All Scientific Stuff:
Science, Expertise, and Everyday Reality in 1926

by

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Dedication

To my parents, Charles Matzke and Janice Beecher, who taught me to read, to write, to think, and to question.

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Preface

From Mary Shelley's *Frankenstein* (1818) onward, a widespread view has been of science as cold and isolating and scientists as potentially "mad." This is one of the oldest stories we tell ourselves about science. But if we think more about it, other narratives come to mind: myths of inventors tinkering in their garages, hoping to strike it rich; mysteries in which forensic analysts catch murderers; medical dramas featuring hard-working doctors. The contrast between *Frankenstein* and these stories is not only between a vision of science as bad and a vision of science as good, but also between a vision of science as extraordinary and a vision of science as ordinary.

Victor Frankenstein's scientific work is both bad and extraordinary, and the novel suggests that those two features are correlated, but they need not be. When Lord Byron praises Sir Isaac Newton as "the sole mortal who could grapple, / Since Adam—with a fall—or with an apple" he presents an image of the scientist as superhero that is as old as the image of the mad scientist. Conversely, when, on the TV show *Breaking Bad*, the chemist Walter White becomes a murderous drug dealer, his descent is instigated by a desire to provide for his family, not by the corrupting or alienating influence of his scientific education. These two features—the relative goodness of a scientist and the relative ordinariness of scientific practice—do not parallel one another; rather, they are orthogonal variables in the construction of stories about science.

Many cultural critics have commented on the dual visions of science as bad and science as good,[1] but the contrast between conceptions of science as extraordinary and science as

everyday has largely gone unexamined. Both extraordinary science and everyday science emerged over time in the popular imagination, but the former gained prominence earlier than the latter, at a time when science itself was relatively young and alien. Popular conceptions of everyday science came to prominence more gradually and more recently. Examples of texts that evince this conception can be found in the nineteenth and early twentieth century, and around 1926 it is clearly visible in several different literary contexts at once. This is not to say that 1926 is a watershed, but rather that the year epitomizes the movement of science into everyday life in the popular imagination. By examining how popular conceptions of science emerged at this time, we can understand explicitly the unspoken but ubiquitous notions of science that run throughout our culture today.

Stories of everyday science gained popularity because more and more nonscientists became aware of how science was relevant to them. Many new technologies helped shape America in the late nineteenth and early twentieth centuries—electric lights and wireless radios, Model T's and telephones, aspirins and airplanes, mimeographs and mustard gas. These technologies, explicitly framed as products of science, transformed work, leisure, and warfare. At the same time, developments in evolutionary biology, medicine, and the social sciences meant that humans could increasingly be objects of scientific study. More and more aspects of people's lives could be understood scientifically, from how they worked to how they dreamed to how they had sex. By 1926, even people with little scientific expertise had a strong appreciation for the significant degree to which science helped construct the material reality of their everyday lives as well as their concept of that reality. And with that appreciation came new ways of being in and talking about the world. This book explores key texts that reveal how those ways grew to be pervasive in our culture.

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Abstract

This dissertation explores a key period in the development of science as an everyday thing as reflected in the important cultures of letters containing the pulp magazines *Amazing Stories* and *Black Mask* and the novel *Arrowsmith*, respectively science fiction, hardboiled detective fiction, and the realist novel. These genres' cultural (re)formation during this period reflects contesting claims as to what constitutes realism and the role of science in realistic fiction and in everyday life. These cultures can be understood as a dialectic, with *Amazing Stories* implying that science can improve everyday reality; *Black Mask* implying that science is insufficient to reliably understand everyday reality; and *Arrowsmith* problematizing the competing visions of science in everyday reality. Analyzing each of these works in the context of the others shows that realism, the everyday, and scientific expertise are all variable concepts that take on different meanings in different cultural contexts.

Amazing Stories names and crystalizes science fiction, the low culture genre that, according to the magazine's vision, underscores the relevance of scientific discoveries to readers' everyday lives. The magazine encourages readers to familiarize themselves with science as an avenue for individual and social betterment.

Black Mask provides a contrasting, hardboiled vision of science's role in everyday life, portraying scientific detection, both in fiction and in reality, as an uncertain representation of an everyday reality that science is insufficient to handle. The hardboiled detective is a nonexpert who resists scientific authority as opposed to embracing it as do the nonexperts in science fiction.

Sinclair Lewis's *Arrowsmith*, the first significant high culture work to represent science as a component of everyday life, depicts the life and career of a medical-doctor-turned-research-scientist in such a way as to question the norms and institutions by which expert authority is constructed. Lewis clarifies the cultural importance of this skepticism in his letter rejecting the Pulitzer Prize. In this respect, the novel encompasses both sides of the dialectic represented by the magazines, venerating the possibility of advancement through scientific discovery while also emphasizing the importance of placing critical pressure on expert authority.

Chapter 1
The Relationship between Science and Everyday Reality
From "This rough magic" to "this man Goddard"

This book is about how science as a way of thinking and understanding the world became available in everyday life. The chapters in this book take as their starting points three events that took place in the year 1926. On March 10, Hugo Gernsback published the first issue of *Amazing Stories*, the first magazine specializing in "scientifiction," later redubbed science fiction. On April 23, Sinclair Lewis received the Pulitzer Prize for his novel, *Arrowsmith*, the first realist novel to feature a scientist as a protagonist (Lewis declined the prize). And in October, Joseph T. Shaw took over as the editor of *Black Mask* and proceeded to transform it into a magazine specializing in hardboiled detective stories, in contrast to the "scientific" detective stories that had been popular at the time. These contemporaneous events signal a change in how popular fiction depicted science. This is not to say that 1926 marked the beginning of a new era the way that Ezra Pound asserted that the publications of *Ulysses* and *The Wasteland* in 1922 marked the beginning of a new era. Gernsback, Lewis, and Shaw all made claims to that effect, but a history of cultural attitudes about science cannot be divided up quite so discretely. Consequently, my purpose here is not "reading 1926" in the style of Michael North's *Reading 1922*. North called 1922 a "generational dividing line" and a "watershed" (4, 173), but the view of science that I am analyzing here trickled out in the works of earlier generations. 1926 is not a watershed, but it is a breaking dam, a time when a once uncommon perspective became pervasive. This book starts with the events of 1926 so as to look both forward and backward in time and interpret different

literary-cultural approaches to science in the lives of ordinary readers and ordinary Americans. The second chapter focuses on *Amazing Stories* and considers early science fiction's efforts to familiarize readers with the workings of science. The third chapter focuses on *Black Mask* and analyzes hardboiled detective fiction's critiques of forensic science. The fourth chapter focuses on *Arrowsmith* and examines how Lewis explores the virtues and limitations of an extended understanding of the scientific concept of an experimental "control."

But first this chapter will provide some background information on how literature has depicted science and on the key concepts that are at play in that depiction. This chapter is divided into sections:

- *The Great Gatsby* serves as a **case study** that suggests how science was perceived by well-off nonscientists in the 1920s.
- The **early history** of how literature depicted science is marked by two dominant narratives, the tragic and the utopian, which over time developed into "romantic" or "ivory tower" images of science. These early stories almost all share a sense that science is uncommon or extraordinary in one way or another.
- Then, beginning in the late nineteenth century, there emerged a sense that science could be an **everyday** thing—something relevant and accessible to anyone at any time.
- Of course, if science is relevant and accessible to anyone at any time, that has ramifications for the concept of **expertise**. Generally speaking, there are four ways in which a character can be construed vis-à-vis scientific expertise: as a scientific expert, a lay expert, an expert in a related field, or a nonexpert.
- As awareness of scientific discoveries and innovations spread, they alter popular understanding of reality. This has consequences for literary **realism/vraisemblance**.

- Different genres make different appeals to vraisemblance, and individual works may participate in multiple genres. In the 1920s, different but interconnected **cultures of letters** coalesced around the popular genres that were emerging in magazines and novels of the time.

In a context where science helps construct the material and conceptual reality of everyday life, how does an understanding of science function as a form of cultural capital? What makes someone a scientific expert in contexts where non-experts have a stake in scientific practice? How do the particular arenas in which scientific knowledge is engaged shape the contest for scientific authority? The magazines and novels under investigation here depict experiences and activities that were familiar components of contemporary readers' everyday reality—the invention and popularization of new technologies, the investigation of crime, the treatment of illness—but they do so with a heightened sense that these experiences and activities are informed by modern science. These works all imply that science is a significant component of everyday reality, and this role has consequences both for how we understand science and for how we understand everyday reality.

In *Mimesis* (1946), his foundational work of literary theory, Erich Auerbach lists "Die ernsthafte Behandlung der alltäglishen Wirklichkeit"—"The serious treatment of everyday reality"—first and foremost among the foundations of modern literary realism (433). As Auerbach understood, and as subsequent scholars have further explored, what constitutes everyday experience is informed by local and historical contexts, meaning that literary attempts to represent and shape reality are always contingent and changing. Realism and everyday reality are both variable concepts. What constitutes realism and what constitutes the everyday can look

very different in different historical moments and in different cultural contexts in the same historical moment.

