectivity and probable reasoning, they also undermine the success of Robert's case because, as he learns upon confronting Lady Audley, he lacks a full picture of what has happened. When he talks to Lady Audley, he has not traced her history far enough back to learn about the death of her mother in a mental institution, and he retains the mistaken impression that George is dead when, in fact, George has merely fled to Australia. Although Robert's version of events is probable, it lacks certain key events and perspectives to be objectively true. In this way, the narrative draws attention to the fact that this chain of evidence is indeed forged by the detective, and the detective's bias and limited perspective has led him to value narrative consistency over a comprehensive gathering of all the necessary facts.

Going to Extremes: Characters and Their Idiosyncrasies

Another way the novel explores how narrative consistency can affect character development is by continual reference to exceptionality. The story opens with a description of a clock that only has one hand "and which jump[s] straight from one hour to the next, and [is] therefore always in extremes" (7). Like this clock, Lady Audley seems to be always in extremes—either perfectly sweet and innocent, or demoniacally deceptive and dangerous. In

other words, her extremes make her illegible from the perspective of an observer. We see this perception of her in the second chapter of the book, when George Talboys returns from Australia expecting to be greeted by Helen Talboys, his "gentle, innocent, loving, little wife" (21). During the voyage, George discusses his situation with Miss Morley, another passenger who, unlike he does, fears that her love will not have waited for her to return home. Notably, they each insist that theirs is an "exceptional case" (21). Miss Morley considers her situation unique because she has been absent a very long time. George considers his situation exceptional because of what he perceives as a mutual love and devotion, which has carried him and Helen through a cruel disinheritance by his father. The remainder of the story will show that George's situation will turn out much more extraordinarily than he anticipates. This allusion to normative exception not only follows a convention of sentimental fiction in which an unpredictable circumstance shapes the narrative, but also recognizes that people often evaluate probabilities based on their personal beliefs and limited experience.

When Quetelet wrote that "too much and too little individuality equally destroy the great man" (100), he might as well have been composing a metaphor for narrative form and the potential to destroy a successful character for, although some people find Lady Audley too generic, others find her too unique. For the second type of reader, the exceptionality of the characters proves an aesthetic deficiency. A review in *The North British Review* faults Braddon for creating a fiction in which "the personages are not like living beings," going on to qualify the statement "with the exception of Pheobe Marks, the lady's maid, not a single personage has any resemblance to the people we meet with in the flesh" (186). This review continues, taking issue with the contradictory personality traits which make its characters distinctive. While Lady Audley seems innocent and kind, her cold and selfish tendencies allow her to commit atrocities.

While Robert initially seems lazy and dispassionate, he dedicates himself quite readily to a thorough investigation of the case. Although today's readers may not find these contradictions surprising at all, especially in a detective story, the reviewer's distaste for extraordinary cases reflects a Victorian impulse essential to statistics and other scientific fields: facts must be consistent and organized into normative categories. Careful categorization was a necessary part of social regulation and a part of statistics, genetics, and studies of mental illness. Ironically, some reviewers of *Lady Audley's Secret*—a novel which one scholar has argued is obsessed with organizing "scattered units of fact" (Jacob 373)—criticized the novel as a whole because its characters didn't fit into an expected set of types.

Perhaps, given the novel's preoccupation with categorization, the secret at the center of the novel is in fact a question of how to understand Lady Audley's nuances. If the novel resists and criticizes the way that mathematics and biased opinions can reduce people to statistical categories, it does so even more predominantly by demonstrating that Lady Audley cannot neatly fit into a single category. She walks the line between two types—both of which would have been considered unsavory from the standpoint of a conservative Victorian audience. As I briefly mentioned above, when Henry Mayhew describes members of urban society that rely on others for sustenance, he outlines three distinct classes defined by their defects: "the first proceeds from some *physical* defect, . . . the second from some *intellectual* defect, as in the case of lunatics and idiots; and third from some *moral* defect, as in the case of the indolent, the vagrant, the professional mendicant, and the criminal" (Mayhew 330). Robert sees Lady Audley has having a moral defect that leads to her criminality; she understands her own defect as intellectual. The book, however, wavers between depicting her as a woman whose intellectual challenges arise from a lack of self-control and one whose intellect is much too sharp, and thus attentive to the

nuanced differences (or perhaps the lack thereof) between women of different classes. If her defect is intellectual, then her problem is that she is smart enough to recognize the degree to which her happiness depends on the category to which she is assigned. As she gives an account of her actions, she describes the realization that her "ultimate fate in life depend[s] upon [her] marriage" (298). She believes that by escaping urban poverty and joining a higher economic class she will find peace. In consequence, her moments of insanity seem to happen when her overly active intellect clashes with the social hand which destiny has dealt. Recognizing how little she can control her circumstances causes her to lose control over her mind and, by extension, her actions. Thus, even in the moments at which Lady Audley seems most easily categorized as one of the mentally ill, she still resists classification.

While Lady Audley certainly exhibits characteristics that align her with a generic or interchangeably type and make her exceptional and therefore completely unique, she is not the only one. Braddon acknowledges the potential for nuance in several minor characters by endowing them with competing and even conflicting motives. Phoebe Marks, for example, fits many of the stereotypes of her class and gender, both in the way she speaks and in the way that she interacts with her mistress and her husband. However, from a different perspective, she exhibits a number of idiosyncratic characteristics that make her role in the novel much more than a mirror by which we can more accurately see Lady Audley. Elizabeth Steere has traced the many instances of ghostly and ghastly imagery that occur to describe Phoebe, arguing that she "is a demon in disguise, frequently acting a part in order to add credibility to her actions" (Steere 314). Although Lady Audley, and many readers, perceive Phoebe as both naïve and submissive, no more than a generic servant, the novel describes her as "a person who never lost her individuality" (116) and Robert recognizes her as "a woman who could keep a secret" (117).

Both of these lines imply that Phoebe's identity is much more complex than she appears at first glance. Like Lady Audley, Phoebe also harbors contradictory personality traits and resist simple categorization. They also attempt to act in calculated ways to achieve their desires. In so doing, they exhibit a degree of agency, even if that agency allows them little more than the capacity to resist the social positioning that statistical fatalism would suggest governs their lives.

Literary characters, like people, do not always act predictably even when they seem to fit within easily defined categories. The earliest mathematicians working with statistics recognized a need to differentiate between predictability at the level of a population and uncertainty at the level of the individual. In 1713, Jacob Bernoulli's *Ars Conjectandi* proposes that even though the likelihood of getting heads on a specific coin toss is unaffected by previous coin tosses, the proportion of heads to tails converges at fifty percent as the number of tosses increases. We might use a similar logic to think about personality development: while we can make assumptions about the likelihood of certain qualities that a large group might have in common, we may not be able to apply those probabilities to a single person. Laplace, DeMoivre, Poisson, and others further developed this principle—the law of large numbers—in the eighteenth and nineteenth-centuries. More recently, Alain Desrosières wrote eloquently about the problem. He explains that transitioning between two levels of reality (that of the individual and of the population) requires a "transfer from one language to another (from unemployed persons to unemployment)" (Desrosières 70). Both levels give us a way of thinking about reality, but they differ in terms of scale, each maintaining a degree of autonomy with regards to the other. With this in mind as we read *Lady Audley's Secret*, we should recognize two possible errors in logic that might influence our understanding of characters. First, if we, like the writer in *The North British Review*, assume that all characters should resemble the people we have known, we may

be judging what we read with too narrow a perspective. Second, and more importantly, when Braddon's characters exhibit distinctive aspects of their personality that may not conform to the category to which they belong, the novel demonstrates an important statistical concept that people intuitively get wrong in daily life: people act in ways that grow out of a compounding network of factors, many of which we may never know.

Braddon's alternately generic and idiosyncratic characters allow her to explore their psychological makeup more deeply. Although her work is typically categorized as sensation fiction, it also examines how individuals are influenced by their social and environmental surroundings, an aim which it shares with the multiplot realist novel. Janice M. Allan has argued that sensation fictions departures from traditional realist tropes in order to "interrogate the epistemological and ideological foundations of the realistic impulse on which it depends" (Allan 99). In this light, the realistic aspects of the world of *Lady Audley's Secret* set the stage so that extraordinary or sensational moments in the text give readers insight into how environment shapes character, inviting us to engage with the story from both a birds-eye and a ground-level perspective by seeing the interplay between social influences and personal agency.

Madness as a Character Type

In addition to being one of the most sensational aspects of Lady Audley's character, insanity was also a hotly debated statistical category at the time this novel was published. In Theodore M. Porter's recent book *Genetics in the Madhouse*, he explains that superintendents of insane asylums in mid-century England dedicated significant time and energy to establishing the root causes of insanity, tracking different types of madness using tables of causes and publishing annual reports. Heredity quickly became the primary attribution for most types of madness. Porter writes that "heredity had the feel of a deep cause and yet seemed to be supported by

ordinary experience" (Porter 58). In Porter's book, he examines the statistical tabulation of heredity and other causes for madness in the case books kept by John Thurnam at the York Retreat as early as 1796, noting that "Thurnam's investigations of insane heredity commenced two decades prior to Darwin's *Origin of Species* and a quarter century before Francis Galton became curious about hereditary genius" (61). Porter goes on to describe the work of asylum physicians, explaining that "if their backgrounds were mainly medical, their tools and methods were social and statistical" (64). Because the study of madness was one of the earliest of the medical fields to incorporate statistical methods, it offers an excellent example of the way that statistical findings filtered into the public consciousness and influenced the biases that people had regarding a diagnosis of insanity.

Braddon's understanding of madness likely came primarily from popular conception, but her representation of Lady Audley does not fit all the typical stereotypes. From the time of its publication to today, critics have debated the probability that Lady Audley really suffers from hereditary madness, as she claims. In her influential article, "Disclosure as 'Cover-up': The Discourse of Madness in *Lady Audley's Secret*," Jill Matus sets the tone for recent critiques of Lady Audley's confession when she argues that her version of madness would have fit into the category of moral insanity that was most often attributed to women, and was defined particularly by a perversion of the natural impulses (334). Hachaichi builds on this argument when she argues that Lady Audley's demons are not "her genetic grips or inborn tendencies, but male conspiracy" (Hachaichi 94). Dunbar agrees that Lady Audley's claim is "patently false" (97) and examines ways that her confession "disrupts the texts' dominant narrative and generic forms" (98). In contrast, Nolan Boyd argues that "scholars are too quick to dismiss Lady Audley's madness as simply either malingered or, at best, a convenient metaphorical device that Braddon

employs to comment on the difficulties that women face in Victorian society" (Boyd 408). While the debate surrounding Lady Audley's madness has opened an important conversation about social and economic issues for women, these arguments overlook the degree to which Braddon's novel takes part in the 19th-century debate about the influence of new scientific epistemologies and the way that they addressed the relationship between hereditary and social causes. Madness, including its causes and treatments, permeated newspapers as well as works of sensation fiction during the 1860s. Certainly then, Lady Audley's poverty-stricken upbringing does more than allow the novel to play on societal fears about the wrong kinds of women taking advantage of opportunities for social mobility and polluting upper-class homes. By recounting aspects of her background, the novel draws attention to the characteristics that many experts at the time considered a precursor for developing madness and used as a way to classify the mentally ill. In her recent book, *Creating Character: Theories of Nature and Nurture in Victorian Sensation Fiction*, Helen Ifill argues that when Braddon portrays "respectable people who *become* deviants; [she is] not simply looking at 'what it means' to be other, but how one may become that way. Characters in sensation fiction are portrayed equally as enmeshed in biological and social determinants as characters in realist novels" (Ifill 9). Lady Audley's insistence that her madness is hereditary should not only cause readers to question of whether Lady Audley was insane but to also ask an equally important question which doctors and scientists continue to ask today; namely, how do we differentiate between hereditary factors that perhaps cannot be changed and environmental factors that can?

