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Stephen Kern: A Cultural History of Causality

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INTRODUCTION

THE QUESTION behind all other questions is the “why?” of human experience. The newborn’s mind gropes for primordial understanding of the causal links between reaching out and human touch, crying and a mother’s soothing voice, sucking and relief from hunger. Causal inquiry drives children’s endless why questions as they try to make sense of life. While scientists try to limit themselves to the how of phenomena, an ultimate why lies behind all their observations and experiments. The concept of causality grounds physicists’ study of subatomic events and astronomers’ probing of the cosmos. Theologians look to God for ultimate first and final causes, while believers pray to God to modify miraculously the course of everyday causality. Psychiatrists struggle to discover why their patients become ill, just as historians investigate why wars break out and why civilizations rise and fall. Novelists build stories around motivation, which is the driving force for their characters’ thoughts and actions. Causality is thus a centerpiece of the inquiring human mind, so fundamental to human understanding and so universal in its explanatory function that it would seem to transcend any historical development. This book ventures into such a history.

In the years since 1830, European and American thinkers transformed understanding of the causes of human behavior. These changes are evident in novels as well as in genetics, endocrinology, physiology, medicine, psychiatry, linguistics, sociology, economics, statistics, criminology, law, philosophy, and physics. Other researchers have studied changing ideas about causality in these specific areas, but no one has tackled a broad cultural history of this concept as my book undertakes to do.¹

The thought of writing a history of causality first occurred to me in 1970, when I read an article by Henri Ellenberger on three types of mental illness that philosophically oriented psychiatrists interpreted in terms of defining causal modes.² A causality of determinism dominates the depressed person, for whom everything seems to result from the pressure of circumstances over which he or she has no control. A causality of chance dominates the manic, for whom nothing happens according to any deterministic order and the future looms fraught with possibility—unpredictable and anxiety-provoking. A causality of intentionality

dominates the paranoid, for whom nothing is the result of chance and everything is caused by menacing thoughts and deeds directed toward the patient.

Ellenberger's speculation that a mental breakdown might be related to the way causality was experienced suggested the deep constitutive power of causal understanding. His notion that individuals experience causality in different ways suggested that historical eras might experience it and try to understand it in distinctive ways. A literary source base for a history of changing ideas about causality occurred to me when I realized that the novelists who did most to define literary modernism—James Joyce, Marcel Proust, and Virginia Woolf—rejected the plot-driven novel and created novels that instead concentrated on the inner life of characters. Their work diminished the role of external pressures and specific motives such as those that had structured the naturalist novels of Émile Zola and Thomas Hardy, in which characters are governed by social, biological, and psychological forces. That literary shift suggested a cultural pivot for a history of causality.

But causal factors and motives were too broad a focus, because there are so many of them for countless possible human actions. For more than fifteen years, while working on two other books, I searched for a way to deal with the many causal determinants for the myriad human behaviors that historical experience includes. I eventually realized that such a history would have to focus on a single act in order to document historically distinctive thinking about its causes. But what was that act?

I discovered it in Roy Jay Nelson's study of causality in the French novel, which briefly discussed a novel by André Gide, *Lafcadio's Adventures* (1914), about an unusually motivated murder.³ While reading that novel I realized that murder suited my analytical purposes because, compared with other acts, it is exceptionally vivid and important and in most cases sharply focused in time and space. Murder superbly illustrates the various characteristics that action theorists offer to explain human behavior, because it is strongly intentional, highly motivated, full of meaning, the result of a desire or a "trying," directed at a clear goal, and usually "done for a reason."⁴ By focusing on murder, an act that remains relatively consistent over time, I could focus on historically changing ideas about its causal factors. Murder further lends itself to historical analysis because in life and literature after 1830 it attracted increasing attention to its causal circumstances and motives among a

number of new professionals: criminologists, sociologists, detectives, statisticians, and forensic psychiatrists, as well as writers of detective fiction (whodunits) and crime novels (whydunits). The history of ideas about the causality of murder over these years also includes a number of new explanatory concepts: monomania, moral insanity, diminished responsibility, irresistible impulse, born criminal, sadism, unconscious determination, and childhood sexual trauma.

In Gide's novel the hero attempts to break the conventional path to murder by intentionally killing without a motive, or at least without a conventional motive such as money or revenge. While sitting in a train, Lafcadio realizes that to kill the stranger who appears in his compartment, he has only to release the door latch and give a push and the man will plunge to his death. Inspired by the prospect of committing a "motiveless crime" (*crime immotivé*), Lafcadio flicks the latch and pushes the man to his death. In contrast to Zola's murderers, who kill because of an irresistible hereditary taint or overwhelming biological, psychological, or social forces, Gide's hero kills for the sole reason of killing without a reason. Gide further challenged Zola's explanatory technique through another character, the novelist Julius, who, in expressing his literary aim to Lafcadio, articulates Gide's own approach: "I used to demand logic and consistency from my characters, . . . [but] it wasn't natural." People are neither logical nor consistent. With respect to murder, Julius specifies, "I don't want a motive for the crime—all I want is an explanation of the criminal. Yes! I mean to lead him into committing a crime gratuitously—into wanting to commit a crime without any motive at all."⁵ Here Julius overstates his case, because Lafcadio's murderous act is indeed motivated, but the motive is, as Gide subsequently explained, not subject to the sort of "ordinary psychological explanation" that occurs in naturalist novels.⁶

Later Gide clarified misunderstanding about his notion of the "gratuitous act" and rejected the notion that it might explain a crime. "I personally do not believe in the gratuitous act, an act motivated by nothing. That is essentially inadmissible. There are no effects without causes. The words 'acte gratuit' are a *provisional* label [étiquette *provisoire*] that seems convenient to designate acts which escape ordinary psychological explanations, the gestures not determined by simple personal interest (and it is in this sense, in playing with words a little, that I can speak of *disinterested* acts)."⁷ Julius's explanatory excess highlights Gide's main goal, which was to dramatize the unpredictable nature of

human action in contrast to the way the characters in naturalist novels behave when governed by external circumstances or driven by inner motives.⁸ Thus Lafcadio's odd murderous act was an event of enormous cultural historical significance, which became clearer as I explored its larger context in the work of Gide and beyond.