For the texts under consideration here, literary fiction creates spaces within which to explore the questions that arise where science participates in everyday life. Literature serves as a domain within which the possibilities presented by science can be depicted, but also where its potential limitations are articulated and the ethical and moral issues it implies are negotiated and debated. As Auerbach notes, the serious treatment of everyday reality entails "the rise of more extensive and socially inferior human groups to the position of subject matter" (433). This extension applies to the literary representation of science as well, as nonscientists lay claim to nontraditional forms of expertise as conferring the authority to contribute to or push against scientific discourse. Like realism and the everyday, expertise is a variable concept that takes on different meanings in different cultural contexts.

Depicting science as an everyday thing is by no means the only option available to writers looking to represent science. It is possible, for instance, to conceive of science as a monastic intellectual pursuit that focuses on esoteric questions while sequestered in a laboratory at a remove from everyday life. It is also possible to conceive of science as a source of wonder, providing access to the sublime, beautiful, or grotesque aspects of nature and technology, but still figuring those aspects as separate from everyday experience. Then again, it is possible to represent everyday reality without any reference to science at all. Myriad options have always been available in terms of whether and how to represent science in fiction. Around the 1920's, however, many literary texts evince an understanding of science as a significant component of modern life. Some writers place this understanding at the center of their stories, while others

express it offhandedly, but in either case, literature served as a useful medium through which to explore the effects of science's status as an everyday thing.

Case study: *The Great Gatsby*

F. Scott Fitzgerald, the great chronicler 1920's modernity, stands as a useful example of science being treated as an everyday thing. Early in *The Great Gatsby* (1925), when Nick Carraway visits Tom and Daisy Buchanan for the first time, he compliments his cousin's sophistication by remarking, "'You make me feel uncivilized, Daisy'" (17). This prompts a sudden outburst from Tom:

> "Civilization's going to pieces," broke out Tom violently. "I've gotten to be a terrible pessimist about things. Have you read 'The Rise of the Coloured Empires' by this man Goddard?"
>
> "Why, no," I answered, rather surprised by his tone.
>
> "Well, it's a fine book and everybody ought to read it. The idea is if we don't look out the white race will be—will be utterly submerged. It's all scientific stuff; it's been proved."
>
> "Tom's getting very profound," said Daisy with an expression of unthoughtful sadness. "He reads deep books with long words in them. What was that word we—"
>
> "Well, these books are all scientific," insisted Tom, glancing at her impatiently. "This fellow has worked out the whole thing. It's up to us who are the dominant race to watch out or these other races will have control of things" (17).

Tom expresses his racist attitudes with very striking language, referring to a book that had been published several years earlier, the actual title of which was *The Rising Tide of Color against White World-Supremacy* by Lothrop Stoddard. Scholars typically interpret this scene specifically in terms of how it alludes to contemporary racial science. George Bornstein, for example, writes that *The Great Gatsby* "at once critiques the racialist tradition exemplified by Stoddard and yet displays the same nervousness about classification that plagued Stoddard and his predecessors" (47). Tom's words exemplify the prominence of racial science in popular discourse at that time, but more generally, they suggest something about the cultural status of *science*. Tom's use of

science to support and promote racial animosity provides a useful example of the stakes that can be involved when drawing on scientific authority. But the artifacts of modern scientific culture, from new transportation technologies to the all-seeing eyes of Dr. T.J. Eckleburg, manifest themselves throughout the world of Fitzgerald's novel.

Tension builds for several pages prior to the outburst, beginning when Jordan Baker mentions Jay Gatsby and escalating when Daisy notices a bruise on her little finger:

> "You did it, Tom," she said accusingly. "I know you didn't mean to but you *did* do it. That's what I get for marrying a big hulking brute of a man, a great big hulking physical specimen of a—"
> "I hate that word hulking," objected Tom crossly, "even in kidding."
> "Hulking," insisted Daisy (16).

Tom's invocation of the "scientific stuff" represents his attempt not only to regain control of the conversation, of his reputation, of his wife, and of civilization as a whole, but also to establish himself as a civilized man. Fitzgerald signals that Tom has a fumbling grasp of Stoddard, first by having Tom misremember his name and the title of the book, then by showing him stutter: "the white race will be—will be utterly submerged." Tom is, in a sense, attempting to pass as an expert on racial science, just like Gatsby and the others are attempting to pass as cosmopolitan East Coast aristocrats when they are in fact Midwestern members of the nouveau riche. But ironically, Tom's very attempt to demonstrate that he is not a hulking brute confirms his hulking brutishness. His opinions are offensive and his failure to properly understand his source is pitiful. Nick observes as much when he writes, "There was something pathetic in his concentration" (18). Tom's anxious need to control his reputation, triggered by Daisy literally pointing out his abusiveness, manifests itself again later in the scene. Nick and Daisy have been speaking on the veranda about Jordan, when Tom demands to know what they were talking about. Daisy tells him, "'I think we talked about the Nordic race,'" alluding to Tom's further summary of

Stoddard, to which Tom responds, "'Don't believe everything you hear, Nick'" (24). Implicitly, the line is in response to what Tom imagines Daisy was telling Nick, i.e., further descriptions of his hulking brutishness, but the line takes on an ironic quality in juxtaposition with Daisy's allusion to Stoddard. Tom is telling Nick to be skeptical of his cousin while he himself accepts the "scientific stuff" without question.

Still, Tom's instincts were not entirely off in attempting to turn the conversation to Stoddard; "scientific stuff" would certainly have been appropriate parlor-room conversation at the time, and would have been far more common among middle- and upper-class circles in 1925 than even a generation earlier. Scientific advancements and discoveries took up more and more space in the news, while popular science books and magazines increased in circulation. The magazine *Popular Science*, for example, enjoyed a circulation of over 300,000 in 1926, when the U.S. population was less than 120 million (Mathews 388). Stoddard's *The Rising Tide of Color* places itself in this genre of popular science writing. As with many popular science publications, Stoddard's book explicitly claims to transcend ideology: "[A] better reading of history must bring home the truth that the basic factor in human affairs is not politics, but race" (5). Stoddard grounds his reading of history in the citation of authorities like Havelock Ellis, and he argues for "recognition of the supreme importance of heredity, not merely in scientific treatises but in the practical order of the world's affairs" (305). This rhetorical gesture, asserting the practical value of basic research, was likewise a common feature of popular science writing.

Fitzgerald was definitely aware of Stoddard; not only did Scribner's publish *The Rising Tide of Color* the same month as his own *This Side of Paradise*, but Stoddard's father also makes a cameo in *The Great Gatsby*. John Lawson Stoddard was a turn-of-the-century writer who became famous for his travelogues, which he first presented as a series of lectures delivered

throughout North America and later published in ten volumes with five supplements. When Nick attends one of Gatsby's parties for the first time, he encounters a man "staring with unsteady concentration at the shelves of books" (49). He tells Nick that they are real:

> "Absolutely real—have pages and everything. I thought they'd be a nice durable cardboard. Matter of fact they're absolutely real. Pages and—Here! Lemme show you."
>
> Taking our skepticism for granted he rushed to the bookcases and returned with Volume One of the "Stoddard Lectures."
>
> "See!" he cried triumphantly. "It's a bona fide piece of printed matter. It fooled me. This fella's a regular Belasco. It's a triumph. What thoroughness! What realism! Knew when to stop too—didn't cut the pages" (50).

Like his son's writings, John L. Stoddard's lectures were aimed at a middlebrow audience. The print volumes promised to be "Illustrated and embellished with views of the world's most famous places and people, being the identical discourses delivered during the past eighteen years under the title of the Stoddard Lectures." As James L.W. West writes, "Such a multi-volume series, aimed at a middle-brow audience, is what one would expect a book supplier to have provided, en bloc, for Gatsby's library" (169). This scene creates a parallel between Gatsby and Tom; like Tom, Gatsby recognizes the importance of representing himself as learned and well read. Gatsby is better at it than Tom—"'a regular Belasco,'" alluding to the Broadway producer, director and playwright David Belasco, who was famous for his realism—but it is still a lie. Both men are faking their intellectualism; indeed, at least Tom read his Stoddard.