Early statistical reports on criminal behavior touch on both nature and nurture, although they don't differentiate between the two with the degree of nuance that we do now. Quetelet's 1812 *Treatise on Man* justifies the study of statistics primarily for its use in studying and

preventing crime. After declaring that his observations have shown that at age twenty-five "the propensity to crime is at the maximum, especially as far as murder is concerned," and speculates that if phrenology would use statistics to track the development of "the destructive organs," people could understand and control the physical mechanisms that contribute to violent crime (vi-vii). Notably, this example focuses not on the social and emotional contributors to criminality, but on biological factors. Although there are large portions of his book in which Quetelet explores the ways in which human behavior reflects social conditioning, this instance serves as an important illustration of an impulse in early criminology to attribute criminal tendencies to biological and physical causes. Ian Hacking goes as far as to suggest that "the roots of eugenics are found earlier than is commonly supposed. They lie in the Queteletian idea of statistical law determining the features of a population" (121). By overtly characterizing criminal propensities as biological features of specific groups or classes, prejudice and governmental intervention within them seemed justified.

Unfortunately, even the ways in which Quetelet and other statisticians categorized their subjects reflected bias regarding the factors that contributed to criminal behavior and insanity. Although it may seem natural—even today—to categorize people based on age, gender, race, and economic status, these divisions often encourage generalizations which—especially when they are applied to individuals in isolated cases—lead to unjust or inappropriate assumptions. As Hacking writes, "defining new classes of people for the purposes of statistics has consequences for the ways in which we conceive of others and think of our own possibilities and potentialities" (6). This was certainly the case for the criminally insane. When Quetelet wrote about insanity and its various manners of expression, he associated it with geographical and social factors. For example, he wrote that "idiocy is a state depending on soil and material influences, whilst

insanity is the product of society and of moral and intellectual influences. In idiocy, these causes have prevented the development of the organ, and, consequently, the manifestation of intelligence. In the production of insanity, the brain is over-excited, and goes beyond its physiological power" (76). Although statistics and medicine did improve over time, Quetelet's conception of insanity still held weight into the 1870s. In an essay memorializing Quetelet's contributions that Florence Nightingale wrote in 1874, she comments that "there seems to be a relation between the increase of civilization and the increase of madness" and also refers to a relationship between madness and crime (Nightingale 53). Similarly, an article published in 1877 specifies that in January of that year "of the total number of patients in asylums and elsewhere (in round numbers 66,600), about 59,000 were pauper, and only 7,600 private patients" (Tuke 130). The article qualifies that statistic by speculating that the numbers probably don't account for all the wealthy people that continue to live at home in spite of their condition, nevertheless concluding that "the pauper lunatics would still be relatively in the majority" (131). Taking all of these statements together, we see that in tracking instances of madness, statistics in mid-century England had established that poor people living in cities had a higher penchant for insanity the rural poor or the wealthy.

Having come from a poverty-stricken household in the city, and being born to a madwoman, someone like Lady Audley would have been considered statistically more likely to develop madness. Notwithstanding her confession, the text itself does relatively little to support her claim to lunacy. It does draw attention to a contrast between her demure behavior in the presence of men and the moments she is alone with Phoebe. In the company of her maidservant, Lady Audley allows herself "to run riot in a species of intellectual tarantella, in which her tongue [goes] mad to the sound of its own rattle" (94). However, nobody accuses her of being mad.

Even after her grand confession, Robert, Sir Audley, and Dr. Mosgrave—a self-declared expert on mental disease—hesitate to arrive at that conclusion. Following an interview with her, Dr. Mosgrave continues to insist that "the lady is not mad; but [. . .] she has the cunning of madness, with the prudence of intelligence" (323) although he does consent to have her committed to an asylum as a "service to society" (324). By creating a character who could have, with a few minor changes, conformed much more easily to statistical or stereotypical classifications regarding her mental health, Braddon chose instead to make Lady Audley something of an enigma. Because the reader has such a limited view of the female protagonist's mental state throughout the novel, the only way to judge her sanity is by using external understanding of social categories to interpret her actions and the opinions that other characters offer about her. Yet, it is the very fact that Lady Audley resonates as particular and unique, rather than as a type, which causes readers to feel as if they can (and should) speculate about her morality and her mental condition.

Textual speculations about madness occur more often in relation to Robert, even though he fits into relatively few of the statistical categories that would mark him as having an elevated propensity for a mental illness. Over the course of the story, Mr. Harcourt, Sir Audley, and Lady Audley, all call him mad. Even "the visitors at Audley Court looked upon the baronet's nephew as an inoffensive species of maniac" (101). Indeed, Robert's investigation certainly takes on a monomaniacal quality. However, when Lady Audley suggests to her husband that his nephew is mad, he responds by doubting that Robert "has brains enough for madness. I believe it's generally your great intellects that get out of order" (243).[20] Alicia Audley comes to a similar

[20] When Lady Audley attempts to cover up her crimes by accusing Robert of madness, and trying to convince others of his derangement, she takes part in a tradition of using insanity as a protection and a defense. Wilkie Collins uses the same technique in his 1862 novel *No Name*, when Captain Wragge deflects Noel Vanston's suspicions by accusing Mrs. Lecount of having inherited madness. Not only is this an example of the prevalence of understanding madness as genetic, but it demonstrates a wider societal discomfort with understanding how to identify madness and how it might develop.

conclusion—that Robert is "not at all the sort of person to go mad. How should such a sluggish ditch-pond of an intellect as his ever work itself into a tempest" (281). In these poignant moments of irony, perhaps the reader, having seen into Robert's mind, as it were, recognizes the frenetic state that has driven Robert to chase after Lady Audley's past even though his closest relatives have overlooked it. Several times he asks himself whether he is "tied to a wheel, and must [he] go with its every revolution, let it take [him] where it will?" (135). Later, he laments that "a hand which is stronger than [his] own beckons [him] on" (148). Robert's compulsive investigation not only reveals the personality change that elevates him from a flat to a round character, but it also complicates the very definition of madness in relation to orderliness. While Robert exhibits thought patterns that might typically have been associated with monomania, in his case, the condition seems to increase his penchant for order, discipline, and work so that he transitions from one character type to another. No longer the lazy aristocrat, Robert becomes emblematic of the industrious family man. By associating both Lady Audley and Robert with insanity, but refraining from endowing their characters fully with the traits that would signal that they suffer from hereditary or any other clearly diagnosable madness, Braddon draws attention to the fact that individuals often depart from the roles and behaviors that define the categories to which they supposedly belong.

With the many different definitions and degrees of madness referred to in the book, one might find it appropriate to apply the Cheshire Cat's conclusion that "we are all mad here" (Carroll 78). In fact, Braddon writes something similar when she reflects that "mad-houses are large and only too numerous; yet surely it is strange they are not larger, when we think of how many helpless wretches must beat their brains against this hopeless persistency of the orderly outward world, as compared with the storm and tempest, the riot and confusion within" (176).

Thus, the novel's obsession with mental illness sets order and classification not in contrast to madness, but as its predecessor. Or rather, the novel characterizes the pathological implementation of categories, as insane in itself. The text pushes back against diagnosis based on social positioning by presenting Robert's brand of madness not as a rejection of social values but as an acceptance of certain kinds of orderliness held up in Victorian society as virtuous. By exploring the prevalence and complexity of madness, the novel asks readers to take a second look at what they expect from characters, particularly when they appear at first to conform to a set typology.

Epistemologies for Constructing Character

How characters are diagnosed and treated with respect to their mental illness has implications for the way we understand representations of identity in the novel. *Lady Audley's Secret* engages with different forms of personhood by contrasting medical and legal definitions of madness, both of which by the 1860s had begun to rely on different statistical methods. In his investigation, Robert demonstrates the limitations and affordances of both. He comes from a legal background as a barrister and frequently draws attention to the legal deficiencies of the case he is building. As he compiles information, Robert wonders if he "ought to have pursued [his] profession instead of dawdling [his] life away as [he has] done" (90). He later admits that if he "were a distinguished QC, [he] could not do this sort of thing" (194) and laments that what he has found so far is "no evidence for a jury" (204). His doubts about the sort of evidence he gathered likely related as much to his method as it did to the object of his investigation. When he confronts Lady Audley, accusing her of killing George, he challenges her to come up with the kind of evidence that would have been more compelling in court when he asks her to "produce witnesses" (233) who will attest to her identity. Robert sets out to gather all of the facts

connected with George Talboys' disappearance, including those "which have no apparent relation to that circumstance" (Braddon 90). In a recent article, Priyanka Jacob has discussed Robert's role in the novel, calling him "an archivist, rather than a detective, as he carefully commits every scrap to storage in his pocket-book or pigeon-hole" (Jacob 384). While it is certainly true that Robert carefully collects and archives scraps and clues, I would argue that his methods have implications for the way that data collection and statistical knowledge was incorporated into both detective work and legal work. When he measures his style of detection against contemporary legal practice, as described above, Robert draws attention to the way that court cases had adopted the statistical practice of gathering data to develop an understanding of someone's identity. Notably, the information that Robert gathers comes largely from external sources. He talks to witnesses (like Mrs. Vincent and Miss Tonks) and gathers scraps from telegrams and shipping labels. By tracing Lady Audley's history using these means, he establishes her identity from the outside in, which allows him to develop theories about her relationships, her motives, and her potential to harm others based on how she has interacted in society.

The investigation and sentencing changes completely when Lady Audley reveals "the secret" which she considers "the key to [her] life" (213). In "Making the Case: Detection and Confession in *Lady Audley's Secret* and *The Woman in White"* Ann-Marie Dunbar points out that "Robert is shocked by her claim of madness, but he quickly seizes on it as an expeditious way of erasing Lady Audley from the family history" (98). A result of this surprising turn of events is that Robert no longer has to imagine ways to convince a jury or his uncle that Lady Audley has intentionally murdered her husband. Instead, he has to convince a doctor that her mental condition makes it so she may harm others, which requires an examination of her body and her

mind.[21] Within only a few years, some doctors would begin looking for evidence of criminality using physical indicators like head shape and facial features. In the novel, Dr. Mosgrave does a physical examination and an interview. In contrast to hunting down the kinds of evidence required to prove her guilt, Robert now needs evidence of mental instability. This requires a change in the way he understands her identity. Whereas establishing that Lady Audley was actually Helen Muldoon means identifying her as a poor, urban woman, establishing that she is mentally ill and banishing her from the estate without a legal investigation means accepting her as a member of the upper class. From one perspective, the legal and medical methods of establishing someone's identity are entirely different. Whether incarceration arises from an impulse to provide treatment for a madwoman or to punish a criminal, the outcomes are strikingly similar. In both cases, institutional authorities sacrifice and individual's freedom in order to maintain the safety, convenience, or identity of the larger familial or societal group.