In addition to assailing the strong determinism of the naturalist novel with his literary efforts, Gide's life and thought challenged a spectrum of causal foundations of Western civilization: political, religious, sexual, familial, monetary, and legal. Born into a patriotic and pious French Protestant family, Gide abhorred imperialism and became an atheist. He defied sexual convention as the first prominent French intellectual to acknowledge his homosexuality in print. He married a cousin but never had sex with her and later intentionally sired a child out of wedlock. His novels questioned the privileges of patriarchal authority by mocking cold and menacing fathers. In *The Counterfeiters* (1925), he subverted conventional family values when he wrote that he preferred to see his characters as orphans, "unmarried, and childless."⁹ That novel also exposed the artifice of the gold standard by suggesting that the art of the novel is analogous to counterfeiting and that art, like money—even gold—has no real backing, no guaranteed frame of reference.¹⁰ His novels about crime challenged the French legal system that his father embodied as a professor of law at the Sorbonne. By presenting Lafcadio's murder as not determined by "simple personal interest" (or "disinterested"), Gide subverted the conventional narrative strategies of the naturalist novelists and underscored the open-ended nature of human action.¹¹ These innovations from a man who grew up at the center of French high culture suggested a broad source of evidence for a history of causality. Perhaps, I thought, other murder novelists might have also challenged the received deterministic ideas relating to causality that Gide challenged in his novel and have offered new ways of rendering the causes and motives for human action. Perhaps a survey of murder novels might reveal some unifying logic to this history.

In reading over a hundred murder novels, I found that nineteenth-century novelists typically crafted clear and strongly deterministic causal factors, either singly or in clusters. Some of their murderers are driven by a single dominant factor, frequently described with the new diagnostic category of monomania, which the French psychiatrist J.-E.-D. Esquirol identified early in the century and which one character in Dostoevski's *Crime and Punishment* (1866) used to explain Raskolnikov's

act of murder. That tag suggesting a strong linear determinism was used by other novelists to explain a murderous impulse, as in *Moby Dick* (1851) where Melville repeatedly describes Ahab as a monomaniac, and Ahab himself explains that “the path to my fixed purpose is laid with iron rails whereon my soul is grooved to run” (147). Other nineteenth-century novelists explained murders as the result of interlocking deterministic causal factors such as poverty and revenge in Dickens’s *Oliver Twist* (1838) or heredity and sexual perversion in Zola’s *La bête humaine* (1890).

In contrast, modernists complicated and subverted these causal factors in many ways. In *Heart of Darkness* (1899), Joseph Conrad characterized the intentions behind Kurtz’s acts of killing and head-hunting as “inscrutable” and “incomprehensible,” and he repeatedly referred to the murderous imperialist venture itself as “absurd.” In Robert Musil’s *The Man without Qualities* (1933), the motives of the deranged murderer Moosbrugger are a chaotic mixture of self-defense, self-definition, and sexual panic. Jean-Paul Sartre questioned the motive underlying a political assassination when in *Dirty Hands* (1948), Hugo explains, “I killed him because I opened the door,” and then wonders, “Where is my crime? Does it exist?”

While modernist detective stories are more concerned with who did it than why, they nevertheless also subvert conventional plotting, which in earlier detective stories was based on a clear motive trail of cause and effect leading ineluctably to the murderer as in the tidy concluding explanations of Sherlock Holmes. Thomas Bernhard’s *The Lime Works* (1970) clouds any clear understanding of the motives for a murder by basing an entire murder investigation on unreliable hearsay accounts from characters whose senses are flawed and whose accounts are contradictory. In Carlo Emilio Gadda’s *That Awful Mess on Via Merulana* (1957), about a grisly murder that never gets solved, the detective believes that crimes are never the consequence of single motives but are “like a whirlpool, a cyclonic point of depression in the consciousness of the world, towards which a whole multitude of converging causes have contributed.” He elaborates that investigative theory into a more general philosophical claim that we must “reform within ourselves the meaning of the category of cause” (5). Friedrich Dürrenmatt’s *The Pledge*, subtitled *Requiem for the Criminal Novel* (1958), is indeed just that, because it fatally ridicules the entire rational framework of such novels—coherent plots, clear motives, genius detectives, even causal

reasoning itself—and in the end the murders are solved by nothing more than dumb luck.¹²

Reading these novels revealed that from the nineteenth century to the twentieth century understanding of the causes of murder in them shifted in five interrelated ways. That multifaceted shift is the thesis of this book—namely, that causal understanding moved in the direction of increasing specificity, multiplicity, complexity, probability, and uncertainty.

The historical significance of these changes can be seen if they are viewed against the dominant thinking about causality in the preceding period, which I begin to trace in 1830, when August Comte published the first volume of his *Course in Positive Philosophy*, an influential statement of the positivistic epistemology and determinist philosophy of science that dominated Victorian thought.¹³ In that same year Charles Lyell published *Principles of Geology*, which demonstrated that geological phenomena are caused by gradual and uniform forces acting according to continuously operating laws. Soon thereafter, social researchers applied positivist methods to show that “moral facts” were subject to behavioral laws similar to physical laws.¹⁴ The first cited reference to *determinism* in the *Oxford English Dictionary* is dated 1846. Balzac underscored the deterministic philosophy that informed his novels. “In this world,” he wrote, “every effect has a cause and every cause a principle, every principle is dependent upon a law. The principles which have created extraordinary men can be studied and known.”¹⁵ In 1851 the novelist George Eliot expressed her confidence in a deterministic causal order of nature in terms of “undeviating law in the material and moral world,” an “invariability of sequence,” and an “inexorable law of consequences.”¹⁶ A materialist-determinist causality dominated much scientific research, in accord with the view of the German physiologists Emil du Bois-Reymond and Ernst Brücke in 1842 “that in the organism no other forces are effective than the purely physical-chemical.” Five years later they were joined by the biophysicists Hermann von Helmholtz and Carl Ludwig and collectively resolved to “constitute physiology on a chemico-physical foundation and give it equal scientific rank with physics.”¹⁷

While there was spirited resistance to such a materialistic determinism that would reduce explanation of all phenomena to matter in motion, especially explanations of human behavior, it nevertheless shaped thinking throughout the remainder of the century.¹⁸ In England, as Frank Turner noted, it was “part of a general cult of science that swept

across Europe during the second half of the nineteenth century and that was associated with the names of Renan, Taine, Bernard, Büchner, and Haeckel.”¹⁹ An evolutionary determinism was reinforced by the enormous impact of Darwin’s theory beginning in 1859. A materialistic determinism applied to mental life peaked with the “mental physiologists” such as Henry Maudsley, who, in 1874, argued that “lunatics and criminals are as much manufactured articles as are steam-engines and calico-printing machines.”²⁰ The French essayist and fictionist Paul Bourget elaborated such thinking in his novel *The Disciple* (1889), which ridiculed the extreme positivism of one arrogant character, who updated Pierre Laplace’s famous determinist hypothesis of 1814 in speculating that “if we could know correctly the relative position of all the phenomena which constitute the actual universe, we could, from the present, calculate with a certainty equal to that of the astronomers the day, the hour, the minute when England will evacuate India . . . or when a criminal, still unborn, will murder his father.”²¹ A physics based on classical mechanics, thermodynamics, and electrodynamics filled out the determinist model with an explanatory system that could account for, and in many cases predict, a spectrum of phenomena such as planetary orbits, tides, trajectories, heat, light, and magnetism. Hard determinists believed that biological and even psychological and social phenomena could be reduced to matter in motion governed by lawlike mechanical forces in addition to electromagnetic, thermodynamic, and gravitational forces. These philosophical and scientific ideas were the foundation for the spectacularly successful positivist-determinist framework of nineteenth-century economy and society as well as its life and thought.