Scholars typically attribute the misnomer—Goddard for Stoddard—to the fact that Stoddard and Fitzgerald were both published by Scribners. Bornstein, for instance, speculates that the misnomer might signal "Fitzgerald's deference towards his own publisher's sensitivities" (49). But the name "Goddard" contains several suggestive implications. An allegorical interpretation of *God*dard seems unavoidable, and on some level the scene satirizes Tom's faith in the divine authority of the scientific stuff, a faith rendered ironic by his later assertion that

Nick shouldn't believe everything he hears. Tom might also be confusing Stoddard with another eugenicist, Henry H. Goddard, an American psychologist who was a pioneer in intelligence testing and who coined the term "moron" in 1910. The irony of this conflation is readily apparent. Additionally, there were at least two other well-known scientists named Goddard in 1925. Calvin H. Goddard was a pioneer in forensic ballistics, having invented the comparison microscope, with which scientists could match bullet striae, and having cofounded the Bureau of Forensic Ballistics, the United States' first independent criminological laboratory. In the later half of the decade, Calvin Goddard would be better known for analyzing evidence in the Supreme Court's hearing of the Sacco and Vanzetti case, and for serving as the key forensic expert in the investigation into the St. Valentine's Day massacre. At the same time, "the father of American rocketry," Robert H. Goddard gained notoriety after the *New York Times* published a front-page profile of the physicist on January 12, 1920 under the headline "Believes Rocket Can Reach Moon." On March 16, 1926 he would successfully launch the first liquid-fueled rocket.

This is the context in which Fitzgerald and his contemporaries were publishing their fiction: one in which everyone—from historians to travel writers to psychologists to criminalists to physicists—was presenting ideas to a popular audience couched in the language of science, in which "science" itself became a contested, complexly signifying term and an ever more frequent participant in the public's everyday reality. In conflating Stoddard and Goddard at this moment, Fitzgerald unites two of the central tensions that characterize popular perceptions of science:

(1) The presumption behind the assertion that "It's all *scientific* stuff," that science enjoys broadly applicable authority over things (this appears to be what Tom Buchanan means), and

(2) The sense that "It's *all* scientific stuff," that everything and everyone is implicated in scientific discourse as a subject, an object, or both.

From automobiles to optometrists, from racism to rocketry, it is, at this time, all scientific stuff. The omnipresence of science in everyday reality forms part of the subtext of *The Great Gatsby*, but numerous texts wrestle more explicitly with this omnipresence. The purpose of this book is to examine this omnipresence as it manifests itself in three different domains: the science fiction magazine *Amazing Stories*, the detective magazine *Black Mask*, and the realist novel *Arrowsmith*. All three manifest an interest in the everyday and the nontraditional expert—an interest which stands in contrast to their forbears from earlier generations—but each expresses that interest from a different perspective. Ultimately, my concern is not the cultural status of science in 1926 in and of itself; rather, I argue that the emergence of various literary cultures around 1926 serves as a useful vantage point from which to survey the history of science in literature and popular culture, a history that extends from before the nineteenth century up to the present day.

The cultural status of science: A brief history

Classically, the pursuit of scientific knowledge has been associated with power. The aphorism, "scientia potentia est"—knowledge is power—contains utopian implications that have shaped views on science and education throughout history. I mean "utopian" in the fullest sense of the term. It is important to recognize that when Thomas More coined the term, he was punning on two Greek prefixes attached to the word *topos*, meaning "place": *eu*, meaning "good," and *ou*, meaning "no." The utopia, as it is originally conceived, is both a good place and no place, a conflation that points to the potential unattainability of a perfect state and to the

potential failure of any social project attempting to achieve the perfect state. Utopia, in this regard, implies the possibility of dystopia.[2] And science has been seen, throughout its history, as having the potential to transform the social order for the better or the worse.

On the one hand, if knowledge is power, that power can transform society in miraculous ways. Many people have mistakenly attributed the phrase "scientia potentia est" to Francis Bacon, a utopian thinker and leading figure in the development of the scientific method, and though he didn't use the phrase (the earliest instance is in the work of Thomas Hobbes), his writing does express this utopian sentiment quite well. The ideas presented in *Novum Organum*, Bacon's 1620 treatise on inductive reasoning as a method of scientific inquiry, lead directly into *New Atlantis*, Bacon's utopian tale published in 1624. In *New Atlantis*, Salomon's House, Bacon's vision of the modern research university built on methods he outlined in *Novum Organum*, lies at the center of his ideal society. As the head of Salomon's House explains, "The end of our foundation is the knowledge of causes, and secret motions of things; and the enlarging of the bounds of human empire, to the effecting of all things possible" (35). The progression in this sentence from the expansion of knowledge to the expansion of empire seems entirely matter-of-fact, but it suggests a connection that is central to much of Enlightenment thought, a connection Bacon also makes in *Novum Organum* when he quotes Proverbs 25:2: "The glory of God is to conceal a thing; the glory of a king is to find out a thing" (100). This is not to say, however, that Bacon envisions natural philosophy as simply a servant of the state, or that Bacon's vision of knowledge as power entails an adversarial or paternalistic dominion over nature. On the contrary, the head of Salomon's House says that some discoveries are deliberately kept a secret from the state, suggesting academic freedom and independence from political influence. And in *Novum Organum*, Bacon asserts, "[O]ne does not have empire over nature

except by obeying her" (100). Baconian scientific utopianism depends on an independence from the influence of political ambition and humility in the face of nature.

On the other hand, when this humility is absent, the pursuit of scientific knowledge has been construed as dystopian. In the sixteenth and seventeenth centuries, these dystopian energies often manifest in the form of personal tragedy and the fall of the individual, the implication often being that the individual serves as a proxy for the state or civilization as a whole. Constructions of scientific inquiry as a form of trespass often stem from lapsarian narratives, most famously, Milon's *Paradise Lost*, in which the desire for knowledge is tied to sexual passion, both in terms of the excitement it produces and in terms of the sinfulness to which it inevitably leads. Immediately when Eve eats fruit from the tree of knowledge, "Nature from her seat / Sighing though all her Works gave signs of woe" (IX:782-783). When Adam eats, "Nature gave a second groan" (IX:1000). Knowledge here does not suggest Baconian obedience to nature, but rather injury, an injury that is immediately followed by carnal desire (IX:1013). For Marlowe's Doctor Faustus, intellectual ambition is inextricably interwoven not only with sexual desire but also with his desire to become "emperor of the world" (14). Faustus's egotistical and highly sexualized ambitions represent a very literal lust for power, and his desire for sex/knowledge/power leads to his fall, a fate that is sealed when Faustus kisses the demonic incarnation of Helen of Troy. In *The Tempest*, Shakespeare's Prospero avoids Faustus's sad fate not only by moving past his quest for vengeance, but also by renouncing the magic by which he set the plot in motion:

> …This rough magic
> I here abjure…
> …I'll break my staff,
> Bury it certain fathoms in the earth,
> And deeper than did ever plummet sound
> I'll drown my book (V:1:55-56,59-62)

Prospero repudiates his knowledge and literally destroys his novum organum, and his reward for this repudiation is a home and a family off of the island. The suggestion made by Milton, Marlowe, and Shakespeare is, most obviously, that the pursuit of knowledge has a strong tendency to corrupt individuals in ways that can lead to their tragic downfall. But the three authors, Shakespeare in particular, also suggest that the pursuit of knowledge, or at least the wrong kind of knowledge, is incommensurable with an idealized vision of a normal family life.

A separation between science and ordinary life figures into Bacon's writing as well, albeit somewhat differently. In *Novum Organum*, he describes various "idols" that threaten science, of which he considers the "idols of the marketplace" to be "the most troublesome of them all":

> I call [them] Idols of the Market-place, on account of the commerce and consort of men there. For it is by discourse that men associate; and words are imposed according to the apprehension of the vulgar. And therefore the ill and unfit choice of words wonderfully obstructs the understanding.

Tellingly, Bacon authored *Novum Organum* in Latin. "Vulgar," in this context, refers to the common people in contrast to an elite or specialized class, just as the vernacular language English, was referred to as vulgar in contrast to Latin, the international standard language for learned men. Here Bacon recognizes the disjunctures that can arise between specialized uses of terms and everyday uses. By carefully considering of the language of natural philosophy, Bacon anticipates the disciplinary specialization that would arise with the development of "ivory tower" science. But he also anticipates the miscommunications that can result when specialized vocabulary butts against vernacular usages, as exemplified today by those who assert that evolution is "just a theory," unaware that in a scientific context, a theory refers not simply to conjecture but rather to a tested, evidence-based explanation of observed phenomena.