While *Lady Audley's Secret* uses madness as the most prominent example of character traits that arise from a combination of hereditary and external factors, its frequent references to other types of inheritance also have significance for an understanding of how the nuances of statistical probabilities take shape for Braddon throughout the novel. Statistics influenced

[21] Throughout the 1860s, debates went on between the medical and juridical definitions of insanity. Prior to the early nineteenth century, defendants would have had to prove that they were "totally incapable of distinguishing between 'good and evil'" (Moran 32). The M'Naughten Case of 1843 established a precedent for a new legal conception of intermittent madness that made accommodations for people who usually exhibited mental clarity but had lapses in judgement so that they could not completely understand the nature or consequences of their actions in given situations. (Clark and Finnelly) This definition of exculpatory insanity left itself open to criticism from both sides of the debate. For example, in 1835 the psychiatrist J.C. Prichard had introduced the diagnosis of moral insanity for patients that did not have delusions, who acted uncontrollably regardless of having an otherwise moral persona. In one instance, he describes this as "a female modest and circumspect [becoming] violent and abrupt in her manners, loquacious, impetuous, [talking] loudly and abusively" (Prichard 21). Through the 1860s and into the 1870s, physicians specializing in mental health argued for broader legal definitions of insanity that would include episodes of temporary insanity or irresistible impulses. For more information about these debates, see *Madhouses, Mad-Doctors, and Madmen: The Social History of Psychiatry in the Victorian Era*. edited by Andrew Scull (1981) and Thomas Maeder, *Crime and Madness: The Origins and Evolution of the Insanity Defense* (1985).

theories of physical inheritance, or genetics, particularly regarding the scientific attempt to model a relationship between the past and the future. Upon meeting Harcourt Talboys, Robert puzzles over what appears to be an inconsistency in how hereditary theories might be applied in individual cases when he reflects on the dissimilarities between George's personality and that of his father. "While family noses and family chins may descend in orderly sequence from father to son," he thinks, the spirit "owns no order but the harmonious law of God" (167). By differentiating between the orderly way that people understand heredity and the inconsistencies which he imagines can only be explained by a divine higher law, Robert draws attention to the statistical probability that offspring will not inherit the genetic characteristics of their predecessors. Although he assumes that God might be able to account for the improbable departure from an inherited family identity, the novel gives no indication that people are capable of accounting for these idiosyncratic personal characteristics other than acknowledging them as a mystery. Later in the text, when Lady Audley refers to the genetic predisposition for madness, she says that "madness is more often transmitted from father to son than from father to daughter" (237). This comment reminds us again of the frequency with which individual characters depart from the norm.

The novel cleverly aligns genetic inheritance with monetary inheritance in a way that further demonstrates the relationship between character traits and destiny. As I have discussed in depth above, Lady Audley justifies her violent behavior through an explanation of madness as a heritable trait. What's more, Robert and Dr. Mosgrave use the possibility of her having inherited mental illness as a justification for sending her to a mental institution. However, the novel expresses just as much interest in the way that monetary inheritance determines her destiny. When Sir Michael Audley "fall[s] ill of the terrible fever called love"—a love akin to madness in

this case—for the governess, "it pain[s] him too much to believe for a moment that any one so lovely and innocent could value herself against a splendid house or a good old title" (12). However, by the end of the novel it becomes apparent that Lady Audley's poverty combined with her beauty not only created the conditions for her first husband, George, to lose his inheritance, but set in motion the sequence of events that would be interpreted as evidence of her madness. Perhaps our female protagonist would have been both kind and sane if she had inherited either wealth or an ugly face. Indeed, of the few characters who work to determine their own fate despite the social position that they have inherited, everyone ends up either dead or in some kind of ruin. Luke Marks, George Talboys, and Lady Audley all try to use their work ethic and unusual cunning to alter their destinies. By contrasting inconsistent and unpredictable aspects of heredity with consistent, socially enforced aspects of inheritance, the novel suggests that although each of these characters possesses unique characteristics, it is ultimately their participation in generic categories that defines their destiny.

Conclusion

Braddon's use of generic and idiosyncratic characterization challenges the idea that individuals fit neatly into categories. Therefore, her work relies on a theory of universality that many would associate with the realist novel. In his essay, "Art and Objective Truth," Lukács describes realist fiction when he writes that "the Universal appears as a quality of the individual and the particular, reality becomes manifest and can be experienced within appearance, the general principal is exposed as the specific impelling cause for the individual case being specially depicted" (Lukács 34-35). While its sensational and gothic elements mark *Lady Audley's Secret* as sensation fiction, the novel nevertheless examines the roots of individual identity by exploring the degree to which truths, such as medical and legal evaluations of

individuals, are socially constructed. As Robert Thomas reminds us, sensation fiction is ‘‘a genre deeply related to the development of detective fiction in its preoccupation with the mysteries of identity and their resolution through the ‘machinery’ of the law’’ (Thomas 38). By engaging with ideas about truth and its association with statistical objectivity, Braddon draws on conventions from multiple genres and contributes to the development of the kinds of generic characters or types that drive later detective fiction.

In addition, the novel sustains a broader critique of the way that the developing field of statistics was developing and being incorporated into fields like criminology, psychology, and medicine. Thus, it serves as a perfect example of “the sensation novel’s methodological skepticism (or, in plainer words, its unwillingness to leave anything undoubted and unquestioned) that led to a powerful ability to question fixed traditions and ideologies in complex and radical ways” (Mangham 3). For example, Braddon gives Lady Audley all the characteristics that statistics and medical science had, at the time, connected with madness. Born in London and in poverty, she already has a higher probability of developing mental illness. Because her mother and grandmother were both mad, she has also inherited their “hereditary taint in her blood” (323). Finally, Lady Audley has the intelligence and over-excitability that statistical observation suggests would put someone at risk for insanity. Based on Lady Audley’s understanding of madness, she had every reason to expect that she had a high likelihood of developing the mental illness. Notwithstanding any evidence to the contrary, she sees herself as part of the class of the insane and justifies her actions accordingly. However, even with all of these factors, both the characters in the novel and its critics have doubted whether she is actually, as she claims, a madwoman. This uncertainty, combined with the novel’s critique of categorization, amounts to a carefully crafted condemnation of medical institutions for their

compliance in propagating structural biases that arose with early studies of insanity based on statical observation. By extension, the novel also criticizes the degree to which entire classes of people such as women, paupers, and others who didn't fit within socially acceptable categories were diagnosed as mentally deficient and condemned to be metaphorically buried alive (to use a chapter title from the novel).

As I have previously explained, the nineteenth century saw an enormous push toward objectivity in science, which led to the widespread use of statistics in scientific and legal contexts. In *Lady Audley's Secret* both Robert and Lady Audley cultivate versions of objectivity into their daily lives by adopting an emotional distance between themselves and other people. The distance between Robert and the crime helps to define his characters as smart and perceptive. In this way, the novel follows the formula of industrial success literature in which studious labor elevates men. Even his bias against Lady Audley seems justified because he maintains an air of objectivity and because the reader understands her as objectively untrustworthy due to her distance from others. She resists the close friendships and emotional bonds that so often influence female heroines in other nineteenth-century novels, even leaving her son behind in the pursuit of a wealthy husband. We read her emotional distance from others as the character flaw which allows her to commit her two most violent crimes—the attempted murder of George Talboys and the attempted murder (through arson) of Robert Audley. The resistance to close relationships, which continues throughout the novel marks a significant contrast to Robert's ability to connect with others. Robert begins the novel with relatively few close relationships apart from a deep friendship with George, marvelling at one point "that it is possible to care so much for a fellow" (81). Yet he learns to value intimacy and, by the end of the story, he has become the guardian of George and Helen's abandoned son and is married to Clara

Talboys. Braddon's critique of emotional distance parallels her critique of scientific objectivity and demonstrates a suspicion of the statistical methods and the lack of empathy that medicine has adopted as a way to diagnose and recommend treatment for physical and especially mental illness.

Lady Audley's Secret is also an argument for the value of probabilistic uncertainty. In the novel, Mary Elizabeth Braddon takes a nuanced approach to understanding calculation and probabilistic reasoning. While on the one hand, she characterizes personal indifference and uncompromising information gathering as attributes of a good detective, she presents the same traits as detrimental when they aren't tempered by an acknowledgement of contrasting points of view and a recognition of doubt underlying any calculation or narrative. As exemplified by Robert's investigation, any kind of scientific or legal investigation that incorporates data collection, organization, and an ultimate verdict should also be tempered by the awareness that its conclusions are examples of probabilistic (as opposed to absolute) knowledge. In this way it is an indictment of legal institutions that failed to seek more complex definitions of insanity. With regards to the way individuals evaluate one another, the novel also claims that "it is a mistake to judge of what a man can do by that which he has done" (240), reminding readers to acknowledge variation even among members of groups that look homogeneous from one perspective.

Finally, when we take into account the degree to which this novel joins other early examples of sensation fiction in representing statistical ideas, we can understand more fully how fictional genres spread new theories of probability to the public. *Lady Audley's Secret* both embraces and rejects assumptions that drive statistical inference and the Victorian celebration of science as a pathway to truth. When Lady Audley accepts the statistical account of hereditary insanity as her identity, she buys into a narrative that determines her destiny. Robert disregards

this medically significant statistic, focusing completely on individual variation and chains of facts within Lady Audley's history and therefore misses a key component of his case. Both errors serve as cautionary tales for scientific research and ask readers to question their own assumptions about individual and group dynamics. To echo the words of Pierre Simon Laplace, "one of the great advantages of the probability calculus is that it teaches us to distrust our first impressions" (94).

Taking a Gamble: Probability and Social Law in George Eliot's *Daniel Deronda*

While many have written about George Eliot's interest in science, particularly regarding its Darwinian and biological paradigms, and some have offered accounts of destiny, luck, and coincidence in her novels, few have recognized the degree to which her writing relies on statistical probability as a model for conceptualizing these things.[22] *Daniel Deronda* (1876) is one of a constellation of works that showcase Eliot's preoccupation with probability and its implications for understanding the relation of people to one another. Only two years after publishing her final novel, Eliot wrote "The Modern Hep! Hep! Hep!" as part of *The Impressions of Theophrastus Such,* which begins by praising the ability to appreciate difference. She writes that "to discern likeness amidst diversity, it is well known, does not require so fine a mental edge as the discerning of diversity amidst general sameness" (118).[23] The injunction to value diversity rather than dwelling on resemblance has particular significance in light of the statistical developments that animated scientific and legal disciplines during the nineteenth and early twentieth centuries. In this chapter, I will examine George Eliot's reliance on statistical

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[22] In addition to Gillian Beer, whose *Darwin's Plots* has been so influential in the study of George Eliot, Ian Duncan (*Human Forms: The Novel in the Age of Evolution*), Lawrence Rothfield (*Vital Signs*), Jill Matus (*Shock, Memory and the Unconscious in Victorian Fiction*), Devin Griffiths (*The Age of Analogy*), Catherine Gallagher (*The Body Economic*), Alice Jenkins ("George Eliot, Geometry and Gender") and John Miller (The Ecological Plot: A Brief History of Multispecies Storytelling, from Malthus to *Middlemarch*") all examine Eliot's work from the viewpoint of Victorian science and/or math. Hillary Dannenberg (*Coincidence and Counterfactuality*), Jesse Rosenthal (*Good Form: The Ethical Experience of the Victorian Novel*), and Leland Monk (*Standard Deviations: Chance and the Modern British Novel*) have written on chance and coincidence in Eliot's fiction.