Against this sketch of the highlights of nineteenth-century positivism, reductionism, determinism, and materialism, I offer, by way of introduction, a sampling of evidence for my thesis about the increasing specificity, multiplicity, complexity, probability, and uncertainty of causal understanding that challenged this earlier model.²² These changes are evident in the murder novels as well as in the history of science and systems of thought.

Increasing specificity includes modern novelists’ invocation of the explanatory knowledge of new professional specialists such as forensic scientists, endocrinologists, sociologists, and neuroscientists. In these and other areas, the increasing specificity includes more precise and in some instances more valid causal explanations, such as the way modern

genetics specified more precisely and accurately the causal action of chromosomal DNA in contrast to the invalid nineteenth-century theory that hereditary traits are transmitted by mixing male and female sexual fluids. Specificity was also a function of the increasing division of labor in academic disciplines and professions. In addition to those new disciplines concerned with the causes of murder, already mentioned, others emerged that analyzed causality more broadly: molecular biology, biochemistry, nerve electrophysiology, bacteriology, epidemiology, existential phenomenology, and modern probability theory.²³

These new specialists identified an *increasing multiplicity* of causal factors from their respective sciences and systems of thought.²⁴ In 1907 Henry Adams described a new “multiverse” brought about by modern science. “The child born in 1900 would, then, be born into a new world which would not be a unity but a multiple.”²⁵ He was referring to the newly discovered forces and processes at work in a human being, but the new sense of living in a “multiverse” came from the identification of many new forces and causal factors from new ways of thinking. In subsequent years, linguists probed new causal functions of language in structuring basic concepts and individual behavior. Sociologists identified multiple ways in which society impinges on behavior from the immediate environment to broad social forces. In biological sciences increasing multiplicity included the identification of new causally acting entities, such as the approximately thirty thousand genes, several hundred hormones and peptides, and fifty neurotransmitters. Forensic psychiatrists, beginning with Richard von Krafft-Ebing, identified new varieties of sexual pathology that led to bizarre sex crimes. Modern criminal profilers drew on increasingly precise and enormous data banks to reconstruct the etiology of murder for purposes of police investigation. Psychoanalysis elaborated a detailed nomenclature of psychosexual etiology which influenced how some novelists made sense of their characters’ behavior. In some areas, however, modern science reduced the number of causal factors. Many nineteenth-century medical and psychiatric researchers elaborated long lists of causes of diseases because they had no clear understanding of their specific etiology. The contribution of the germ theory of disease reduced the causes of diseases to single specific organisms, offering one particularly clear example of the progress of causal understanding as a reduction and simplification rather than a multiplication of causal factors. It should be added, though, that in identifying specific germs, scientists vastly increased the number of specific etiologies for an

increasing number of specific diseases. The larger picture is therefore one of a dramatic increase in the number of causal factors identified ever more precisely by new sciences (such as genetics and sex endocrinology), as well as new systems of thought (such as psychoanalysis and sociology).

Increasing complexity was a consequence of efforts to integrate these new causally acting entities and forces in comprehensive systems. In 1902 the French physicist Henri Poincaré connected the increasing specificity and complexity of recent scientific knowledge in noting that “we are continually perceiving details ever more varied in the phenomena we know, where our crude senses used to be unable to detect any lack of unity. What we thought to be simple becomes complex, and the march of science seems to be towards diversity and complication.”²⁶ A few years later Henry Adams listed the many causal forces that must be taken into account in addition to electrical forces: thermal, magnetic, chemical, osmotic, cohesive, elastic, vibratory, capillary, and sexual. Science has found that forces “sensible and occult, physical and metaphysical, simple and complex, surround, traverse, vibrate, rotate, repel, attract, without stop.” He concluded that “a historian after 1900 would think in complexities unimaginable to an earlier mind.”²⁷ More recently the historian of science Gerald Holton concluded that “it is as if after a successful search for simplicities and harmonies in science over the last three centuries, the search has turned to a more direct confrontation of complexity and derangement, of sophisticated and astonishing relationships among strangely juxtaposed parts.”²⁸

Around the mid-twentieth century researchers began to explore complex feedback systems under the general rubric of cybernetics. Modern systems theory and, later, chaos theory were based on the interactive causal action of complex systems. In the last thirty years computers have enabled scientists to solve nonlinear problems and to understand more fully the complex systems of such phenomena as heart fibrillations, population ecology, and weather patterns. In consequence, as Alan Beyerschen noted, “the rise of an aesthetic of complexity in science” has made “a significant challenge to the primacy of simplicity.”²⁹ Some researchers applied a nonlinear causality to the human sciences, emphasizing that culture emerges as a series of causally interactive feedback loops, making it possible for individuals to “transform nature or society in dramatic and unpredictable ways.”³⁰ Prior to around 1980, complexity referred to something complicated, with many layers of meaning that are difficult to

sort out; after that time it began to refer to the specific science of adaptive and self-organizing systems in which the whole is greater than the sum of its parts. In 1984 the Santa Fe Institute was founded to explore such complex systems.