As far back as the seventeenth century, then, both tragic and utopian visions of science positioned the pursuit of scientific knowledge far outside of the realm of everyday experience. As science developed, so did prevailing cultural attitudes about what science was, but this outsider status continued to dominate. The tragic narrative, with its focus on lust and ambition, grew into the romantics' understanding of science as a passionate pursuit. This passion is Janus-faced, allowing access to the sublime aspects of the natural world while still carrying the potential to corrupt the scientist. Both Wordsworth and Byron sought inspiration from science as a source of the sublime, and cast Sir Isaac Newton specifically as the preeminent icon of scientific discovery. In *The Prelude*, Wordsworth recounts staring at a statue of Newton that had been visible outside of his bedroom window in Cambridge. He describes the statue as, "The marble index of a Mind for ever / Voyaging through strange seas of Thought, alone" (62-63). In these lines, Wordsworth conveys feelings of admiration for Newton and paints scientific discovery as a grand adventure, but he also depicts such an adventure as well outside the realm of ordinary experience—these are "strange" seas, after all—so out of the ordinary that the scientific man must make the journey alone. This is in keeping with the view of science that Wordsworth expresses in the preface to his *Lyrical Ballads*: "The Man of science seeks truth as a remote and unknown benefactor; he cherishes and loves it in his solitude" (197). The man of science, as Wordsworth describes him here, stands in contrast to the poet, who sings "a song in which all human beings join with him" (197).

Byron developed this image of the solitary scientist even further, casting Newton as a Byronic hero:

> When Newton saw an apple fall, he found
> In that slight startle from his contemplation—
> 'Tis *said* (for I'll not answer above ground
> For any sage's creed or calculation)—

> A mode of proving that the Earth turned round
> In a most natural whirl, called "gravitation;"
> And this is the sole mortal who could grapple,
> Since Adam—with a fall—or with an apple.
>
> Man fell with apples, and with apples rose,
> If this be true; for we must deem the mode
> In which Sir Isaac Newton could disclose
> Through the then unpaved stars the turnpike road,
> A thing to counterbalance human woes:
> For ever since immortal man hath glowed
> With all kinds of mechanics, and full soon
> Steam-engines will conduct him to the moon. (*Don Juan*, Canto 10, Verses I-II)

In Byron's hands, the scientific genius remains a solitary figure, "the sole mortal," but he is also humanity's savior. Byron takes up the lapsarian narrative of knowledge and discovery that runs through Milton, Marlowe, and Shakespeare, and he turns it on his head. Creating a tone of humor and excitement, Byron depicts knowledge/power as freeing and thrilling rather than corrupting. The first verse establishes a parallel between Newton's discovery and the story of the Fall, but the chiasmus in the first line of the second verse cuts against the reader's expectations. Rather than further corrupting humanity, science provides relief from our fallen state by counterbalancing human woes and holding the promise for even more sublime experiences in the future.

Richard Holmes examined this vision of the scientific sublime in this historical moment at length in his book, *The Age of Wonder*. Holmes writes:

> Around such a vision Romantic science created, or crystallized, several other crucial conceptions—or misconceptions…the dazzling idea of the solitary scientific "genius", thirsting and reckless for knowledge, *for its own sake and perhaps at any cost*. This neo-Faustian idea…is certainly one of the great, ambiguous creations of Romantic science…. Closely connected with this is the idea of the Eureka moment, the intuitive inspired instant of invention or discovery, for which no amount of preparation or preliminary analysis can really prepare (xvii).

Holmes' book quite effectively pushes against prior interpretations of the Romantics as hostile to modern science. But Holmes, in identifying those moments when the Romantics seem to embrace the wonders of science, underscores the degree to which the culture of this period continued to see science as something other than everyday experience. The emphasis on the Eureka moment—an ineffable, often rapturous moment of inspiration that both Wordsworth and Byron dramatize in their descriptions of Newton—exemplifies this distinction. Newton's contemplation might be an everyday occurrence, but scientific discovery only happens when he experiences a "startle."[3]

Mary Shelley addresses this sense of wonder head on, identifying it not as a source of aesthetic pleasure, but rather as an ethical problem for which *Frankenstein* serves as a cautionary tale. Early in his narrative, Victor Frankenstein tells Walton, "I see by your eagerness, and the wonder and hope which your eyes express, my friend, that you expect to be informed of the secret with which I am acquainted; that cannot be: listen patiently until the end of my story, and you will easily perceive why I am reserved upon that subject" (31). As Victor knows from personal experience, the sublime experience of scientific discovery can blind the scientist to the consequences of that discovery, and the risks of this blindness are compounded by the scientist's isolation. Being the sole mortal grappling with his research does not mark Victor as a grand adventurer; instead, it signals his status as a tragic figure in the mold of Dr. Faustus. His increasing obsession with his work causes him to neglect friends and family. His father writes him, "I regard any interruption in your correspondence as a proof that your other duties are equally neglected" (33). Nonetheless, Victor explains, "My employment…had taken an irresistible hold on my imagination" (33). It is worth noting that Victor is passive in this sentence. He does not say that he became obsessed with his work, he says that his work took

hold of him. One could easily interpret this as another example of Victor's unwillingness to take responsibility for his own character flaws, but the passage also carries an implication that scientific research, by its very nature, exerts a corrupting influence.

In America, Nathaniel Hawthorne picks up on this theme. Several of Hawthorne's stories develop the trope of the mad scientist, with "The Birthmark" (1843) clearly building on *Frankenstein*'s message. Like *Frankenstein*, "The Birthmark" presents a scientist who believes that humanity can be perfected through scientific inquiry, but whose attempt to act on this belief ends in tragedy. Unlike Frankenstein, who strives to recreate life, the protagonist in Hawthorne's story, Aylmer, strives to perfect life that already exists. Aylmer fixates on a birthmark on his wife Georgiana's cheek, eventually convincing her to remove it using a potion he has concocted. The potion removes the birthmark, but kills Georgiana in the process. By conflating Aylmer's treatment of Georgiana as an object of scientific inquiry with his treatment of her as an object of his aesthetic gaze, Hawthorne points to the dehumanizing effects of both forms of objectification. Hawthorne indicates a parallel between these two forms of objectification by describing science and Georgiana as rivals for Aylmer's affection:

> In those days when the comparatively recent discovery of electricity and other kindred mysteries of Nature seemed to open paths into the region of miracle, it was not unusual for the love of science to rival the love of woman in its depth and absorbing energy…. [Aylmer] had devoted himself, however, too unreservedly to scientific studies ever to be weaned from them by any second passion (84).

Hawthorne suggests that by going too far as a student of science, Aylmer has permanently altered his own emotional makeup, such that he can love his wife only as an object of scientific study. While the story presents this sort of objectification as a danger of scientific inquiry, it also marks a departure from *Frankenstein* in that it locates that danger in the past. The story is set "in the latter part of the last century," and it explicitly claims that Aylmer's irresponsible behavior

was more common then than it was at the time of the story's publication. This implies an historical trajectory—as scientific miracles become more and more normalized, the potential for science to corrupt people diminishes.

Hawthorne's "The Artist of the Beautiful" (1846) serves as a counterpoint to the narrative of scientific corruption that he presents in "The Birthmark." In "The Artist of the Beautiful," the protagonist, a watchmaker's apprentice named Owen Warland, builds a mechanical butterfly which stands as a symbol for the potential of technological innovation to produce beauty. Significantly, Hawthorne refers to Owen as an artist throughout the story, whereas he refers to Aylmer as a student of science.[4] Whether technology is seen as falling under the rubric of science and whether inventors and naturalists are both perceived as scientists varies depending on the cultural context. Hawthorne treats science and technology as different from one another, but by the later part of the nineteenth century, technology was commonly seen as the material manifestation of scientific progress.

In *Wonder Shows*, historian Fred Nadis has observed how public displays of new inventions and discoveries by personalities like P.T. Barnum, Thomas Edison, and Nikola Tesla, as well as those of their less-known contemporaries, helped forge "a populist science shaped by public desire" (19). And in *American Technological Sublime*, David E. Nye has asserted that the experience of the sublime in the face of technological marvels such as the railroad, bridges, and skyscrapers helped to forge a unified American identity defined in large part by notions of technological progress. These notions of progress manifest themselves in fiction as well, as in *A Connecticut Yankee in King Arthur's Court* (1889) or *The Wonderful Wizard of Oz* (1900). In both of those novels, the titular characters use their superior technical know-how to give the impression that they have magical powers, thus gaining control over the people. Neither Hank

Morgan in *A Connecticut Yankee in King Arthur's Court* nor the titular wizard of Oz are depicted as particularly exceptional—the former is a young engineer from Hartford and the latter is a circus balloonist from Omaha—but even the basic technical know-how afforded to them by virtue of having lived in late-nineteenth century America gives them tremendous power. And unlike Hawthorne, Twain calls that technical know-how "science," writing, "Every time the magic of folderol tried conclusions with the magic of science, the magic of folderol got left" (236). This populist rendering of technological progress suggested that the wonders of science were accessible to everyday people, not just Byronic geniuses. In this respect, the view of technology as science was instrumental in the construction of science as an everyday thing.