[23] This brief bit of commentary sets the stage for a more sustained discussion of English discrimination against the Jewish nation. Eliot based the title "The Modern Hep! Hep! Hep!" on riots in Germany in 1819. The rallying cry of the anti-Semitic mobs was "Hep-Hep!" While some scholars point out overt racist and nationalistic views in this piece, accusing Eliot of having harbored these opinions, others approach it as a hybrid between fiction and the essay. K. M. Newton has argued that "ignoring the literary aspects of 'The Modern Hep! Hep! Hep!' leads to grossly distorted readings of it and that claims that it directly represents views that can be identified with racism and jingoism are very much open to question" (Newton 656). Newton goes on to contrast the narrator's language and response to racism in the essay with Eliot's language and expressed beliefs in her own letters.

probability as a way to showcase the limitations of scientific and social perspectives built on a crude understanding of difference particularly as they relate to social hierarchies, fatalistic views, and errors in prediction. While I focus primarily on *Daniel Deronda*, an analysis of portions from scientific texts and Eliot's other work will aid in tracing the progression of her perspective.

Rousseau and the Gambling Scene

When George Eliot describes Poetry as the "less accurate grandmother" to Science in the epigraph of *Daniel Deronda* (1876), she reminds her readers of the similarities between scientific and literary attempts to understand human nature within the larger network of natural laws and social influences that make up everyday life. She explains the resemblance between the two disciplines by referencing their ability to "reckon backwards and well as forwards" in spite of an inevitable failure to access "the true beginning" (Eliot, *Daniel Deronda* 3). Scholars have read this epigraph as a reference to various natural sciences. Sally Shuttleworth delves into its relation to Copernican astronomy (Shuttleworth 178). Gillian Beer relates it to the randomness inherent in evolution, pointing out the novel's emphasis on "the multiplicity of possibilities, on coincidence as a creative force, on the absorbing unpredictability of what is to come" (Beer 178). Rather than focusing on this aspect of the novel, Beer pursues its application to Darwinian theory. While taking a broad view of the scientific pursuits to which Eliot compares poetry and art certainly provide insight into her work, these interpretations understate the degree to which probability—along with its mathematical, social, and political resonances—forms a central theme throughout *Daniel Deronda*.

Notably, the first image of science offered by the novel hinges on the relationship between probabilistic thinking and gambling. The scene opens with Daniel Deronda observing Gwendolen gambling "not in the open air under a southern sky, tossing coppers on a ruined wall,

with rags about her limbs; but in one of those splendid resorts which the enlightenment of ages has prepared for the same species of pleasure at a heavy cost of gilt mouldings, dark-tones colour and chubby nudities, all correspondingly heavy" (3). By contrasting a rural, possibly ancient landscape, with the modern gambling hall constructed using the architecture, art, and all of the accoutrements of an enlightened civilization, Eliot sets up an assessment of the way that the purported advancements in human knowledge have impacted society and its members. Surrounded by the trappings of luxury, the act of making wagers resonates as a symbol of the degree to which the social order and its financial systems look like they are built on reason and carefully designed mathematical principles, when they are more often vehicles for a kind of chance that people do not understand and cannot control. While Eliot recognizes the potential value of probabilistic reasoning, she also sees the ways that it can mislead and even harm society.

As Daniel contemplates the crowd that filled the gambling hall, it occurs to him that "Rousseau might be justified in maintaining that art and science had done a poor service to mankind" (5). In her essay about Rousseau's influence on *Daniel Deronda,* Judith Still points out that Eliot and Rousseau share an interest in "the complex psychological law governing the efficacy of the code of beneficence" and describes Daniel's comment as "reductive, with a note of sarcasm regarding the full scope of Rousseau's criticism of social history" (Still 63, 66). However, when examined in light of nineteenth-century science, this reference to Rousseau offers insight into Eliot's complex view of the psychological constraints of a probabilistic mindset and how it influenced society. Daniel's thought arises from two important and somewhat contradictory aspects of the scene. First, the novel describes the crowd as "a striking admission of human equality. The white bejeweled fingers of an English countess were very near touching a bony, yellow, crab-like hand stretching a bared wrist to clutch a heap of coin" (4). By focusing

on the appendages of these two distinct individuals, including their respective ornamentation, the text draws attention to the way that "equality" in the gambling hall requires economic objectification. The way to measure people, in other words, has arises more distinctly from their value in currency than with their morals or personal characteristics. In addition to juxtaposing people of different classes, the text also describes people of different races ("very distant varieties of European type"), ages, and genders that wouldn't otherwise sit side by side (4). Beyond their desire for monetary winnings, the circumstance and set of beliefs that they have in common disturbs what might have been an opportunity to celebrate the convergence of such a diverse group for, "while every single player differed markedly from every other, there was a certain uniform negativeness (*sic*) of expression which had the effect of a mask—as if they had all eaten of some root that for the time compelled the brains of each to the same narrow monotony of action" (5). The negativity that pervades the room cloaks the personal characteristics that might otherwise distinguish one person from another. Thus, both the nature of diversity among the people in this crowd and their uniformity lead Daniel to agree with Rousseau's assertion that scientific and artistic progress had become a hindrance to virtue in modern society.

In his prize-winning "Discourse on the Sciences and Arts" (or *Discours sur les sciences et les arts)* of 1750, Rousseau responded to a question posed by the Academy of Dijon, which asked whether "the restoration of the Sciences and Arts contributed to the purification of Morals or to their corruption?" (Rousseau 4). Of course, the word science in the context of this discourse would have had a broader connotation than it had by the time Eliot used it in the late nineteenth century. Rousseau often uses it in reference to the accumulation of knowledge generally. He describes the pursuit of science as someone going forth "to dispel by the lights of his reason the

darkness in which nature had enveloped him . . . to study man and to know his nature, his duties, his and his end" (6). In *George Eliot and Nineteenth-Century Science*, Sally Shuttleworth compares Eliot's conception of science in the epigraph to that of Claude Bernard in his *Experimental Medicine* (1865) when he accuses "scholastics or systematizers" of "never question[ing] their starting point, to which they seek to refer everything; they have a proud and intolerant mind and do not accept contradiction, since they do not admit that their starting point may change" (Shuttleworth 176). Both the use of "science" in the epigraph of *Daniel Deronda* and in the initial gambling scene resonate with Rousseau's definition in that they reference the smug certitude that often results when people gain a little knowledge. In his essay, Rousseau points out an ironic feature of science and letters. Whereas education and civilization claims to reduce uncertainty in the world by raising people out of the darkness that surrounds them in their natural state, it also breeds uncertainty between people by encouraging them to adopt "the appearances of all the virtues without having a single one of them" (6). For Rousseau, the belief that virtue and certainty increase through scientific progress remains unfounded.

In the gambling scene, this unwarranted certainty arises from a misinterpretation of the science of probability. From its earliest iterations, probability had been connected to gambling. In fact, many attribute the birth of probability theory to Blaise Pascal who worked in tandem with Pierre de Fermat in 1654 to develop a formula for calculating the odds of winning games of chance. In theory, understanding the likelihood of a given outcome should help people overcome a more natural urge to make unfounded assumptions about the probability of winning at dice. Whereas people often instinctively base predictions about games of chance on the results they have witnessed recently, probability acknowledges that the result of each new roll exists independent from those that have preceded it. By using Pascal's formula, one could ostensibly

make more successful wagers by using mathematical rather than intuitive reasoning. Understanding the science of probability as having originated in response to a concern about gambling in games of chance also brings to light the necessity of acknowledging difference within apparent similarity. While the complexity of the field and its mathematical formulas developed over time, even an early practitioner of probability theory should strive to see each event as connected to, but not determined by the set of similar circumstances that surround it.

Like Daniel, whose survey of the room reveals a curious resemblance of aspect that characterizes an otherwise diverse crowd, Rousseau begins the aforementioned "Discourse on the Sciences and Arts" by outlining how science and art breed inequality while encouraging conformity. While he briefly praises the "lights of reason" for allowing a person "to raise himself above himself," he goes on to describe how the pursuit of knowledge has harmed society:

> While the Government and the Laws see to the safety and the well-being of men assembled, the Sciences, Letters, and Arts, less despotic and perhaps more powerful, spread garlands of flowers over the iron chains with which they are laden, throttle in them the sentiment of that original freedom for which they seemed born, make them love their slavery, and fashion them into what is called civilized Peoples. (6-7)

By contrasting the laws imposed by government with the "more powerful" pursuit of knowledge, Rousseau draws attention to the way that science and art have been used to disguise legal oppression. In this view, law preserves an artificial social order so that under the guise of protecting people, it instead protects hierarchies that reward those who are born into privilege while punishing those whose heritage contributes to their lack of education. He will later point out the frequency with which the pursuit of science is more accurately a pursuit of luxury; and that while "ancient politicians forever spoke of morals and virtue; ours speak only of commerce

and of money" (19). When money becomes a standard which replaces virtue, by "pursuing this calculation [the State] will find countries where a man is worth nothing, and others where he is worth less than nothing" (20). We might also understand Rousseau to be saying that by chasing monetary distinction through a quest for scientific advancement, society renders people equivalent in their lack of virtue and equally worthless as individuals for the State. What's more, the contrast between Rousseau's image of the iron chains and the garlands of flowers illustrates another kind of cloaking he associates with sciences, letters, and arts. These three disciplines discover truths about the physical world and the patterns of human behavior that appear as natural as flowers. Yet their discoveries are intentionally shaped into garlands which, like the forging and shaping of iron chains, require careful organization and arrangement. Neither the chain of iron nor that of flowers offers an unmediated view of law and nature.