Modernist fiction, as David Lodge argued, “eschews the straight chronological ordering of its material [and] tends toward a complex or fluid handling of time, involving much cross-reference back and forward across the temporal span of the action.”³¹ In 1925 Virginia Woolf made a classic statement among modernist novelists on the need to move from a linear to a nonlinear narrative form that does justice to the complexity of experience: “If a writer were a free man and not a slave, if he could write what he chose, not what he must, if he could base his work upon his own feeling and not upon convention, there would be no plot, no comedy, no tragedy, no love interest or catastrophe in the accepted style. . . . Life is not a series of gig lamps symmetrically arranged; but a luminous halo, a semi-transparent envelope surrounding us from the beginning of consciousness to the end. Is it not the task of the novelist to convey this varying, this unknown and uncircumscribed spirit, whatever aberration or complexity it may display?”³² Joseph Conrad and Ford Madox Ford made similar appeals.³³ The novels of Proust and Joyce attempted to capture the luminous halos of life across time and space in ways that would have been unthinkable to earlier realists. Later in the twentieth century Vladimir Nabokov, Jorge Luis Borges, and Thomas Pynchon explicitly invoked scientific field models for causal action to create novels based on what N. Katherine Hayles subsequently characterized as a “cosmic web.”³⁴

The increasing specificity, multiplicity, and complexity of causal knowledge was made more calculable with the computer and made more visible by other new research technologies, beginning with X rays around the turn of the century. Later, with the widespread use of electron microscopes in the 1950s, biologists were suddenly able to observe numerous subcellular structures that had been invisible through light microscopes. Within a decade they amassed an array of high-resolution photographs of different types of cells, revealing a vast new realm of life processes. Since that time researchers worked to understand the causal functions of the structures that first appeared in these early electron micrographs along with other causally significant processes. More causally acting entities and processes throughout the body and the brain were revealed by the electroencephalogram (EEG) in 1929 and a series of

breakthroughs in the 1970s: computerized axial tomography (CAT), magnetic resonance imaging (MRI), and positron emission tomography (PET).³⁵ These technologies produced more exact knowledge of ever smaller structures and functions never before viewed so precisely, and in so doing they raised questions about complex interactions that constitute the cellular and molecular springs of human behavior and thought.

Increasing probability refers to new interpretations of chance in the novel and to probabilistic explanations in science. In the nineteenth-century novel, chance or coincidence was invariably a sign of some transcendent controlling destiny if not divine plan.³⁶ In the modern novel, chance is more often evidence of life's fundamentally stochastic nature and the absence of any ultimate designing mind.³⁷ Nineteenth-century sciences were themselves increasingly probabilistic. The kinetic theory of gasses, Darwin's theory of evolution, Mendel's experiments on hereditary transmission, and sociological studies of suicide and crime by means of "moral statistics" all involved probabilistic calculations. Modern probability theory refined the statistical techniques for dealing with such probabilistic explanations. For example, early nineteenth-century phrenologists believed that enlarged "organs" of the brain directly cause the increasing activity and importance of the individual faculty supposedly located in them. Modern neuroscientists exposed such erroneous confusions of correlation with causation and made probabilistic causal analyses of the relative causal role of brain anatomy, neuropeptides, neurotransmitters, and environmental stimuli in the determination of behavior. Such calculations were made possible by what historians of science have called "the probabilistic revolution," which centered on developments among statisticians who, in the generation around 1900, refined and developed a number of new techniques for calculating probabilities, including standard deviation, the chi-square, analysis of variance, and the t-test and its distribution.³⁸ These techniques revolutionized social science and made it possible to assign magnitudes to a variety of causal factors impinging on single events and thereby determine the statistical probability of their respective causal roles. Relating to the causality of murder, researchers conducted statistical analyses of the causal significance of reduced levels of the neurotransmitter serotonin relative to other neurobiological agents and social factors among incarcerated men to help explain why they committed murder. With such calculations, causal explanations throughout the physical as well as the natural sciences became increasingly probabilistic.

Nineteenth-century physicists conceived of probability as dealing with limits in the knowledge of what they believed to be phenomena that ultimately, at least in theory, could be reduced to deterministic, lawlike processes. In the twentieth century, quantum physicists theorized that some phenomena were irreducibly indeterministic and that the world was therefore ultimately explicable with only a probabilistic causality, at least at the subatomic level.

Increasing uncertainty is a function of increasing multiplicity, complexity, and probability, which modern novelists dramatized in their narratives and which scientists studied in their research. Philosophers in the sway of pragmatism and pluralism, contextualism and historical relativism, abandoned the earlier absolutist “quest for certainty.”³⁹ Modern novelists reveal a greater willingness to accept open-ended stories with less satisfying closure than one finds in the Victorian novel, which typically was governed by what Thomas Vargish called “the providential aesthetic”—a belief in some guiding transcendent destiny or ultimate meaning to life.⁴⁰ In contrast, modern philosophers and novelists were more willing to accept higher levels of uncertainty in understanding the causes of behavior, while some such as Nietzsche, Sartre, Gide, Bernhard, and Pynchon reveled in it.

In 1911 Karl Pearson, a pioneer of modern probability theory, wrote, “Nobody believes now that science *explains* anything; we all look upon it as a shorthand description, as an economy of thought.”⁴¹ A year later Bertrand Russell underscored that skepticism, specifically with regard to causal knowledge: “The word ‘cause’ is so inextricably bound up with misleading associations as to make its complete extrusion from the philosophical vocabulary desirable. . . . The reason why physics has ceased to look for causes is that, in fact, there are no such things. The law of causality, I believe, like much that passes muster among philosophers, is a relic of a bygone age, surviving, like the monarchy, only because it is erroneously supposed to do no harm.”⁴² Later in the century the uncertainty of knowledge of events in the physical world became a defining feature of modern science, formalized by Werner Heisenberg’s uncertainty principle. It maintained that it is impossible to know with unlimited precision both the position and momentum of an electron or any subatomic particle at the same instant. The product of the error or uncertainty in these two measured values is approximately equal to a constant (discovered by Max Planck in 1900)—a small but discrete magnitude that appears in many places in quantum physics and functions in

the physical world as an insurmountable margin of error in all measurements. This further limit on deterministic causal understanding fueled speculation, sometimes rather loosely, that uncertainty was a defining feature of modern life and thought.⁴³

My book draws on a wide range of sources—from quantum theory and genetics to existential philosophy and murder novels—to track changing thought about the increasing specificity, multiplicity, complexity, probability, and uncertainty of causal knowledge across 170 years. Some of these changes begin well back in the nineteenth century or well into the twentieth century and vary widely in their extensive range and intensive depth among different sciences and systems of thought. They proceed with different paces and magnitudes for each discipline and science and so preclude any broad chronological ordering of them across the entire cultural record, although the turn-of-the-century period produced a great many new ideas and is generally the historical pivot for this history. I am describing the logic of a general development in many areas, a gradational shift, not a specific turning point in the history of ideas or a single paradigm change. In some places I refer to this shift as going simply from Victorian to modern modes without qualification. Such renderings are usually a shorthand formulation of what is more precisely a gradational change unless otherwise specified, as in those occasional instances when a later idea is absolutely unprecedented (e.g., Freud’s theory of the causal role of child sexual trauma) or when an earlier idea is flatly rejected (e.g., hereditary traits passed through the blood).