Marlowe and Shakespeare's lapsarian narrative of science transformed into the Romantic vision of science as either sublime (as in the poetry of Wordsworth and Byron) or corrupting (as in the stories of Shelley or Hawthorne), while Bacon's utopian narrative of science grew into visions of professionalization and disciplinary specialization. Bacon's description of Salomon's House placed emphasis on the practical utility of scientific inquiry, with discoveries being put to use "effecting of all things possible" (35). But as the modern university emerged in the nineteenth century and became the heart of the scientific community, it placed emphasis not on applied knowledge, but rather on autonomy—on the pursuit of knowledge for its own sake and on "pure" science independent of nonscientific pressures (Cahan 301-305). As Steven Epstein has observed, "Purity and cleanliness…were not intrinsic to the scientific project; they were legitimating metaphors that imbued modern scientific institutions with an appearance of the sacred" (*Impure Science* 257). This construction of purity and of the laboratory and university as cloistered sites of pure science gave solidity to the knowledge that scientists produced while also

setting the work of knowledge production apart from everyday concerns. The image of the socially autistic, ivory-tower intellectual is distinct from the Romantics' heroic or tragic scientists like Newton, Frankenstein, or Aylmer, but it is no less an image that contrasts the scientist with the everyday.

In fiction, this contrast manifests itself when writers depict "scientific" characters attempting, in a bumbling way, to impose the rationalism of laboratory science on the messiness of the external world. The repeated failure of these efforts reinforces the perception that science has little to offer that is of practical value, and that it primarily functions as a monastic pursuit of knowledge for its own sake. Charles Dickens provides an early model for this sort of narrative when he parodies a purely utilitarian mode of education in *Hard Times* (1854). The protagonist, Thomas Gradgrind, is an educator who advances a curriculum based entirely around facts and mathematics to the complete exclusion of anything fanciful. This is the source of misery for his children, which his wife identifies when she tells their daughter, "'You learned a great deal, Louisa, and so did your brother. Ologies of all kinds from morning to night…. But there is something—not an Ology at all—that your father had missed, or forgotten, Louisa. I don't know what it is…. I shall never get its name now'" (150). Mrs. Gradgrind's identification of the various disciplines in which her children were educated as "ologies" pokes at the disciplinary specialization that the sciences were undergoing at the time of the novel's publication. Mrs. Gradgrind's use of the word "ology" is highly alienating, and it serves to underscore the contrast between Gradgrind's educational system and the other ways of knowing about and being in the world, which are elsewhere described as fanciful or sentimental, but which are depicted here as ineffable. That sense that sentimental knowledge is ineffable contributes to the sense that the

Gradgrind family has lost this trait to Mr. Gradgrind's project, yet it also suggests a spiritual quality that places that which Mr. Gradgrind forgot above those ologies.

In George Eliot's *Middlemarch* (1872), Tertius Lydgate evinces the same failings that hampered Mr. Gradgrind, only Eliot explicitly casts those failings as a product of scientific thinking. Lydgate is a doctor who, informed by his own scientific education, is determined to modernize the practice of medicine. However, he soon finds himself ill-equipped to communicate the value of his reforms to a public that views them with skepticism—a public whom Eliot tellingly describes as "the laity," suggesting the status of the scientific man as a kind of priest (430). His professional failings, however, are dwarfed by his failings at love. Early in the novel , Lydgate resolves to "take a strictly scientific view of woman," and this approach leads to his deeply unhappy marriage to Rosamond Vincy (152). Eliot writes, "His superior knowledge and mental force, instead of being, as he had imagined, a shrine to consult on all occasions, was simply set aside on every practical question" (567). Eliot depicts book learning as completely distinct from practical knowledge, and she pokes fun at the ultimate uselessness of Lydgate's scientific education at fostering a happy domestic life by characterizing that education in haughty terms as "superior knowledge and mental force." Lydgate's scientific ambitions are noble, but ultimately foolhardy.

In Walt Whitman's eyes, scientists aren't foolish in the same way, but their perspective is similarly insufficient. In his poem, "When I heard the Learn'd Astronomer" (1865), he describes attending a scientific lecture. In its entirety, the poem reads:

> WHEN I heard the learn'd astronomer;
> When the proofs, the figures, were ranged in columns before me;
> When I was shown the charts and the diagrams, to add, divide, and measure them;
> When I, sitting, heard the astronomer, where he lectured with much applause in the lecture-room,
> How soon, unaccountable, I became tired and sick;

> Till rising and gliding out, I wander'd off by myself,
> In the mystical moist night-air, and from time to time,
> Look'd up in perfect silence at the stars.

In this scene, Whitman's speaker experiences dissatisfaction and, like Thomas Gradgrind's wife, he struggles to put it into words. He literally cannot account for his problem with the lecture, and the solution that he finds can only be experienced in silence. Again this ineffability takes on a spiritual dimension with the speaker's description of the night as "mystical." The speaker's wordlessness suggests that he is privileging a direct experience of nature, and that any mediation of that experience through language somehow diminishes the experience itself. This distaste for mediation explains why he felt tired and sick; in the second and third lines of the poem, he characterizes the astronomer's lecture as a long list of ways in which the scientist mediates the experience of nature—proofs, figures, columns, charts, diagrams, additions, divisions, and measurements. In one sense, Whitman's description of the learn'd astronomer is the opposite of Byron's description of Newton; Byron suggests that science provides access to the sublime, while Whitman suggests that science is an impediment to the sublime. But in another sense, the two are alike in that they both suggest that the scientist experiences the world in a way that is fundamentally different from ordinary people, either because his insight is so great or because his book learning has alienated him from direct experiences. These poetic visions of the scientist suggest a mastery over nature that Byron admires, but that causes Whitman to feel discomfort. His use of "learn'd" conveys an ironic tone that suggests that the astronomer's authority comes mixed with a certain amount of arrogance, while staring in perfect silence suggests humility and even reverence in the face of nature. Importantly, this humble interaction with nature is available to anyone, not just experts; it is a universally available experience, and such experiences constitute a recurring thematic concern for Whitman and other transcendentalists.

The satires of academic thinking presented by Dickens, Eliot, and Whitman do not mean that Bacon's utopianism disappeared in the nineteenth century; on the contrary, towards the end of the century, scientific utopianism was more popular than ever thanks in no small part to Edward Bellamy's *Looking Backward* (1887). Numerous technological innovations shape and support Bellamy's highly influential vision of a socialist future, especially the telephone, which, in the novel, serves as a medium for both one-on-one and broadcast communications. Bellamy envisions music and religious sermons reaching audiences of up to 150,000 people simultaneously, serving to unite citizens into a global community (where ethnic and racial others are conspicuously absent). Goods, meanwhile, are purchased with credit cards and delivered via pneumatic tubes. These sorts of innovations, in Bellamy's estimation, ensure fairness and equity while eliminating menial labor. Unlike most of his forebears or his contemporaries, Bellamy develops the idea that science and technology will not only be involved in extraordinary experiences, but will also shape everyday life.

A lesser-known work of scientific utopianism, William McClung Paxton's poem, "A Century Hence" (1880), shares Bellamy's emphasis on progress while also utilizing the Romantics' language of wonder. His speaker begins by wishing that he could "draw from Isaiah's mysterious pages / a key to his visions sublime" (7). Invoking the sublime up front, he provides a list of prophecies about the world one hundred years into the future, including ships that fly in the air, artificial lights, and "a motor much stronger than steam" (10). Echoing the imperialist language found in Bacon and others, Paxton writes, "as science progressed, / Man ruled upon the sea and in the air" (10). This domination extends even into control of the weather, and Paxton makes it clear that the benefits of these inventions extend to all members of society;

describing the artificial lights, he asserts, "every house had a sun" (13). Paxton concludes, however, with a melancholy tone; the speaker awakes and realizes, "T'was all but a beautiful vision" (13). Paxton's speaker returns to a present in which science and the everyday do not go hand-in-hand, and optimistic though the poem may be, a century is a long time to wait.

Clearly, some nineteenth century writers were envisioning a place for science in people's everyday lives, but even for Bellamy and Paxton, that vision could only be expressed in the future tense. Like Byron's steam engines, everyday science was on the horizon, but still 100 years away, if not further. Present-tense representations of science in everyday reality remained rare.

The emergence of science as an everyday thing

In 1869, the journal *Nature* was created with the following mission statement:

> It is intended, FIRST, to place before the general public the grand results of Scientific Work and Scientific Discovery; and to urge the claims of Science to a more general recognition in Education and in Daily Life; and, SECONDLY, to aid Scientific men themselves, by giving early information of all advances made in any branch of Natural knowledge throughout the world, and by affording them an opportunity of discussing the various Scientific questions which arise from time to time.

In 2000, that mission statement was revised:

> First, to serve scientists through prompt publication of significant advances in any branch of science, and to provide a forum for the reporting and discussion of news and issues concerning science. Second, to ensure that the results of science are rapidly disseminated to the public throughout the world, in a fashion that conveys their significance for knowledge, culture and daily life.