We might think of Rousseau's iron chain in relation to the social chain which Alexander Pope describes in "Essay on Man" (1733). Pope characterizes any departure from the established social hierarchy as "one step broken, the great scale's destroy'd:/ From nature's chain whatever link you strike,/ Tenth or ten thousandth, breaks the chain alike" (Pope ln 244-46). In this poem, he understands this chain of being as inherent to the natural order of things; people and animals alike have inherited their position. In contrast, Rousseau draws attention to the constructed nature of the chain and the role of art and science in its formation. He further articulates the problem by quoting Socrates, who bemoaned the prejudice that he saw as characteristic of poets and artists, explaining that "because the most skilled among them excel in their particular Field, they look upon themselves as the wisest of men. In my eyes this presumption has completely tarnished their knowledge" (Rousseau 12). Among the crowd in *Daniel Deronda* there are those who, like these artists, revel in their superiority. Eliot describes a "statuesque Italian" who

remains impassive to his loss of a pile of napoleons, "probably secure in an infallible system which placed his foot on the neck of chance" (5). By specifying this man's nationality, Eliot uses his heritage as one way to signal his inherited place on the social chain. She also contrasts the Italian to a tradesman who "in his pleasures was fit to rank with the owners of the oldest of titles" (5). In contrast to the tradesman, whose identity arises from his work, the Italian's identity is tied to the "infallible system" that has characterized his circumstances since birth. His assurance stems from an understanding of chance that is entirely tied to the realistically high probability that he will remain comfortable in his elevated position in the social chain. Thus, he enters the gambling hall, where probability works according to a principle of uncertainty, with the same bravado that he carries throughout the rest of his life. Unlike Socrates's poets and artists, the Italian imagines himself to be one of the luckiest, rather than one of the wisest of men. Still, this presumption tarnishes his knowledge. As Pierre Simon Laplace wrote in his *Philosophical Essay on Probabilities* (1812), "our passions, prejudices and prevailing opinions, by exaggerating the probabilities that are favourable to them and by attenuating contrary probabilities, are rich sources of dangerous illusions" (Laplace 92). The Italian's problem isn't merely that he sacrifices virtue by participating in a game in which his gain is another's loss—a motif that will appear in different iterations throughout the novel—but also that he misinterprets the possibility of winning as probable because experience and the belief that he has inherited some degree of power over chance have taught him to do so.

As exemplified by the Italian, the self-aggrandizement that can arise from a system of inequality often forges an equally artificial public facade among those who consider themselves civilized. Rousseau describes this mask of constraint as a movement toward propriety and civility:

> A vile and deceiving uniformity prevails in our morals, all minds seem to have been cast in the same mold: constantly civility requires, propriety commands: constantly one follows custom, never one's own genius. One no longer dares to appear what one is; under this perpetual constraint, the men who make up this herd that is called society will, when placed in similar circumstances, all act in similar ways unless more powerful motives incline them differently. (Rousseau 8)

Rousseau's concern about civility and custom in this passage are consistent with his writings in other places about the relationship of individuals to the state. For example, in *The Social Contract,* he confronts the problem of the tyranny of the majority. Even though he values the protective role of government, he also wants it to prioritize the freedom of citizens. Etymologically, the terms civil and civility have similar backgrounds. Civility comes from the Old French *civil* and the Latin word *civilis*, both of which have an orientation toward public life and refer to the kind of behavior befitting a citizen. Not surprisingly, Rousseau's language in the passage above addresses how education influences the way people treat each other within the civic order. A little more than a decade after writing this discourse, Rousseau would go on to argue in *Èmile* (1762) that good citizens developed through an education that promoted their natural goodness. Simon Dentith has traced Rousseau's conception of education though a tradition of educational practice which he describes as "the paradox of contriving natural consequences," explaining that "Rousseau is at the head of that tradition and George Eliot is at its tail" (Dentith 42). While it has widely been acknowledged that Eliot read Rousseau extensively, Dentith also reminds us that her reception of "Roussouvian" ideas would have been colored by the intellectual debates sparked by his work in the intervening years, including Comte, Wollstonecraft, Edgeworth, Herbert Spencer, and James Mill. Notwithstanding the

differences between Eliot's ideas and those of her predecessor, she still may, in many respects, be considered a "child of the Enlightenment" (47). For Dentith, this has to do with her attitudes about education and her engagement with intellectual ideas. I would add that her critique of probability and statistics as disciplines which had, by the 1870s, shown their potential as instruments of the state also align Eliot with Rousseau's thought.

Rousseau's resistance to standardization and the prospect of overwhelming homogeneity that might cause people to "act in similar ways when placed in similar circumstances" foreshadows the concern that many, including Eliot, will have about one of the main premises of nineteenth-century statistics. In Quetelet's *Treatise on Man and the Development of His Faculties* (1842), he had written that "from the examination of numbers, [he] believed [him]self justified in inferring, as a natural consequence, that, in given circumstances, and under the influence of the same causes, we may reckon upon witnessing the repetition of the same effects, the reproduction of the same crimes, and the same convictions" (Quetelet vii). During the nineteenth century, many disciplines that had taken up statistical methodologies developed theories about what would happen in the future by gathering data about the past. For example, reformers like Florence Nightingale and others used statistical data to argue for improved treatment of soldiers in the British military. Because people's health declined in unclean conditions and improved with additional sanitary measures, hospitals could improve mortality rates even before they had an understanding of germ theory. Towards the end of the century, though, the medical and sociological uptake of similar data contributed to criminology and eugenics and became a breeding ground for racist and classist stereotypes. As I have discussed in previous chapters, the enforcement of statistically based policies also lent credibility to the unfair treatment of women, the mentally ill, and minority groups. In these fields, an overzealous application of probabilities

coupled with preexisting prejudice fueled a kind of homogeneity that was externally enforced. While Rousseau, in the above quotation, seems more worried that people will choose to act alike because they equate similarities in manner and speech with status, his concerns are also applicable to powerful institutions that can shape public behavior by treating people as predictable.

Rousseau's most scathing criticism of science inheres in its potential for causing error. He sees error as "a thousand times more dangerous than the truth is useful," reminding us that "falsehood admits of an infinite number of combinations; but truth has only one way of being" (18; ii.38). He sees this as a problem relating to time. First, scientific pursuits take a lot of time, and often result in errors that have to be corrected in the future. Meanwhile, people labor under incorrect perceptions and are, in a sense, moving in the wrong direction. Second, he describes the pursuit of scientific knowledge for its own sake as idle. He lists a number of pursuits in astronomy ("in what ratios bodies attract one another in a vacuum; the proportions between areas swept in equal times by the revolutions of the planets" etc.) as examples of discoveries that require a great deal of time but have little yield in terms of their usefulness for daily life (18; ii.39). In the case of Eliot's gambling scene, both of these problems with mathematical probability have come into play. Not only do people continue under incorrect perceptions regarding their futures, but any knowledge or curiosity that they have about probability as a science has contributed to their idle participation in games of chance.

Although Rousseau was not a statistician, by commenting on his theories within the context of a gambling scene and by referencing 19th-century conceptions of probability as both the pursuit of a coherent system that described social law and as a formula for conceptualizing luck, Eliot highlights the resonances of Rousseau's theory for statistics. If we consider the

elements that Daniel finds distasteful about the gambling scene, we might separate them into three main critiques of the science of probability. First, he critiques society's dependence on an artificial social order, with set classifications that correspond to hierarchies. Second, he sees examples of people whose position within the hierarchy or within a crowd drives their individual expression. In such cases, it is as if they lack any desire for individuation because an existence outside of what they have inherited seems out of the question. This is a problem having to do with time and the force that past generations exert over the present. Finally, the gambling scene exemplifies the way that predictions based on experience—the kind of probabilistic thinking that people find instinctual—leads to error, especially because people struggle to understand how they relate personally to the collective. The attention that Eliot gives these three things in the novel's first scene serves as an anchor point for the societal problems she will address in the rest of the book, and they are the points that I will examine more closely for the remainder of this chapter. Eliot's choice to draw attention to these aspects of how an individual might perceive and be perceived within society also stems from her critique of the way that probabilistic reasoning and statistical methods shaped scientific fields, particularly those which presumed to establish the natural laws governing social interactions and individual characteristics and had a high potential for errors that in turn would influence future research and social practice.

The Artificial Social Order

The misunderstanding of probability as working in one's favor, rather than recognizing it as neutral, finds consummation in the character of Gwendolen who, surrounded by admiring observers "had begun to believe in her luck, [and] others had begun to believe in it: she had visions of being followed by a *cortège* who would worship her as a goddess of luck and watch her play as a directing augury. Such things had been known of male gamblers; why should not a

woman have a like supremacy?" (6). By describing Gwendolen in this way, the narrator draws attention to the uncertainty inherent to a world governed by probability. The passage also connects "luck" to "belief." These two concepts recur many times throughout the novel, often marking aspects of individual identity or status that appear as particularizing characteristics, but that also grow out of membership in a community. In the case of the crowd watching Gwendolen, by believing in the likelihood that she will continue to win, they cohere as a group. As the book describes, they are "as one of an insect swarm" with "no individual physiognomy" (7). Whereas "luck" makes her different from others, the "belief" in her exceptionality—that she is lucky or has a higher probability of success—unites her with the crowd in a way that diminishes the distinctiveness of all its participants. Gwendolen, therefore, represents an ideal statistical object because her uniqueness also anchors her to the group.

In her book *A Probable State* Irene Tucker differentiates between the "sameness" produced by a representation of a group and the particularity of belief among group members. She explains the assumption behind a line that appears late in Marian Evans's well-known review essay "A Natural History of German Life." In this essay, Evans contrasts overgeneralizations or idealizations with the kind of particularized representation that teaches the reader to "feel, not for the heroic artisan or the sentimental peasant, but for the peasant in all his course apathy, and the artisan in all his suspicious selfishness" (111). She writes that "appeals founded on generalisations and statistics require a sympathy ready-made, a moral sentiment already in activity: but a picture of human life such as a great artist can give, surprises even the trivial and the selfish into that attention to what is apart from themselves" (110). Tucker addresses the juxtaposition between subject and object by explaining that "to be constrained within a category is to cease to be a subject, sameness must become the definition of the category

of objects. To be an object is to be categorical, and to be a subject is to be unable to experience sameness" (Tucker 43). However, as she goes on to argue, by separating subjects from objects in this way the realist novel becomes "the ideal cultural form for the production of commonness" because it generates "a shared *structure* of belief" that arises from a common experience of the fictional (48, 49). She also points out that "the point of view from which a common culture might be established need no longer conflict with any unequal distribution of material evidence that would produce such a point of view, because belief is precisely what cannot be distributed" (51). If we re-examine the scene of Gwendolen surrounded by an entourage of believers with these ideas in mind, we might now add that the reader also shares the structure, if not the content, of their belief in Gwendolen's luck because by engaging with this fictional text, they are willingly entering a world in which luck has as much power as probability. Within the broader context of this novel, the fact that the belief which unites the reader to the group of people in the gambling house centers on luck is also significant. We might think of a belief in luck as expressing faith that that a particular individual will go against the grain of probability that governs the otherwise unlucky crowd. Thus, even the particular belief that Gwendolen's admirers share foregrounds probability as a governing principle in social and economic matters, and compels the reader to pay closer attention to how commonality, rather than individuality or even agency, exerts a determinate force in life.

The narrator signals just such a commonality by transitioning from a description of Gwendolen and those that surround her to an observation about the world in general: "Such things had been known of male gamblers; why should not a woman have a like supremacy?" (6). This line represents a shift in narrative voice from that of an exterior observer to one whose omniscience offers further insight into Gwendolen's character. While most of the scene up until

this moment seems to favor Daniels perspective, the question in the second half of the line is free indirect discourse. It gives us access to Gwendolen's personal thoughts, but while doing so, it characterizes people generally or with respect to their category. This is only one of many instances in which the novel points out Gwendolen's preoccupation with how others see her. Her awareness of being watched spurs a comparison between male and female gamblers. Unlike men, women who gamble don't tend to garner the status that Gwendolen feels she deserves. The comparison demonstrates a perceived disjunction between her identity as an individual and her participation in the group. To state it more clearly, by equating a high status with having a *cortège* of admirers, the line quoted above draws attention to the fact that a person's particularity grows out of their participation within a set of people with whom they share similar features or characteristics. The unique individual's ability to either resist or supersede expectations must, then, be measured and represented in relation to the categories to which they belong.