The scope of this undertaking obliged me to combine these five developments into a single argument that readers could grasp with a single concept and visualize with a single image. That argument is a variant of the epistemological cliché that the more we know, the more we realize how little we know; or, specifically applied to causality, the more causes we understand, the more we realize how many more causes there are to discover and how little we actually know about the causes we think we know. I refer to this argument as the *specificity-uncertainty dialectic*. I use the terms *specificity* and *uncertainty* because they come closest to expressing the positive and negative aspects of this interaction, but they each stand for a cluster of concepts. Specificity may also imply precision and validity, while uncertainty may imply multiplicity, complexity, and probability.

The specificity-uncertainty dialectic embraces the interdependence of the two main concepts. Thus, as researchers sharpened their

understanding of causal factors in the physical, biological, and social sciences, they also disclosed new areas of ignorance about what they did not know and new sources of uncertainty about what they did know, and those areas of ignorance and uncertainty suggested new projects for more specific inquiry. The visualizability of the concept is suggested by my use of the image of areas or realms of ignorance to refer to the palpable volume of all that was not known, which was increasingly delineated by ever more specific accounts of those causal agents and causal processes that were known. This expanded realm of ignorance suggested to some observers that causal knowledge was increasingly complex and uncertain. And because that realm seemed to grow in size in comparison to the area of empirically verifiable and causally acting biochemical substances and psychosocial determinants, causal understanding seemed to many observers to be moving toward greater uncertainty. Early on, Oliver Wendell Holmes noted the dialectical interaction of knowledge and ignorance and used a spatial metaphor to illustrate it: “Science is the topography of ignorance. From a few elevated points we triangulate vast spaces, including infinite unknown details. We cast the lead, and draw up a little sand from abysses we may never reach with our dredges. The best part of our knowledge is that which teaches us where knowledge leaves off and ignorance begins.”⁴⁴ Similar formulations can be found at will throughout the modern period, such as one about the impact of computer modeling on the study of oceans made by the oceanographer Jochem Marotzke in 2002: “We are in a state now where the more we know, the more it becomes clear how little we really understand about the system.”⁴⁵ Arkady Plotnitsky ran the dialectical argument the other way—from the unknowable to the knowable—in maintaining that in quantum theory the impossibility of knowing certain things about subatomic events has “shaping effects upon what can be known.”⁴⁶ In mathematics and science generally, he concluded, “the threshold of the unknown, and even the unknowable . . . defines all significant knowledge.”⁴⁷

A graphic example of the specificity-uncertainty dialectic is the human genome. The discovery that it is made up of three billion pairs of nucleotides snaking around one another in double helixes enormously increased the specificity of scientific knowledge of the complex interaction of a great number of new causally acting entities in the process of hereditary transmission. At the same time, it opened vast realms of uncertainty

about what exactly all of these causally acting entities do and how they do it. Modern novelists were increasingly aware of the complexity of genetics but less inclined to explain behavior based on it in contrast to a number of nineteenth-century novelists who eagerly invoked “hereditary taints” flowing “in the blood” to make sense of their characters’ acts of murder.

In the modern period novelists rarely explained behavior in terms of cellular and, even less frequently, molecular processes. They occasionally mentioned genes, hormones, and neurotransmitters to suggest that a detective, forensics expert, or scientist was aware of current knowledge, but causally acting biochemical entities play an insignificant role in explaining the motive for murder or any other behavior. I found no references to neuropeptides by their technical name, although their aliases as opiates do cause numerous murders indirectly by addicts who kill to get money to buy drugs, such as heroin, that initiate the same physiological response as neuropeptides. Nevertheless, I include the history of understanding of these causally acting biological substances for four reasons: (1) because understanding of their causal function is distinctive to the modern period and therefore offers compelling evidence for historical change, (2) because these substances account for human behavior at the most basic level and as such imply the most basic causal explanation, (3) because theories about their causal role make vivid historical contrasts with less precise nineteenth-century theories about gemmules, germ plasm, body humors, vital forces, and imagined ultimate atoms of life, and (4) because the history of their discovery, which opened up vast new realms of the unknown, offers compelling evidence for my argument about the specificity-uncertainty dialectic.

That argument raises a major evidentiary problem, however, because increasing specificity implies progress, not in a moral or aesthetic sense, but according to the standards of scientific research. One can claim that the history of science, and especially the history of medicine, progresses in understanding the causes of ever more numerous and precise aspects of observed phenomena. The accomplishments of Newton, Darwin, Mendel, Pasteur, Koch, Einstein, Heisenberg, Crick, and Watson mark unmistakable progress in the direction of increasing accuracy, detail, and verifiability in explaining phenomena. But one cannot argue that causal understanding in novels progresses—that explanatory understanding of characters or even of specific acts of murder in Dreiser or Don DeLillo is more valid than, or represents progress over, such understanding in

Dickens or Zola. Without making such a claim, I believe that one can integrate evidence from the history of science and literature in support of an argument about the specificity-uncertainty dialectic based on six considerations.

1. Modern science is more precise and valid than Victorian science.⁴⁸ The emergence of the germ theory of disease in the 1870s is a hallmark of modern medicine, which is clearly more effective than was earlier medicine in diagnosing, preventing, and curing illnesses.⁴⁹ Today anyone practicing Victorian science would be incompetent, and anyone practicing Victorian medicine would be subject to malpractice suits. If a contemporary physician treated a tubercular patient 1830s-style by opening a vein in the neck, he or she would be indicted for assault. One early-nineteenth-century medical organization estimated that in 1810 there were nine quacks in England for every regular doctor.⁵⁰ At the turn of the twentieth century, Sherlock Holmes's detecting was supposed to be based on the latest and best science, and Conan Doyle invented for Holmes some scientific breakthroughs of his own, which themselves represented progress over earlier investigative methods. The first words Holmes utters are "I've found it!"; and "it" refers to a test for the presence of blood. In investigating murders it is useful to be able to test for blood, and any discovery that makes such identification possible is evidence of progress toward achieving that result. Modern pharmacologists have discovered drugs that target specific enzymes with minimal negative side effects. Twentieth-century physicians, psychologists, sociologists, and criminologists improved on earlier methods of data collection and statistical analysis to make their probabilistic causal explanations more reliable. Modernist novelists' ability to draw on that science gave them a more precise understanding of specific causal processes and also helped identify their work as distinctly modern.

2. I compare not whole novels but parts of novels, which I draw on as if they were criminological or psychiatric case histories. Dreiser in total did not understand the causes of behavior better than did Zola in total, because each novelist understood behavior according to the current level of knowledge and explanatory categories of their respective times. Nevertheless, specific parts of their dramatizations of human causality are historically marked, and the more modern explanations—to which Dreiser had access, and Zola did not—were better able to explain more precisely the function of such causally acting entities as genes and hormones. Dreiser was particularly influenced by current

theories about tropisms and hormones, and while one cannot argue that his novels represent progress in artistic expression, one can argue that specific parts of them explained behavior based on more verifiable science than was available to Victorian novelists.