The revision retains much of the spirit of the original. Both versions articulate two goals: the popular dissemination of science and the facilitation of professional discourse. But the alterations are significant. The first thing one may note is that the statement no longer specifies "Men." In the 131 years separating these two statements, the practitioners of science have transformed from

an elite and explicitly gendered class of people to members of a more inclusive profession. Also, the order has been reversed. In the original, the public comes first and foremost, while scientists come second. And when it came to that public audience, the *Nature* of 1869 felt the need "to urge the claims of Science to a more general recognition," while, 131 years later it merely wished "to ensure that the results of science are rapidly disseminated." The former phrasing suggests that, at the time, the journal felt the need to promote science itself to the general public, and that the significance of science to "Education and Daily life" was not readily apparent. But by 2000, the public was convinced. The fact that the claims of science no longer need to be urged to recognition might also account for the change in order; public dissemination need no longer be the first priority when science's relevance to education and everyday life is understood as a matter of course.

The authority and utility of science has been so well established that it serves as a trope that can be invoked in any number of contexts, from a politician emphasizing the importance of STEM education to an orange juice commercial beginning with the narration, "It seems like every day, science discovers another reason why the nutrients in orange juice are good for you." Of course, a vocal minority of science denialists—from global warming skeptics to anti-vaccine conspiracy theorists—continue to influence public discourse to a degree,[5] but contemporary society seems tacitly to agree that science would, as a matter of course, have something to contribute to any component of ordinary life. The notion that science would participate in the quotidian may sometimes continue to be a source of amazement, but it is also a matter of common sense. As the previously discussed literary examples suggest, this was not always so; rather, this notion emerged in the nineteenth century and gained prominence in the early decades of the twentieth century.

By the 1920's, the mechanisms that had contributed to creating the contemporary perspective, that science is a rightful component of everyday life, were largely in place. Historian Frederick Lewis Allen makes this abundantly clear in his book on the decade, *Only Yesterday*, published in 1931. Allen writes:

> The prestige of science was colossal. The man in the street and the woman in the kitchen, confronted on every hand with new machines and devices which they owed to the laboratory, were ready to believe that science could accomplish almost anything; and they were being deluged with scientific information and theory…. The word science had become a shibboleth. To preface a statement with "Science teaches us" was enough to silence argument. If a sales manager wanted to put over a promotion scheme or a clergyman to recommend a charity, they both hastened to say that it was scientific (149-150).

As Allen's quotation suggests, this transformation in the public's attitudes towards science took place largely thanks to the reshaping of domestic life through modern technology.

In the late nineteenth century, the "War of the Currents" between Thomas Edison and George Westinghouse raised public awareness of the conveniences afforded by the electrical age. Westinghouse's powering of the 1893 Chicago World's Fair demonstrated the safety and reliability of alternating current:

> Electricity silently made just about everything run at the Exposition, from ornamental fountains to humming dynamos, to the first elevated railway and "moveable sidewalk." Electrical appliances, gadgets, and machines were on display everywhere generating constant public amazement as visitors would view elevators, cash registers, calculating machines, massive search lights, automatic door openers, ironing machines, dishwashers, carpet sweepers, doorbells phonographs, clocks, industrial motors, an electric dentist's drill, even an electric cigar lighter! (Neumeister xxi).

World's fairs bolstered public enthusiasm about modernization and urbanization, supporting the country's demographic shift away from the country. Frederick Jackson Turner wrestled with these demographic shifts when he presented his Frontier Thesis—arguing for the importance of the frontier to American democracy—to the American Historical Association in 1893, which was held in Chicago in conjunction with the fair. Despite Turner's anxieties about the erosion of the

frontier, America became an increasingly urban nation. According to census data, in 1910, the majority of the country still lived in rural areas, but by 1920 the majority inhabited a city.

These shifts changed the temporality of technological progress from "A Century Hence" to "The World of Tomorrow," the slogan of New York's 1939 World's Fair. Starting in the early twentieth century, the impact of scientific progress on everyday life was not distant, but immediate. Rodgers and Hammerstein capture this spirit in their song, "Kansas City," from the musical *Oklahoma!*, first performed in 1943 but set in 1906. The character Will Parker describes the various sights that he has seen on his recent visit to a thoroughly modernized Kansas City, including gas buggies, a bell telephone, a skyscraper, and a radiator. The song's refrain asserts, "Everything's up to date in Kansas City / They gone about as far as they can go." Whereas Bellamy and Paxton held that science's impact on everyday life was on the horizon, this song presents the sense that that impact is here.

The idea that science is exceptional remains with us today, and one need only to look at the myriad adaptations of Sherlock Holmes to appreciate how we still often view scientific thinkers as outsiders. But the idea that science could be an everyday thing had risen to prominence by the 1920s, and the prevalence of everyday science both shaped and reflected attitudes towards science in important ways. Once again, I am not saying that the 1920s constitute a watershed, only that this period serves as a useful vantage point from which to analyze an ongoing, long-term historical phenomenon.

Observing this phenomenon as it manifests itself in popular culture, however, requires a more solid definition of what I mean by an everyday thing. Historian Paddy Scannell has defined an everyday thing as something that is available to anyone anywhere at any time. He derives this

definition from Heidegger, who distinguishes two ontological states, *Vorhandenheit* (presence-at-hand) and *Zuhandenheit* (readiness-to-hand, handiness). In Heidegger's philosophy, a thing is present-at-hand when we theorize about it, attempting to understand a universal law about the thing or identify its Platonic form. Something is ready-to-hand when we actually make practical use of it. An everyday thing is a thing that is ready-to-hand without any insurmountable barriers to its use.

Of course, in material terms, nothing is an everyday thing according to this definition. Heidegger points to a hammer as an example of an item that we primarily regard as ready-to-hand, and one might easily think of a hammer as an everyday thing. But a college freshman hanging a picture on their dorm room wall is unlikely to have a hammer readily available, nor are any of their neighbors. This might not be a serious obstacle for the college freshman—after all, driving nails into walls is what their calculus textbook is for—but the obstacles are more severe if we are talking about science as an everyday thing. Class, education, and geography all serve as serious impediments to many people's abilities to engage in science on any level. But even if nothing is really an everyday thing, we often imagine that things are everyday things. What we imagine to be an everyday thing is historically and culturally contingent, and it can tell us a lot about the priorities and the outlook of people in a particular cultural context. The notion that suffrage is an everyday thing, for example, is a structuring myth that supports the institutions of democratic states, even when those states remain plagued by implicit or explicit limitations on suffrage. By having Tom Buchanan invoke it in a parlor room discussion, *The Great Gatsby* provides evidence to suggest that men like Tom considered science to be an everyday thing at the time the novel is set.

Expertise and literary characters

Tom Buchanan, bloviating about the state of civilization, claims the authority of science despite his lacking any formal scientific knowledge. This results from a worldview that imagines science as an everyday thing: if science is available to anyone, then anyone can draw on or engage in scientific discourse regardless of their level of expertise. Works of literature that evince this worldview lend themselves to the development of laypersons' relationship with science.

In the earliest sense of the term, the laity only referred to "the body of the people not in orders as opposed to the clergy" (OED). The term exclusively denoted a lack of religious authority. But as higher education expanded and more fields underwent greater professionalization, the word generalized to identify "Unprofessional people, as opposed to those who follow some learned profession, to artists, etc." (OED). Under this broadened definition, someone can be a layperson in one context but an expert in the next—whether a lawyer or a mechanic constitutes a layperson depends on whether they are sitting in a courtroom or in a body shop. But under this definition, the use of the term laity still often suggests a disconnect between the general public's way of understanding and a specialized way of understanding. Experts' specialized knowledge and methods can give them power in some circumstances, but it also creates a responsibility to explain their insights in a way that laypeople can understand or at least trust. If an expert fails to do this, they might no longer be recognized *as* an expert. *Middlemarch* illustrates this point when Lydgate, having already come into conflict with other doctors, fails to foresee how his efforts to modernize medicine "would be even more offensive to the laity" (430).

An expert is defined as "one whose special knowledge or skill causes him to be regarded as an authority; a specialist" (OED). While seemingly at odds, "layperson" and "expert" are not

antonyms. As historian Steven Shapin observes, "Certain forms of scientific practice involved the acquisition and deployment of intellectual skills which were not prevalent in lay culture or in the culture of the generally literate. Such a cultural gulf, however, was not a 'natural' or inevitable feature of the place of science in the overall map of culture" (990-991). As Shapin and other historians have observed, substantial cultural work over a long historical period went into constructing the distinction between scientific experts and "the laity" or "the public" (Shapin and many other historians of science use these terms more or less interchangeably). Shapin points to the triumph of Darwinism in the late nineteenth century as the moment when the "common cultural context" linking scientists and laypeople became fragmented (997). This interpretation of history holds value when considering the professionalization of science in the period, and Shapin's observations are a significant contribution to any effort at breaking down an understanding of the expert-lay binary as necessary or inevitable, but this interpretation is also incomplete. Shapin does not examine the place of science in the cultural imagination as reflected in fiction. In examining fictional depictions of science, it becomes apparent that, well into the early twentieth century, as science was achieving new heights of prestige and authority, it was often perceived as *more* accessible to lay people, not less. In practical terms, it might be the case that Darwinism dismantled the bridge between science and the public, as Shapin claims, but in the 1920s, in the popular imagination, that bridge was stronger than ever.