That the relation between an individual and society would be brought forth using free indirect discourse also mirrors a shift in the way George Eliot and her contemporaries understood social ontology. In an 1896 lecture, Hermann von Helmholtz discussed the disparity between external stimuli and internal responses. He delivered this lecture on sensory physiology to a group of scientists in Germany, explaining that all sensations "are only signs of external objects, and in no way pictures bearing any resemblance" (qtd. in Daston 253). While his lecture focused primarily on the way that scientists could study sensory experience, like color and taste, his perspective on scientific objectivity is representative of the suspicion that experts in many fields were beginning to hold with regards to truth in representation. Lorraine Daston and Peter Galison have written extensively about the shift in scientific objectivity from the late eighteenth century until the twentieth, concluding that "this conviction that much of mental life, especially

sensations and representations, was incurably private and individualized was itself the product of a highly successful late nineteenth-century scientific research program in sensory physiology and experimental psychology" (Daston and Galison 45). A decade later, when the mathematician and logician Gottlob Frege wrote *The Foundations of Arithmetic* (1884) he expressed even more strongly his concern with the practice of "conflating subjective representations with objective concepts" (Daston and Galison 268). George Eliot engaged with the ideas that spurred these debates between scientists and mathematicians. In "The Natural History of German Life," she criticizes the tendency to expresses distaste for "the tendency created by the splendid conquests of modern generalization, to believe that all social questions are merged in economical science, and that the relations of men to their neighbours may be settled by algebraic equations" (111-12). By recognizing the gap between representation and subjective truth, and by hesitating to replace "real knowledge of the people" that comes through "a thorough study of their habits, their ideas, their motives" (112) with mathematical formulae, Eliot shows her sympathy with a scientific community that was becoming increasingly critical of their own methods. Eliot demonstrates attentiveness both to the ways in which individuals can become conflated with their economic status and to a related problem arising from representation itself. When she declares that "we want to be taught to feel, not for the heroic artisan or the sentimental peasant, but for the peasant in all his coarse apathy, and the artisan in all his suspicious selfishness" (111), she offers an alternative to idealized narratives. Although both the heroic artisan and the suspicious and selfish artisan operate as constructs within a fictional text, a representation of the heroic artisan only connects the reader to the text, whereas a representation of the suspicious and selfish artisan connects the reader both to the text and to the external world from which the peasant was drawn because it asks the reader to think more carefully about the artisan's internal motives in relation

to the various real-world forces that would contribute to a suspicious and selfish disposition. Like Frege, Eliot separates subjectivity from objective concepts, but instead of attempting to discard subjectivity completely, she challenges her readers to examine the relationship between the two. In her review of R. W. Mackay's *The Progress of the Intellect* (1851) Eliot wrote that "A correct generalization give significance to the smallest detail, just as the great inductions of geology demonstrate in every pebble the working of laws" (Eliot, "R. W. Mackay's *The Progress of the Intellect*" 271). Thus, when the narrator of *Daniel Deronda* slips into free indirect discourse, and transitions from an external description of Gwendolen to an internal reflection of her thoughts, the novel reminds us that her lived perspective is as valuable to a true representation of the scene as the external observation.

Not only does the incursion of free indirect discourse offer insight into Gwendolen's point of view, it also showcases that of the author, especially given the fact that similar concerns feature prominently in Eliot's other fictional texts. For example, in *Felix Holt, The Radical* Eliot situates an account of political controversy in the town by explaining that "these social changes in Treby parish are comparatively public matters, and this history is chiefly concerned with the private lot of a few men and women; but there is no private life which has not been determined by a wider public life, from the time when the primeval milkmaid had to wander with the wanderings of her clan, because the cow she milked was one of a herd which had made the pastures bare" (Eliot, *Felix Holt, The Radical*). In the final paragraphs of *Middlemarch*, the narrator comments that "there is no creature whose inward being is so strong that it is not greatly determined by what lies outside it" (Eliot, *Middlemarch* 784–85). While this statement may be taken as a justification for *Middlemarch* as a novel, and its manner of engaging with the overall project of narrative realism, it also applies to the individual characters. Rosamond Vincy, for

example, "[is] rather used to being fallen in love with," and therefore finds it completely "natural that Mr. Lydgate should have fallen in love at first sight of her. These things happened so often at balls, and why not by the morning light, when the complexion showed all the better for it?" (110). Notably, the narrative tone and structure of Rosamond's question bears a striking resemblance to Gwendolen's when she contemplates her own status as a gambler. Both women are used to responding indifferently to a host of unwanted suitors, and their identities have been greatly determined by how others have responded to them in the past. According to Mrs. Lemon, Rosamond's instructor at finishing school, "no pupil, she said, exceeded that young lady for mental acquisition and propriety of speech, while her musical execution was quite exceptional" (89). Lydgate responds to her in a similar manner. He "had said of that particular woman, 'She is grace itself; she is perfectly lovely and accomplished. That is what a woman ought to be: she ought to produce the effect of exquisite music.' Plain women he regarded as he did the other severe facts of life, to be faced with philosophy and investigated by science. But Rosamond Vincy seemed to have the true melodic charm" (87). While Mrs. Lemon and Lydgate see Rosamond as "exceptional," their judgment is based on her adherence to an ideal standard that they believe women should live up to. Their perception of her particularity does not result from anything unique in her character or ability, but rather from the fact that she conforms perfectly to the category to which she has been assigned. In other words, that which makes her unique is also what marks her as being born into a certain gender and social class. Like Rosamond in *Middlemarch*, Gwendolen mistakes her privilege (both in terms of beauty and fortune) for the kind of particularity that will lift her out of the stagnation that so often characterizes Victorian women of their class. Thus, when we read Gwendolen as a "spoiled child," as the title of Book I in *Daniel Deronda* suggests, and when we recognize that the aspirations that motivate her to

stand apart, or above the limits that determine her social position in society, it seems natural to predict her downfall as a heroine. Neither character recognizes the degree to which their opportunities and even their thoughts have been influenced by the broader social landscape that surrounds them. Therefore, they are both surprised when their self-understanding and aspirations, which they thought were unique, contribute to their oppression. This problem not only affected the actual lived experience of women, but also offers perspective into one reason that George Eliot was interested in critiquing probability and statistical theory as tools used by those with higher power and status to enforce social inequality.

When, in the gambling scene in *Daniel Deronda,* the narrator speaks from Gwendolen's perspective to question why society would treat a female gambler differently from the way they treat a male gambler, saying that "such things had been known of male gamblers; why should not a woman have a like supremacy?" (6), it also draws attention to ways that norms—gender norms, in this case—governed social protocols. The question "why not?" is central to many events of the text. The novel as a whole seems to ask why not allow women, racial minorities, and the impoverished equal status in society? Why not give individuals more freedom to live according to their own conscience? Often, the norms that govern individual destiny are perpetuated by institutionalized practices. Aspects of these norms seeped into statistical practice, and tables and numerical data cloaked their inherent bias. As mathematics became more rigorous, and researchers became more eager to seek objective methods, numbers and statistics inherited the status of objectivity without actually achieving it. In *Daniel Deronda*, recurring references to science, probability, and chance—often in the voice of Gwendolen—draw attention to the disjunction between social norms and statistical laws.

The idea that social norms might suggest something about an underlying law is one reason that statistics gained influence so quickly and in so many fields during the nineteenth century. In his *Treatise on Man* (1812), Adolphe Quetelet justifies the use of statistical averages in understanding norms of human development and behavior. He argues that while science progresses over time as human understanding of natural law changes, the laws themselves, including those that govern human development and faculties "are essentially stationary" (Quetelet 101). While Quetelet recognizes that individual within a group vary in every particular, he also considers it absolutely essential to calculate the averages or norms within any group to develop an abstract idea of "the average man" because that information becomes the basis of "every other inquiry into social physics" (96). He goes on to write that "The average man, indeed, is in a nation what the centre of gravity is in a body; it is by having that central point in view that we arrive at the apprehension of all the phenomena of equilibrium and motion" (96). Although Quetelet seems to understand statistics as a project designed to observe and track trends in human behavior and social interaction, his comparison between the individual body and the body of the nation proves telling. Studying national averages had value for the British government beyond increasing human understanding because it provided information that could lead to changes in legal regulation. For those who specialized in physical and mental health, statistical averages were particularly important for identifying when a patient departed from the norm in some way so that they could offer a remedy or a cure. In *The Taming of Chance*, Ian Hacking reminds us that "one can, then, use the word 'normal' to say how things are, but also to say how they ought to be" (Hacking 163).[24] Because people have such a strong tendency to

[24] In his book, *The Taming of Chance*, Hacking traces the word 'normal' to its early roots as follows: "The word entered modern European language as soon as geometry was expressed in the vernacular. It meant perpendicular, at right angles, orthogonal. *Norma* is Latin, meaning a T-square. Normal and orthogonal are synonyms in geometry; normal and ortho- go together as Latin and Greek. Norm/ortho has thereby a great power. On the one hand the

accept norms and averages as if they were the ideal, there is strong social and institutional pressure to force people to conform to norms, even when they aren't indicative of an underlying natural law. This is why, despite its early proponents' honorable intentions, statistics—and even the patterns of probabilistic thought within individuals—often became tools for arbitrary social control.

Inheritance and the Assumption of Causality

For nineteenth-century thinkers, the regularity of social phenomena which statistical observation revealed spurred debates about determinism and causality. Henry Thomas Buckle played a key role in this debate. In his *History of Civilization* (1857), he drew an explicit connection between the statistical regularities of society, such as the consistency of crime rates and suicide from year to year and the laws of nature which geologists had begun to study. He argues that "Climate, Food, and Soil, have . . . originated the most important consequences in regard to the general organization of society" (Buckle 39). For Buckle, the physical aspects of nature have had an even more significant impact than political figures, whose imagination and belief was frequently an outgrowth of their environment. Although Buckle's statistical fatalism lies at the extreme end of the spectrum, a similar pattern of thought characterized the perspectives that many English people had toward matters of probability and possibility.

In contrast to Buckle, other statisticians advocated for a more conservative interpretation of statistical consistency. They acknowledged yearly regularities without assuming they were driven by natural law. One such statistician was Ernst Engel. Early in his career, he critiqued the

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words are descriptive. A line may be orthogonal or normal (at right angles to the tangent of a circle, say) or not. That is a description of a line. But the evaluative 'right' lurks in the background of right angles. It is just a fact that an angle is a right angle, but it is also a 'right' angle, a good one. Orthodontists straighten the teeth of children; they make the crooked straight. But they also put the teeth right, make them better. Orthopedic surgeons straighten bones. Orthopsychiatry is the study of mental disorders chiefly in children. It aims at making the child—normal. The orthodox conform to certain standards, which used to be a good thing" (Hacking 162–63).

fatalistic vein that he saw in English and French statistics. While he respected Quetelet's work, he also resisted what he considered Quetelet's deterministic impulse. While running the Prussian Statistical Bureau from 1860 to 1882, he oversaw the publication of a statistical journal. In its 1862 edition, Engel offered an alternative to statistical fatalism. He affirmed his belief that "statistical research accompanies the individual throughout his entire earthly existence," but goes on to point out that even though statistics show that nearly the same number of people in a given population commit suicide from year to year, this consistency fails to provide an explanation of its cause.[25] For Engel, many underlying factors contributed to suicide and to other social norms, and these deserved more careful study than to be swept aside while researchers highlighted the mere fact of recurrent suicide. Like George Eliot who, as I discuss above, sees art and literature as a way of examining causation through the representation of individuals over generalization, Engels investment in statistics values the one amidst the many. He encourages readers to appreciate the affordances of statistical study without overlooking its limitations.