3. Modern novelists had the benefit of hindsight in that they were able to draw on as well as critically evaluate the novels of their predecessors. Gide criticized the psychological and social determinisms in Zola and Bourget, while Alain Robbe-Grillet targeted Balzac for similar reasons. Virginia Woolf registered her disappointment with the subject matter of H. G. Wells, Arnold Bennett, and John Galsworthy, concluding forcefully that “the sooner English fiction turns its back upon them . . . the better for its soul.”⁵¹ Such criticism suggested that the novel was moving beyond earlier conventions in ways that were historical and directional, if not progressive. Many modernist novelists viewed themselves as an *avant-garde*, by which they meant a group that led the way into formerly tabooed topics and new artistic strategies that improved on outmoded traditions and conventions. The historian Christopher Butler noted that insofar as the development of new paradigms for art is seen “to derive from innovative technical breakthroughs, they are by definition ‘progressive,’ because if you can imitate the technique, you can do something that you could not do before.” Butler dissociated himself from the claim of progress in art by putting the word in quotation marks, but his study documents the pervasive sense among *avant-garde* artists that they were breaking new ground in a positive direction. Some modernists, like the German expressionists, emphasized the social and political aspect of that emancipatory role from the grip of “bourgeois” morality and oppressive family psychodynamics. Others emphasized their contribution as technical and formal, but they shared a sense of surpassing what had gone before, at least during the heyday of their stylistic triumphs.⁵² The benefit of hindsight that the moderns enjoyed did not in itself enable them to understand or explain human behavior any better than their predecessors, to be sure, but it did create a sense of historical development, however difficult it may be to define precisely its meaning or logic.

4. In writing about causality, modern novelists and scientists used rhetorical techniques and explanatory models that are closer to our own, and they therefore addressed some issues that may seem more germane and responsive to contemporary scientific and artistic concerns, if only for their more up-to-date rhetoric, subject matter, value judgments, and methods. The language that novelists, critics, and especially scientists

used to contrast past and present work was shot through with value judgments implying a sense of progress, because later as opposed to earlier work avoided the deficiencies of exhausted topics, dated material, passé attitudes, outmoded styles, refuted theories, and obsolete research methods.

5. Evolution and human history suggest kinds of progress or at least directed change. Evolution produced more complex living forms with human brains instead of primitive nerve nets, offering a controversial but compelling model of the progress of higher forms of organization and consciousness throughout the eons. In the first edition of *On the Origin of Species*, Darwin claimed that “as natural selection works solely by and for the good of each being, all corporeal and mental endowments will tend to progress towards perfection.”⁵³ In history the Judeo-Christian tradition offered the hope for worldly perfection, the fulfillment of the millennium. History generally was a story of movement toward goals resulting in more complex social organizations and indisputable progress in at least one area—knowledge of the time span of history itself. A sense of progress lies behind the grand historical narratives of nineteenth-century thought: Hegel’s view of history as the realization of the idea of freedom, Comte’s theory of the three progressive stages in the history of knowledge (theological, metaphysical, positivist), Kierkegaard’s three progressive stages on the way to true Christian faith (aesthetic, ethical, religious), Marx’s theory of the dialectical advance of history toward communism, Darwin’s theory of evolution in the direction of what is increasingly well adapted and reproductively successful, and Spencer’s notions of the survival of the fittest and evolution from simple to complex. Although Nietzsche rejected any collective historical improvement of human life, his exhortative positive philosophy charted a way to the “higher man,” or overman, as a way to an increasingly meaningful existence. The purpose of Freud’s psychoanalytic therapy was to make progress toward mental health, while Jung viewed individual life as a process of increasing individuation.

6. Human beings individually experience progress in many simple acts such as drinking in order to quench thirst, studying in order to pass an exam, or practicing a musical instrument in order to improve.

Thus, the tendency to view history, evolution, and individual lives in matters big and small as stories of progress, or at least of accomplishment, is an abiding temptation. Although that temptation has sometimes substituted for careful argumentation and led to crudely

self-congratulatory Whiggish history, it is built into the primordial intentionality and purposiveness of human experience and shapes the way we view our own life in time as well as the larger sweep of history. We judge as progressive whatever satisfies our immediate desires, resolves our daily challenges, and realizes our endlessly projected goals. The widespread belief in some such design to life is further evidence of this insistent explanatory instinct.

These six considerations address the difficult problem of integrating the history of science, which clearly progresses in some aspects, with the history of literature, which does not reveal even an overriding direction or meaning, let alone a story of progress. They also apply to another body of evidence, the systems of thought that make other historically distinctive contributions to the understanding of causality—psychoanalysis, linguistics, philosophy of language, sociology, cybernetics, systems theory, and existential philosophy. These systems of thought aspired to the rigor of observational sciences but based their explanations more on interpretations, philosophical arguments, and historical narratives. Freud, Saussure, Wittgenstein, Derrida, Durkheim, Weber, Nietzsche, Wiener, Bertalanffy, and Sartre contributed to the specificity of causal understanding of various human behaviors and experiences by raising awareness, redirecting attention, and clarifying thought about a host of issues and therefore must be characterized as progressive.

Although these considerations justify using scientific, philosophical, and literary evidence together in support of my argument about the increasing specificity of causal knowledge, these clashing sources nevertheless generated interpretive instability that, I must concede, would not go away. However, to generalize about the history of such a complex concept as causality across almost two centuries demands a broad evidentiary base and bold interpretations. Without the novels, this history would lack dramatic action to flesh it out in observable movements and lack the voices of the past in dialogue to articulate its living actuality; without the systems of thought, it would lack evidence from some of the most probing and influential examinations of the human condition made during the years of this study; and without the science, it would lack concrete evidence for the essentially progressive movement of historical change that an argument about increasing specificity implies. The discoveries of germs, genes, hormones, peptides, and neurotransmitters were specific, datable events that—yes—improved the way scientists understood the causes of disease, hereditary transmission, sexual desire, emotion, and

neural transmission. Novelists from both periods were perceptive observers of scientific achievements in their own times, but only the moderns had access to such findings of modern science that made it possible to understand these phenomena more precisely and fully.

The novels I use for evidence to make that argument are not so much typical of their time as representative. By this I mean that novels render the causes of murder in ways that are historically marked in that some of the causal analyses in them are unlikely, if not inconceivable, in other historical periods.⁵⁴ Thus in Zola's *Germinal* (1885), Etienne kills because of a hereditary taint from his remote human ancestors, an explanation that is unlikely in a serious modern novel. Conversely, in *Compulsion* (1956), Meyer Levin explains a murder by two young men as caused by their childhood sexual traumas, an explanation that appears nowhere in the cultural historical record before Freud, as far as I have been able to determine.