This popular notion that the laity can access and engage with science generates several options for how to construct characters vis-à-vis their relative expertise. One option is to depict a character who is a scientific expert interacting with nonexperts. In these sorts of interactions, novels and stories can characterize the expert in any number of ways, from extremely haughty to surprisingly humble. In Hugo Gernsback's science fiction novel, *Ralph 124C41+*, for example,

the titular character is "one of the greatest living scientists," and he spends the majority of the novel introducing his love interest, a young and relatively uneducated woman from the Swiss Alps, to the various inventions and innovations that characterize life in his future New York City (9). Ralph's tone is friendly and accessible, but his superior authority is never called into question. By contrast the protagonist in Sinclair Lewis's *Arrowsmith* becomes less and less sure of himself as the novel progresses, despite the fact that he holds a medical degree and a prestigious job at a research institute. Arrowsmith spends most of the novel attempting to hold onto his authority in contexts that fill him with self-doubt, exclaiming at one point, "I wish people wouldn't keep showing me how much I don't know!" (370).

Another character type besides the traditional scientific expert is the "lay expert," someone with specialized knowledge who acquired that knowledge through means other than an advanced degree or professional certification. The sociologist Steve Epstein developed the concept of lay expertise in his study of AIDS activism, observing, "AIDS activists did not achieve influence simply by applying political muscle of the conventional sort…they found ways of presenting themselves as credible within the arena of credentialed expertise…changing the rules of the game, transforming the very definition of what *counts* as credibility in scientific research" (409). Patients and their advocates, though not professional doctors or biomedical researchers, acquired cultural competence so as to speak back to the recognized authorities. In this manner, they successfully changed scientific research practices from within.

These sorts of lay experts heavily populate science and technology studies, but they also populate fiction. Indeed, these fictional lay experts serve as models for how a nonscientist can be scientific. Perhaps the best example of this is Sherlock Holmes. When Watson first moves in with Holmes in *A Study in Scarlet*, he goes to great lengths to establish Holmes's nonexpert

status: “He was not studying medicine…. Neither did he appear to have pursued any course of reading which might fit him for a degree in science or any other recognized portal which would give him an entrance into the learned world” (641). Many works of fiction that adopt the Holmes model of an eccentric scientific thinker with outsider status, such as the TV show *House, M.D.*, neglect to adapt Holmes’s condition as a layperson, but Conan Doyle, himself a trained and practicing physician, suggests that it is essential to the detective’s insightfulness. Holmes is a lay expert, and fiction’s many amateurs, hobbyists, and apprentices follow in the same tradition.

A third available character type is an individual without scientific expertise who has recognized expertise in a related field. As with Epstein’s study of lay experts, it is worth noting that nonscientific experts are not simply a type that can be found in fiction, and that their interactions with scientific authority have been of interest to science studies for some time. The sociologist Brian Wynne’s famous analysis of Cumbrian sheep farmers exemplifies these sorts of interactions. Wynne’s study describes the restrictions placed on sheep farmers in the wake of the Chernobyl disaster and the misunderstandings that occurred between the farmers and the scientists responsible for making recommendations to the British government:

> Whereas the hill-farmers were quite reserved in their skepticism towards the scientists on scientific matters, they were abrupt and outspoken about them when they saw the extent of the scientists’ ignorance of hill-farming environments, practices and decision making. Even worse was the way that the outside experts did not recognize the value of the farmers’ own expertise, nor see the need to integrate it with the science in order to manage the emergency properly (295).

The scientists’ ignorance of local farming practices led to many poor recommendations, such as unsustainable grazing practices, which led to mistrust and resentment. Wynne also describes the farmers as laypeople, but conflicts such as these are different from those between AIDS activists and doctors, or between Holmes and criminal scientists. Rather than nonscientists acquiring scientific expertise, Wynne’s study is about two different kinds of expertise intersecting. Both

the AIDS activists and the sheep farmers speak back to scientific authorities, but they base the legitimacy of their critiques in different places.

As with the concept of the lay expert, the concept of the nonscientific expert can be imported from science studies and productively be applied to the understanding of fictional character types. Dashiell Hammett's Continental Op, for example, is a private investigator who frequently criticizes the methods employed by Phels, the police department's forensic scientist. Another example can be found in the film *Armageddon*, in which an asteroid headed towards earth can only be stopped by a nuclear bomb planted in its core, requiring the efforts of both NASA astronauts and a blue-collar drilling team. A slight variation on this trope can be found in expert-expert interactions within the academy, which also tend to feature misunderstandings between two different ways of knowing the world, but often with a more explicit attempt to police the disciplinary boundaries of what can be called scientific. In Kim Stanley Robinson's *Red Mars*, for example, the scientists traveling to Mars at one point interrogate Duval, their resident psychologist: "What were his controls? How did the testers repeat them? How did they eliminate alternative explanations of the data? How could they claim to be scientific in *any* sense of the word *whatsoever*?" (63). This rain of questions might be of genuine methodological importance, but the aggression of their questioning has more to do with power, authority, and cultural capital. These themes are implicit in all conflicts or collaborations between competing forms of expertise, regardless of whether those competing forms of expertise evince a disparity in class or formal education.

The fourth character type available to writers is simply the non-expert, exemplified by Tom Buchanan, a man whose clear ignorance of science does not prevent him from engaging with scientific ideas. In twentieth century fiction, it is remarkably common to find nonexperts

offhandedly expressing views that demonstrate the omnipresence of science. For example, in Horace McCoy's 1935 crime novel *They Shoot Horses, Don't They?* Gloria, the suicidal heroine, tells the narrator she finds it peculiar that "'everybody pays so much attention to living and so little to dying,'" and she asks, "'Why are these high-powered scientists always screwing around trying to prolong life instead of finding pleasant ways to end it?'" (113). This is an early moment where Gloria reveals her morbid state of mind, and it is striking for how that morose sensibility is expressed. After putting forth a general criticism of society expressed in terms of "everybody," she instantiates that criticism with the example of "scientists," the implication being that scientists' work accurately evinces the views held by everybody. She articulates this "scientists" example by way of a rhetorical question which suggests that this group's energies are singularly directed towards inappropriate ends, further reproducing the wrongheaded views of "everybody." Scientists, however, are not simply everybody; rather, they are "high-powered," a modifier included not to denote a subset of scientists but rather to indicate what separates scientists from the rest of everybody. Scientists, for Gloria, are defined in terms of their supreme levels of authority and agency. Presumably, this quality is true of all scientists; Gloria does not make her case more narrowly by limiting her question to doctors, for example. Perhaps the most significant word in this sentence, however, is "these." McCoy gives no indication that Gloria is at this moment pointing at a group of men in lab coats, so Gloria's inclusion of a demonstrative adjective at the beginning of this noun phrase does not particularize the noun. Instead, it conveys a sense that Gloria holds the group indicated by "these" in contempt, and more importantly, it telegraphs an expectation that that group will be familiar to her hearer. In a sense, the scientists at whom she is tacitly pointing are everywhere, interwoven into the fabric of her and her listener's shared modernity.

The very glibness with which the line is delivered reinforces a sense that the worldview with which Gloria understands scientists is commonplace. That worldview contains at least five notions:

1. Science has a widespread presence in modern life.
2. Scientists have the ability to affect the world in powerful ways.
3. The term "scientists" refers to practitioners of a constellation of disciplines that are sufficiently coherent that they can be addressed and discussed collectively.
4. Scientists work in a close relationship with society at large, as opposed to operating in a hermetic environment.
5. Scientists can be wrong in terms of their behavior, morals, or priorities.

At the time, the first three of these notions were not controversial in and of themselves, while the fourth and fifth were counterbalanced by the continuation of the tragic and utopian narrative traditions. Collectively, these notions frame an understanding of what it means for science to be an everyday thing. When science is an everyday thing, everyone can contribute to it or critique it. The scientific expert, the lay expert, the expert in a related field, and the non-expert—all of these character types interact with one another and engage with scientific discourse in complex and revealing ways that vary according to the cultural context.