In Eliot's novels, she often depicts characters whose assumptions about what is likely reflects either a shallow form of determinism or an underdeveloped idea of the complexity of factors which influence the outcome of a single individual. One issue, as it says in *Daniel Deronda*, is that "a great deal of what passes for likelihood in the world is simply the reflex of a wish" (81). In Eliot's *The Mill on the Floss*, the protagonist, Maggie Tulliver, embarks one morning on what she believes will be a short maritime excursion with Stephen Guest who, along the way, asks her to marry him. Unfortunate circumstances keep them away from home overnight. Although

[25] Engel's article is "ihre Stellung zur Wissenschaft und ihre Aufgabe in der Geschichte," *Zeitschrift des Königl Preussischen Statistischen Bureaus*, 1862, vol. 2 (pg. 25-31). For additional commentary on this article, and on Engel's work more broadly, see Ian Hacking's book *The Taming of Chance* (Hacking 238) and George Davey Smith's article "Is the First Cut the Deepest? Ernst Engel on the Statistical Imperative of Embracing the Life Course Perspective" (Smith 1135).

nothing that Victorians would have considered immoral happens between the two, they will face social consequences upon their return. Eliot presents two possible receptions from the people of St. Oggs: if Maggie and Stephen have eloped, they will ultimately be accepted back into society, but if Maggie returns unmarried, she will be rejected while Stephen will still be accepted. For readers, this conundrum showcases the gender inequality that raged throughout Victorian society, particularly in rural areas. It also serves as an example of the way that people might misconstrue an outcome that is, from their experience, probable, with a less predictable one that has been affected by a series of factors, including the actor's own free will. Because "this has never happened before" (404), as Maggie's pretentious aunt will later fret about, they are unable to conceive of an alternative set of events and therefore can only imagine Maggie "in that degraded and outcast condition to which error is well known to lead" (397). Once they have made their judgment, they begin to mentally rewrite their own narrative of Maggie's past, saying that "there was always something questionable about her" (398). As in the gambling scene of *Daniel Deronda*, in which Gwendolen imagines that past success might guarantee her future, the people of St. Oggs imagine that there is a causal relation between unsupervised boat rides and the deflowering of a beautiful young woman. This superficial application of probabilistic thinking is similar to the fatalistic way that statisticians used yearly recurrent episodes of suicide as evidence of a natural law that might preclude individual circumstance and choice. What's more, the example from *The Mill on the Floss* draws attention to the human need to create a narrative that justifies a tenuously held belief. Eliot's narrator implicates the reader as well by suggesting that "we judge others according to results; how else?" (396). The narrator's use of the first person "we" heightens the effect of the plot's dramatic irony. Whereas the reader knows both the events and the internal conflict that drives Maggie's response to Stephen, the townspeople don't really

know the "results" of Maggie's excursion, even though they are all too ready to pass judgement. Instead, they conflate a generalization, and all kinds of assumptions, with the unique details of this encounter.[26] Nevertheless, in breaking the fourth wall by speaking to readers directly, the narrator challenges the audience to think differently about how they might apply similarly insufficient kinds of probabilistic reasoning in their own lives.

In *Daniel Deronda*, Eliot often examines statistical causation by giving different accounts of heredity and inheritance. In the gambling hall scene that I discussed above, Gwendolen's confidence in luck parallels that of the Italian, who seemed to have been born into success. Just after she imagines being adored by a cortege of followers, our lady suddenly sees her luck turn and with every roll of the dice, her losses increase. When she returns to her room, she finds a letter detailing her family's sudden financial downfall on account of an ill-advised investment scheme. Because the novel has already established a connection between heredity and monetary inheritance with its description of the people in the gambling hall, this sudden turn of events stands as a fitting echo of Gwendolen's own loss. The novel describes the effect of the letter on its recipient as "half-stupifying. The implicit confidence that her destiny must be one of luxurious ease, where any trouble that occurred would be well clad and provided for, had been

[26] In my chapter, I am using this instance of the temptation to substitute generalizations based on past experience as an example of failed probabilistic reasoning, and am comparing it to Buckle's statistical fatalism because both of these errors assume that recurrence is evidence of causality. The issue of causality is also one of the main concerns that 18th and 19th century philosophers discussed at length, and that influenced how statistical information was used in other fields. In his 1748 *Essay Concerning Human Understanding,* Hume thought about the limitations of the mind in relation to inference about the future based on the past, suggesting that "the effect is totally different from the cause and consequently cannot be discovered in it" (111). If we cannot rely on our notion of cause and effect, then we can't effectively use particulars that we have observed to generate either a general theory or a prediction about other particulars. J. S. Mill and William Whewell debated this problem intensely. According to Laura Snyder, "both Mill and Whewell took on the task of 'defining' science, and much of their debate over science involved the characterization of its method and aims" (Snyder 2). Part of their debate had to do with induction and the process for abstracting general principles from experience. Mill denied the possibility of inferring general truths from particulars, an argument that resonates with Hume, Engel, and even Eliot in this instance, who expressed concern about the overzealous generalizations that some people made based on limited observation of particulars.

stronger in her own mind than in her mama's, being fed there by her youthful blood and that sense of superior claims which made a large part of her consciousness" (11). In this description, the word "blood" not only has reference to her age, but also to her status as an heiress. The words "blood" and "claims" set side-by-side reinforce the connection between birth and wealth. For Gwendolen, as we are beginning to see, birth does not always have a causal connection to a given outcome. Whereas she has inherited her beauty and her fortune and her disposition—that of a haughty heiress—seems fitting for the place she occupies on the social chain. Prior to this moment, we might have reasonably assumed that, notwithstanding the desires she expresses to the contrary, she will likewise end up living the life that nature has set before her.

As a figure that vacillates between conforming to convention and defying it, Gwendolen might be thought of as an apt case study for examining the limitations of probabilistic thinking when applied to individual cases. She recognizes that wealth affords a woman many opportunities for agency and experimentation than poverty and embraces that portion of her birthright. However, in other ways, Gwendolen is intent on defying expectations and making her own way in the world, always looking for opportunities to resist the social forces that might otherwise determine her fate. When her mother chastises her for riding her horse recklessly, lamenting that her "father died by an accident," Gwendolen points out that "children don't take after their parents in broken legs" (62, 63). This reference to heredity, although true, showcases one way that intense emotion (fear, in this case) can lead someone to find causal connections using models of heredity, even when they aren't there.

Perhaps Daniel Deronda's portion of the narrative is an even more salient example of how Eliot intervenes in the debate over genetic predispositions and the causal link between an individual and the various groups to which they belong. The chapter in which Daniel re-enters

the story occurs more than one hundred twenty pages into the novel and begins by recalling Gwendolen's gambling scene. Just as Gwendolen is depicted as unique in some respects, the novel offers a portion of Daniel's backstory, explaining that "Deronda's circumstances, indeed, had been exceptional" (136). Daniel doesn't know his parents, and has been raised by Sir Hugo Mallinger. He fears that there exists "something about his birth which threw him out of the class of gentlemen to which the baronet belonged" (142). When Sir Mallinger tells Daniel that he will go to a public school in preparation for university, Daniel takes the moment as significant, almost as if his caretaker is passing down a birthright. The young boy realizes that "he [is] meant to be a gentleman" after all, and that "in some unaccountable way it might be that his conjectures were all wrong. The very keenness of the lad [teaches] him to find comfort in his ignorance. While he [is] busying his mind to the construction of possibilities, it [becomes] plain to him that there must be possibilities of which he [knows] nothing" (144). In his youthful anxiety over parentage, Daniel's primary concern has to do with making a connection with the section of the population to which his caretaker, a man he calls his uncle, belongs. His desire to be classified as a gentleman has less to do with money or power and more to do with kinship and belonging. Notably, the text specifies that Daniel is "meant" to be a gentleman, rather than that he "will" be a gentleman. This language gestures backward instead of forward in time, and reveals that Daniel is seeking group membership with its consequent norms. Arising out of this affirmation of his identity, his subsequent train of thought represents a shift in his mindset. He doesn't jump to the conclusion that his participation in the class of gentlemen has a causal connection to his past, and he finds peace with the fact that the "results" of his life don't account for the causes that contributed to them. By recognizing the difference between a given social class and the

possibilities that would allow a person to join that class, Daniel acts as a model for separating inheritance from heritage and, by extension, particularity from generalization.

Although the passage above uses language that is only peripherally related to mathematical probability, Daniel's careful and precise way of thinking about causality aligns him with its principles. As a student at Cambridge, in fact, he "[applies] himself vigorously to mathematics" but becomes dissatisfied because he finds that his "inward bent towards comprehension and thoroughness [diverges] more and more from the track marked out by the standards of examination" (150). Daniel's divergence from mathematics and the obsession with standard testing acts as a critique of education, and of the way that mathematics might appear prestigious while falling short of embracing a fully informed approach to objectivity and truth. Over a relatively short time, Daniel becomes enamored of the idea to study "universal history" so that he can overcome the "merely English attitude in studies" and "understand other points of view" (150, 154). His desire to explore the world outside of his English background surely foreshadows the eventual discovery that Daniel was born Jewish, but in the context of the other ways that he suspends judgement in order to gather additional information, this also demonstrates how widening one's point of view tends to open possibilities and keeps them from making unfounded assumptions.