Another reason for viewing these novels as representative of the times in which they were written or set is that many of their authors took pains to craft a sense of historical verisimilitude and create murderers based on real people—beginning with Stendhal's *The Red and the Black*, subtitled “Chronicle of 1830” and based on a real-life model for Julien Sorel. A few of the many other fictional murderers with actual models include Vautrin in *Old Goriot*, Raskolnikov in *Crime and Punishment*, Pozdnyshv in “The Kreutzer Sonata,” Clyde Griffiths in *An American Tragedy*, Moosbrugger in *The Man without Qualities*, Bigger Thomas in *Native Son*, Jame Gumb in *The Silence of the Lambs*, and the titular murderers in *Eugene Aram*, *The Count of Monte Cristo*, *Thérèse Raquin*, *The Picture of Dorian Gray*, and *Lafcadio's Adventures*.⁵⁵ In the modern period a new genre also appeared—“nonfiction novels” based closely on actual murders, as in Levin's *Compulsion* and Truman Capote's *In Cold Blood*.

These novels also document historical change in that they function as a filter for current scientific explanations of behavior. Reductive scientific explanations deaden fiction, so novelists glean scientific ideas from wide reading and everyday experience to understand how they are disseminated in popular culture and shape everyday understanding of human action; then they sift and adapt those ideas to make their novels plausible. Dreiser, for example, studied new theories about tropisms and hormones, which he wove into his rendering of Clyde's murder of Roberta in *An American Tragedy* in order to evoke a sense of contemporary historical actuality and draw authority from the current

state of scientific understanding. In *Berlin Alexanderplatz: The Story of Franz Biberkopf* (1929), Alfred Döblin explained one murder, ironically, with reference to the causal action of the pituitary, thyroid, suprarenal, and prostate glands. DeLillo invoked neurotransmitters to help explain a murder in *White Noise*. Dozens of novelists drew on Freud to explain how adult character and actions derive from childhood experiences and are shaped by unconscious mental processes, while Thomas Pynchon satirized Pavlovian sex conditioning in *Gravity's Rainbow* (1973). In *A Philosophical Investigation* (1992), Philip Kerr mined Wittgenstein's philosophy of language in crafting a main character, actually named Ludwig Wittgenstein, who attempted to put into practice the philosopher's ideas (grotesquely misinterpreted) by committing serial homicide.

I rely primarily on novels by male authors about male murderers, because my method is comparative and requires controlling variables to focus on historical change. To add female writers and female murderers would have multiplied those variables and reduced the sharpness of the historical comparisons. Moreover, in fact and fiction the majority of murderers are male, as are almost all serial murderers. I do, however, include a few female novelists or female murderers when the evidence is clearly marked historically: for example, the female author Mary Braddon, who used Victorian theories of heredity and insanity to explain the attempted murder by a female in *Lady Audley's Secret* (1862); and the female serial murderer in Laurence Sanders's *The Third Deadly Sin* (1981), who kills men and mutilates their genitals at twenty-seven-day intervals because of hormonal problems that are detected by endocrinological and hematological analyses that would have been impossible a century earlier.

The interpretive problem of authorial distance further challenged my synthetic objective. Historically revealing ideas can be uttered by a character in a novel who speaks for the author (Pozdnyshv in "The Kreutzer Sonata"), by a character who does not speak for the author (Bill Sikes in *Oliver Twist*), by a character who explicitly subverts the author's ideas (Edouard in *The Counterfeiters*), by two characters who formulate the author's ideas in dialogue (Julius and Lafcadio in *Lafcadio's Adventures*), by a first-person narrator (Humbert Humbert in *Lolita*), by a third-person narrator (Joseph K. in *The Trial*) who may occupy varying distances from the author's "actual" view, by the author in an interview about a novel (DeLillo in "American Blood"), by a journal entry (Gide in his

Journals), or by a subsequent essay that explains what the author had in mind (Richard Wright in “How ‘Bigger’ Was Born”). While I was aware of the different evidentiary value of these various sources, I did not make a systematic assessment of them, which would have enormously complicated my synthetic task and cluttered my presentation of evidence.

This book is organized in chapters on changing ideas from Europe and America about causal factors. Their classification and ordering is based on three guidelines: the chronology of when factors effect their causal action (ancestry before childhood and language), physical factors before mental (sexuality and emotion before ideas), and individual factors before collective (mind before society). Of course, these orderings are arbitrary and these distinctions are not absolute: language is acquired in childhood, sexuality and emotion have a mental aspect, and society shapes mental development just as it shapes social pressure. These ordering principles and the classifications they determine are therefore approximate and interrelated, neither precisely delineated nor mutually exclusive. Changing ideas about these factors emerged in nineteenth- and twentieth-century modes, which, for purposes of conciseness, I refer to as *Victorian* and *modern*. Victorian does not denote specifically English developments or any sexual morality; I use it because the period to which it refers, 1837–1901, approximates my periodization of this earlier stretch of time, 1830–1900. Modern denotes the entire twentieth century, including developments that some critics call postmodern.

Each chapter surveys changing ideas about a different causal circumstance or motive for murder in novels supported by developments in the new sciences or disciplines that are its intellectual pivot. These shifts are about causality in general, not just the causality of murder, and so they are drawn from the natural and social sciences, as well as from novels and systems of thought. Their groupings in my chapters are: ancestry with genetics, childhood with psychoanalysis and psychohistory, language with philosophy of language and linguistics, sexuality with sexology and endocrinology, emotion with economics (for greed) and physiology (for emotion generally), mind with neuroscience and psychiatry, society with sociology, and ideas with existential philosophy (primarily Nietzsche’s).

Causality, or causation (the terms are used interchangeably), is a metaphysical (or ontological) concept that refers to actual cause-and-effect relations between events or to dynamic interactions and processes in the

world; it is also an epistemological concept that refers to knowledge involved in answering “why” questions about those interactions and processes. These two definitions are circular, because causality is a fundamental aspect of human existence in the sense that all human beings necessarily have some elementary causal understanding, such as, for example, that dropping an object will cause it to fall or that running into a tree will cause pain. The philosopher and historian of causality in science and medicine K. Codell Carter concurred emphatically in noting “how totally pointless, hopeless, and downright silly it is to think one can ever state *precisely* what it is for one thing to cause another.”⁵⁶ Although that elemental sense is universal, elaborations of it vary culturally and emerge in historically changing ways which are the focus of my study. *Human causality* refers to causes of human action and ways of understanding them. Other terms in this study refer to aspects of human causality. *Motives* are inner impulses toward action, while *intentions* are object-oriented plans for fulfilling the motive. Causal understanding can also include *purposes* for actions directed toward the realization of goals. *Reasons* are the rational grounds for behavior and may form part of *explanations* that answer causal questions. Explanations may include a broad range of factors such as universal covering laws and a specification of initial conditions, a single decisive factor such as an icy road in a car crash, or a mix of factors such as heredity, desire, belief, childhood background, and social pressure.