In the above examples, Daniel hesitates to adopt heredity and inheritance as reasons for accepting a fatalistic view of his life. His impulse toward freedom shares this in common with Gwendolen's aversion to being seen as predictable. In a conversation between Gwendolen and Rex, one of her admirers, she reveals both her overarching consciousness of social expectations and her desire to elude them. When he asks whether she intends to run with the hounds, an

activity that many consider dangerous and unbecoming of a lady, she talks instead about her wish to defy probability:

> 'Anna had got it into her head that you would want to ride after the hounds this morning,' said Rex, whose secret associations with Anna's words made this speech seem quite perilously near the most momentous of subjects.
>
> 'Did she?' said Gwendolen, laughingly. 'What a little clairvoyant she is!'
>
> 'I don't know. I can't tell what I shall do till I get there. Clairvoyants are often wrong: they foresee what is likely. I am not fond of what is likely; it is always dull. I do what is unlikely.'
>
> 'Ah, there you tell me a secret. When once I knew what people in general would be likely to do, I should know you would do the opposite. So you would have come round to a likelihood of your own sort. I shall be able to calculate on you. You couldn't surprise me.'
>
> 'Yes, I could. I should turn round and do what was unlikely for people in general,' said Gwendolen, with a musical laugh.
>
> 'You see you can't escape some sort of likelihood. And contradictoriness makes the strongest likelihood of all.' (56-57)

While on the one hand, Gwendolen seems to be acting contrary in this passage simply for the sake of toying with Rex, her repeated emphasis on what "people in general" do reveals the degree to which she already feels hemmed in by social norms. Her resistance to them isn't, as she will later claim, that she does what pleases her, but that her life feels so predetermined that she wants to rebel in any way she can. Unlike Gwendolen, whose talk of "likelihood" relies mostly on subjective interpretation, Rex thinks of likelihood in a more mathematical sense. He wants to be able to "calculate" the probability that she will behave in a given way, and capitalizes on the

observation that if Gwendolen continually bases her actions on what everyone else does (whether she does similarly or the opposite), her actions will always fall into a statistical category. Either she will be among the majority or the minority. Neither of these options remove her from the realm of the possible. Because Gwendolen begins the conversation with Rex already feeling trapped by societal and familial expectations, Rex unknowingly exacerbates the problem when his allusions to number imply an even stronger causal relationship between her actions and her position in society. Thus, it is perhaps unsurprising that only a few minutes later Gwendolen does indeed decide to ride with the hounds. Although this little act of rebellion is predictable, the freedom of galloping in the English countryside may feel to her like the only semblance of freedom she has recourse to. Gwendolen's preoccupation with predictability seems like a reaction to discomfort with the idea that "statistical research accompanies the individual throughout his entire earthly existence," as Engel claims, and her fear that the gender and class to which she belongs have too much power in determining her life.

Future Probabilities

As we have seen, one of Gwendolen's biggest shortcomings is that she pays far too much attention to what people do in general. What's more, the novel seems to share this obsession. In its pages, we find thirty-one references to people "in general," thirty-five instances of a character speculating on how people are "generally," and over a hundred mentions of human "nature" or a particular character's nature. However, at one point the narrator does pause to clarify the novel's perspective on representation and the problems with presuming to speak in universals. Even though novel examines probabilities and the way that societal norms influence an individual, the narrator entreats the reader to observe that "nothing is here narrated of human nature generally; the history in its present stage concerns only a few people in a corner of Wessex" (75). When it

characterizes English people generally, it explains that "we English are a miscellaneous people, and any chance fifty of us will present many varieties of animal architecture or facial ornament" (85). Thus, the novel acknowledges its own limitations in forging a link between the common and the absolute, both with regards to people and to events.

In contrast, Gwendolen's sense of self seems to hinge on a belief that she can make predictions based on her knowledge of people generally. Her failure to predict her own future in the gambling hall, then, foreshadows similar failures in interpersonal situations later in the book. Two of her biggest errors have to do with her ability to discern the intentions of young men, including Daniel Deronda, Rex Gascoigne, and Henleigh Grandcourt. After noticing Daniel for the first time, she recognizes that "he is not like young men in general" and asks another man about him. The other man, in response, asks whether she "admire[s] young men in general," to which she replies that she doesn't in the least because she "always know[s] what they will say. [But she] can't at all guess what this Mr. Deronda would say" (9). Gwendolen has the unfounded confidence of a gambler when it comes to young men. She neither knows what they will say, nor does she know how she will react. When Rex visits her home to express his love for her, she responds "fiercely", even though she "could not have foreseen that she should feel in this way" (67). Not only does she fail to predict what they will say, but she also fails to predict how she will respond! By conflating subjective interpretation with general principles, Gwendolen sets herself up for confusion and pain.

Unlike Daniel and Rex, both of whom have good intentions, Grandcourt represents the most dangerous encounter Gwendolen will have with a potential suitor. As before, she cannot anticipate her own response to him. In addition to their conversation, the scene in which they meet contains a series of parenthetical pauses, through which the reader witnesses a complete

shift in her perspective toward marriage. Her early thoughts focus primarily on his social position and attractiveness, but they progress into an interior conversation about whether marrying him might actually be a good idea:

> (Pause, wherein Gwendolen recalled what she had heard about Grandcourt's position, and decided that he was the most aristocratic-looking man she had ever seen.)
>
> . . . (Pause, during which Gwendolen thought that a man of extremely calm, cold manners might be less disagreeable as a husband than other men, and not likely to interfere with his wife's preferences.) (91)

These interior speculations prove most dangerous because "Gwendolen had no sense that these men were dark enigmas to her, or that she needed any help in drawing conclusions about them—Mr Grandcourt at least" (101). Although this scene might certainly be thought of as one that illustrates the difficulty that someone might have in interpreting the interior thoughts and motives of other people, it also has important implications for Eliot's commentary on probability. Gwendolen's unsuccessful attempt at predicting what Grandcourt will be like after marriage demonstrate the degree to which decisions based on "general principles" seldom account for the myriad of factors that contribute to an individual's beliefs and choices. Daniel's birthmother will later respond to his question about her motives by exclaiming, "Oh—the reasons of our actions! . . . 'When you are as old as I am, it will not seem so simple a question" (529).[27]

[27] Princess Halm Eberstein's full explanation is worth quoting: "'Oh—the reasons of our actions!' said the Princess, with a ring of something like sarcastic scorn. 'When you are as old as I am, it will not seem so simple a question—'Why did you do this?' People talk of their motives in a cut and dried way. Every woman is supposed to have the same set of motives, or else to be a monster. I am not a monster, but I have not felt exactly what other women feel—or say they feel, for fear of being thought unlike others." (529) This example of individual variation is reminiscent of the error that the townspeople in *The Mill on the Floss* made when they made assumptions about Maggie's morality based on the fact that she and Stephen hadn't returned promptly from their boating excursion. Because circumstances, values, and disposition vary from person to person, similar actions don't imply similar motives. They are even less likely to indicate that an underlying natural law has caused such different people to act in similar ways.

The warning that we might garner from Gwendolen's errors in predicting Grandcourt's post-marital evolution resonates with one of Charles Darwin's clarifications about natural law. In the introduction to *The Variation of Animals and Plants under Domestication* (1868), he writes that he has "often personified the word Nature; for [he has] found it difficult to avoid this ambiguity; but [he] mean[s] by nature only the aggregate action and product of many natural laws,—and by laws only the ascertained sequence of events" (Darwin 6). Darwin's work on natural selection had been influenced by Sir Charles Lyell and his well-known book, *The Principles of Geology*. Although early geologists certainly shared in the excitement about consistent immutable laws which influenced all branches of science in the early nineteenth century, they studied geological events that took place in a certain time and under certain circumstances. By the early twentieth century, geologists had distanced themselves somewhat from the earlier notion of natural laws (Bucher 491). Darwin, like geologists and researchers in other fields had begun to realize that such a notion contributed to unsupportable assumptions about causality and allowed bias to creep into prediction.[28] By offering detailed and specific explanations of how they understand natural laws, these scientists began to mitigate some of the misperceptions that had percolated throughout society.

Conclusion

Even though clear definitions can help to clarify the limits of probability and the other scientific domains that rely on statistical data and prediction, literature and art offer alternative methods for encouraging critical and conscientious responses to such concepts. For Eliot, an important element of representation was focusing on individual variation and the way that a

[28] In 1869 Sir Francis Galton published a book called *Hereditary Genius*, which mobilized Quetelet's methodology to show that talent runs in families. This book was one of the earliest investigations of how the laws of heredity might be harnessed in order to produce a generation that would have superior traits. Galton coined the term "eugenics" in 1883.

network of people within a given area influenced one another. As we have seen in *Daniel Deronda,* by showcasing two characters with similar traits but very different outcomes, she draws attention to the way that agency and individual circumstances can influence results. Gwendolen and Daniel both express a desire to escape the limitations of their social and economic position in the world, but they have been born with different racial and gender profiles, and they take vastly different approaches. The novel's repeated references to probability, generalizations, and gambling; its way of representing characters' fears and motives; and its preoccupation with science and natural law combine as a condemnation of the way that scientists and common-folk alike misunderstood statistical observation and probabilities as offering full insight into the psychological interior of individuals.

Similar to writers whose work I have analyzed in other chapters of this dissertation, Eliot uses the language of probability as a way to examine the group norms and dynamics that influence and often oppress individuals within their ranks. In doing so, she at once illuminates the potential for responsible statistical practice and condemns the mistakes researchers and political leaders often fall into when they fail to revise and replace uninformed and uncharitable attitudes.

Eliot's interest in science and statistics contributes to the structure of *Daniel Deronda*, which allows her to work within and against the traditional form of the multiplot novel. Many scholars agree that Eliot's fictional writing approaches realism in a unique way. In a recent essay on Eliot's epigraphs, Anna Torvaldsen writes that these introductory remarks "exploit their position on the textual margins to delimit a more open-ended realist framework" (Torvaldsen 180). In contrast, Ian Duncan has argued that "Eliot's last novel presses beyond the bounds of realism into a kind of science fiction" (Duncan 17). Whether we consider this novel as

representing a broader, more inclusive form of realism, or as a version of the multiplot novel that occupies the outskirts of its genre, Eliot's use of the form serves a very specific purpose in relation to the statistical ideas that she addresses in the text. In an unpublished essay titled "Notes on Form in Art" (1868), Eliot highlights the importance of acknowledging difference. She writes that "form, as an element of human experience must begin with the perception of separateness" (Eliot, "Notes on Form in Art" 232). Because recognizing difference is so essential to human experience, it must also occupy an important role in artistic representation. She goes on to explain that in art, form consists of "the relation of multiplex interdependent parts to a whole which is itself in the most varied and therefore the fullest relation to other wholes" (232). By alternating between plots, Eliot's novel preserves the independence of its characters while simultaneously acknowledging their connectedness. *Daniel Deronda* begins by setting its two protagonists side-by-side, with Daniel observing Gwendolen at the beginning of the first chapter, and Gwendolen observing Daniel at the end of the chapter. Because their relationship remains platonic throughout the entire story, despite any intimations about their mutual interest, the novel preserves their difference to the end. Eliot's final novel does, indeed, take up certain aspects of science fiction, both because it offers scientific commentary as I have discussed above, and because it operates using a statistical perspective. Like statistical observation at its best, Eliot's novel offers a representation of people in a specific time and place, examining the way in which individuals operate within their given categories. It seeks to examine sequences of events without making overgeneralizations. By moving from one narrative to another, one data set to another, it demonstrates interconnectedness without giving way to fatalism.

Eliot's novel encompasses a response to probability as it developed. Early nineteenth-century novelists like Mary Shelley saw probabilistic thought as a potential solution for

reconciling social laws with the consistency and reliability of natural physical laws. Mid-century writers examined statistics and probability in their capacity to facilitate social reforms by incorporating probabilistic methods into genres that exemplified progress and heightened penetration of the human mind, such as the analytical essay and detective fiction of Florence Nightingale and Mary Elizabeth Braddon. Later in the nineteenth century, even as statistics gained status as an essential part of the rigorization of scientific disciplines and the development of sociology and psychology, and many writers including George Eliot expressed optimism about its potential, they also expressed concern about the political and social implications of how statistics and probability were being used. George Eliot's response to emergent mathematical and scientific ideas shed light on many pressing social problems of her day and continues to encourage readers to value difference.

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