Causal knowledge is most specific at the molecular level, less so at the cellular level, and extremely complex and uncertain at the behavioral level, generating in the modern period many new unanswered questions about the way in which molecular or cellular entities cause gross behavior. This increasing uncertainty at higher levels of complexity is also a function of the phenomenon of emergent properties. This concept refers to the fact that at higher levels of complexity properties emerge that cannot be predicted from lower levels. For example, a precise understanding of the properties of protons, neutrons, and electrons would not enable one to predict the properties of combinations of those subatomic components into atoms of oxygen and hydrogen, and a precise understanding of the properties of those atoms would not enable one to predict the properties of molecules of water such as its surface tension and boiling point, and so on to cells, individual behavior, and group behavior. The phenomenon of emergent properties reveals a central methodological problem in this history: the impossibility of achieving a

fully integrated history of causal analysis that would include subatomic, atomic, molecular, biological, individual psychological, and collective social causation.

That problem is further complicated by the different sorts of phenomena treated by novelists, philosophers, natural scientists, and social scientists. While they are all concerned with causality, they approach it in radically different ways with different purposes and different criteria for precision, evidence, and argumentation. A few novelists draw on scientific findings, while the arrow of influence almost never goes the other way.⁵⁷ Formal thinkers such as Darwin, Spencer, Lamarck, Mendel, Weismann, Nietzsche, Freud, Wittgenstein, Sartre, and Derrida exert some direct influence on murder novelists, and I have been attentive to such influences.

This study is primarily an interpretive history of changing ideas about causality (the epistemology of causality), but such a history cries out for some causal explanation of those changing ideas based on changing ways in which people actually experienced causality (the ontology of causality). While my primary focus is on those ideas, in every chapter (usually at the end) I do consider concrete historical developments that helped shape new experiences of causality as well as thinking about it. The major concrete historical influence is the increasing division of intellectual labor and analytical precision that resulted from the rise of new academic disciplines in universities and from the increasing specialization among professionals such as doctors and lawyers, whose diagnoses and briefs rested ultimately on causal analysis. A related influence is the increasing complexity and interdependence of social relations and market activities in cities, which also increased reliance on a wide range of highly specialized professionals. The expansion of capitalism in scale and scope brought more remote and complex productive and distributive forces to bear on local activities. Industrial production became the consequence of ever more temporally and spatially remote psychological, social, technological, and economic determinants, creating a potential market for new professionals who were trained to analyze specific causal actions.

Among the most concrete historical influences on the experience of causality are the new transportation and communication technologies. Across the years of my study the telegraph, railroad, telephone, automobile, airplane, cinema, radio, television, computer, and Internet accelerated communication and transportation across time and space

to create new paths and variable speeds of transportation and information flow, including computerized global communications networks, which reworked the experience of causality for everyone. The same communication and transportation technologies that expanded the spatial and temporal range of causal action in social relations and economic undertakings also revolutionized how individuals became motivated to commit murder and carried it out. A number of fictional murderers, and especially serial murderers, found their victims or became worked up about something they learned about them from modern communication technologies such as newspapers, movies, and television—media they also used to follow investigations into their own murderous acts and observe their growing public reputations afterward. In Richard Wright’s *Native Son* (1940), Bigger Thomas first becomes attracted to the woman he will eventually kill when he and his friends masturbate while looking at her in a newsreel shown in a movie theater, and he commits a cover-up murder of someone else in reaction to the attack on him in the newspapers while he is still at large.⁵⁸ One murderer from Truman Capote’s *In Cold Blood* (1965) dreamed of “fast money” from finding hidden treasures he learned about in travel magazines and movies such as *The Treasure of Sierra Madre*, which he had seen eight times. The serial killer in Kerr’s *A Philosophical Investigation* (1992) revels in the fact that “you kill enough people, you get your story in the papers all the time” (176). In DeLillo’s *Libra* (1988), Lee Harvey Oswald targets JFK by watching him on television and then imagines himself being seen live on TV as he is being shot by Jack Ruby. In Thomas Harris’s *Red Dragon*, a serial killer finds his victims from the home videos he processes in the laboratory where he works and makes a movie of his slaughter of a family, which he then uses to arouse himself for subsequent killings.⁵⁹

In real life, the causal role of media technology is operative in copycat killings, terrorism, and the murder of media celebrities and political leaders—including, most famously, the assassination of John Lennon in 1980 by Mark David Chapman and the attempted assassination of Ronald Reagan in 1981 by John Hinckley, who was morbidly inspired by the movie *Taxi Driver* and the movie actress Jodie Foster. After seeing the movie *A Clockwork Orange*, Arthur Bremer changed his assassination target from Richard Nixon to George Wallace. The motivation for September 11 was likely shaped in part by the conspicuous American values, economy, foreign policy, and lifestyle that were communicated

around the world by television and movies and symbolized by the World Trade Center.

Sometimes the most important things in history are the most obvious. I had mixed feelings about my argument for this huge subject turning out to be as obvious as a cliché—that the more one knows, the more one realizes how little one knows. Its obviousness meant that it was easy to grasp, although it also suggested that the argument might be trivial. But the force of my argument about the specificity-uncertainty dialectic is not its unexpected nature but its broad applicability, which implies that there just might be a unifying sense to the history of such a fundamental concept as causality that grounds many natural and social sciences and also shapes how novelists over the past 170 years made their characters' actions plausible. My argument integrates the various modes of changing thought about the increasing specificity, multiplicity, complexity, probability, and uncertainty that are evident in a wide range of sources from genetics, neuroscience, and psychoanalysis to sociology, existential philosophy, and murder novels. That integration also embraces a set of concrete developments in the ontology of causality, as it was shaped by the increasing division of labor among research professionals, the increasingly complex and interdependent life in modern cities and industrial capitalism, and new technologies of communication and transportation. Making that argument involved a comparative cultural history of thinking about the nature of causal explanation across two ages—Victorian to modern. The scale of that undertaking obliged me to focus on the act of murder. That approach made it possible to identify a coherent evidentiary base for a broad cultural history of causality, and while the overall argument about that history was as simple as a cliché, its elaboration proved to be richly varied and endlessly surprising.