Literary realism in the depiction of everyday science

The products of science shape the world in ways that, to the nonexpert, are miraculous. They allow us to instantaneously hear the voice of someone on the other side of the world, to lift heavy machines into the air for travel across entire oceans, and to take away agonizing pain simply by drinking one of a variety of potions. At the same time, the version of the natural world

that science presents to the nonexpert is unbelievably strange. Science tells us that the land beneath our feet sits atop a sea of molten lava, that diseases are caused by organisms that are too small to see, that light travels at a measurable speed, and that the solid objects around us are comprised mostly of empty space. None of these advancements and none of these ideas are in any way intuitive, and substantial cultural work went into making them common sense.

In a context like 1920's America, science could put forth new ideas that claimed to alter people's understanding of their everyday reality on a daily basis, and in such a context it becomes difficult to draw a line between the credible and the incredible. This is all the more true because the level of laypeople's science education and the degree to which various cultures accept science varied so substantially across the country. In 1925, the trial of John Scopes became a defining flashpoint in ongoing debates over the place of science in the construction of reality. This was not inevitable; when John Scopes was arrested for teaching evolution, prosecutors had wanted to limit the focus of the trial to the question of majoritarian control over public education (Lawson 143). But after William Jennings Bryan joined the prosecution, he gave a speech to the Progressive Club in which he declared, "The contest between evolution and Christianity is a duel to the death" (143). Bryan had previously lectured on the literal truth of the Bible, and defense attorney John R. Neal capitalized on Bryan's speech as an opportunity to reframe the trial. Neal published a response the day after the speech, in which he wrote, "His speech comes as a challenge to the defense not to confine the test of the anti-evolution law, but instead to put on trial the truth or lack of truth of the theory of evolution" (144). By turning the case into a referendum on the theory of evolution, the defense was able to cut off the prosecution's attempt to block expert witnesses from testifying as to the veracity of evolution. This extended the duration of the trial and brought it greater attention from the media. H.L.

Mencken wrote a series of articles on the trial arguing that it demonstrated how "enlightenment, among mankind, is very narrowly dispersed" and that the uneducated masses "have fought every new truth ever heard of." Turning the Scopes trial into a duel between scientific truth and religious truth—opening it up to questions of belief systems and authority—garnered attention for this "trial of the century" because that duel had become familiar to many people.

The Scopes trial shows that the authority to define reality was neither immutable nor widely agreed upon.[6] In a literary context, this renders constructing a single, totalizing understanding of what constituted realism impossible. But still, the ability to claim that something was or was not "true" or "realistic" carried rhetorical weight that many different people could claim. Asserting that a story is realistic holds value, but what that assertion means can vary tremendously. The detective writer S.S. Van Dine, for example, produces a sense of realism by presenting a highly academic understanding of criminal investigation based on the work of real criminologists. He presents this information in footnotes to his novels, and when a reader arrives at one of these footnotes, it produces a sense that the story provides a glimpse into how real criminal investigators solve crimes. At the same time, detective fiction editor Joseph Shaw explicitly calls Van Dine's stories unrealistic in his magazine, *Black Mask*, and he uses Van Dine as a point of contrast with his own writers, who he asserts write from firsthand knowledge of criminal investigation.

These competing understandings of realism represent different appeals to *vraisemblance*, a term from French that roughly translates to "true-seeming." An appeal to vraisemblance is an appeal to the appearance of truth rather than an appeal to "reality," and this more accurately captures fiction's relationship with the real in cases where works deal with science as an everyday thing. Works of fiction can appeal to vraisemblance in any number of ways, such as by

invoking the expertise of the writers or editors or by asserting that characters or plots are based on real people or events. Unlike "realism," which often appears to be relatively objective (as in Auerbach's definition: the serious treatment of everyday reality and the rise of socially inferior human groups to the position of subject matter), what makes a work *seem* true is clearly subjective and depends on the audience. Even science fiction stories frequently make an appeal to vraisemblance by claiming that they provide a glimpse into the world of tomorrow. The poor predictive power of the average science fiction story is moot in this regard; what matters is that these claims *feel* like they could come true. And the sometimes outlandish content of these stories feels plausible because they are being written, published, and read by people who are mindful of the frequency with which science upends common sense notions of what is and is not true.

Genres, their users, and the cultures of letters that coalesce around them

In *Structuralist Poetics* (1975), Jonathan Culler writes, "The *vraisembable* is whatever tradition makes suitable or accepted in a particular genre" (162).[7] Culler's observation serves as a reminder that, when examining how a work of literature constructs reality, we cannot consider only the social and historical context generally; we must also consider the particular literary context in which that work participates. A genre is an understanding of the kind of text that something is. That understanding is shared among the various users of the genre. I take this term "users" from rhetorical genre theory, and I use it to refer to anyone involved in a particular genre, including writers and readers, but also illustrators, editors, publishers, booksellers, librarians, etc. (Devitt 190). Some users' contributions to the work of genre construction are more visible than others'. Readers' contributions are particularly hard to gauge, except for those

who wrote letters to the editor that were published in magazines. But this study proceeds from the assumption that users of a genre collectively construct implicit and explicit definitions of that genre. The shared understanding that a work of fiction participates in a genre exerts pressure on how that work is produced, consumed, and interpreted.

The users of a genre may be understood as collectively participating in a "culture of letters," a network of individuals whose connections are at least in part mediated by their mutual engagement in works that they understand to be participating in a particular genre. I take the term from Richard Brodhead, who writes about literary genres, "The works we separate out in this fashion often shared social space, having been created and consumed in the same historical world.… The differences among such works do not flow from their exemplification of abstract categorical groupings, however we might insert them in such groupings later on, but require a different understanding of their source" (4). Brodhead shows that cultures of letters are plural, and diverse sites of textual production and consumption can be found even in a narrowly defined time and place. Furthermore, categories of form and genre and the attributes by which those categories are defined are products of the cultural norms endemic to those sites of production and consumption. Literary critics are users of genres as well, but as Brodhead suggests, they typically engage with works of fiction with some historical distance from the social space within which these cultures of letters formed. In studying texts from 1926, this book attempts to take into account the categories of form and genre as they existed in 1926 as well as the ways in which those categories undergo a constant process of redefinition throughout time.

Because genres are the products of ongoing processes of social construction, individual works' identification with specific genres is determined not only by the formal features of the work but also by the context in which the work is found. For example, when a detective

magazine reprints the Edgar Allan Poe story, "The Gold Bug," the story participates most obviously in the detective genre; when a science fiction magazine publishes the same story, it participates primarily in the science fiction genre. While users may sometimes emphasize a work's participation in one genre over another, participation in multiple genres can also be understood as simultaneous, and some works, such as Isaac Asimov's *Caves of Steel*, foreground the way in which they participate in multiple genres simultaneously.

Also, people can be users of more than one genre and consequently belong to more than one culture of letters. One can easily be a fan of both novels from the lost generation and short stories from *Weird Tales*. Or for a real-world example, one need only look at Raymond Chandler's *The Big Sleep*, a famous hardboiled detective novel, the screen adaptation of which was co-written by William Faulkner, a leading figure in the Southern Renaissance, and Leigh Brackett, a well known science fiction writer. A convergence of that sort appears to be neither particularly rare nor particularly common. Users tend to group into more or less discrete clusters around single genres, or at least that appears to be the case for authors. In their first ten years of publication, for example, not a single writer published a story in both *Black Mask* and *Amazing Stories*, the first hardboiled detective magazine and the first science fiction magazine respectively. And in the entire history of the magazines, only one person, Curt Siodmak, published in both.

Pulp magazines provide a useful starting point from which to embark on a consideration of how cultures of letters shaped the literary depiction of science in the 1920s. The pulp magazine industry began in 1893 when publisher Frank Munsey lowered the price of his juvenile magazine, *Argosy*, to ten cents per issue. This low price—achieved by printing the magazine on

low-quality paper made of untreated wood pulp (as opposed to the more durable, chemically-treated "slick" magazines)—enabled *Argosy* and other pulp magazines to reach middle- and working-class readers as well as children. During this early period, the cultural distinction between genres as well as between high- and low-brow magazines had not yet reified. By the 1920s, pulp magazines were a thriving part of the literary marketplace, and as their readership expanded, the magazines specialized to meet their audience's interests. In 1924, Street and Smith published four pulp magazines: *TopNotch Adventure*, *Detective Story*, *Western Story*, and *Love Story*. According to the Audit Bureau of Circulation, "These had a combined distribution of 1,182,728, or a circulation of 3,548,184" (Earle 201). What had started as a single culture of letters fractured into many, reflecting different styles, interests, and sensibilities. These magazines mostly specialized in popular genres still familiar to us, and they often served as the context in which the storytelling formulas that characterize those genres developed. Romance, horror, action/adventure, crime/mystery, western, and eventually science fiction all flourished in the pulps, but so did some genres that did not stand the test of time. In the late 1920s and early 1930s, for example, spurred by innovations in aerial warfare, the popularity of Charles Lindbergh, and films like *Wings* and *Hell's Angels*, aviation fiction became its own pulp genre, propagated by magazines like *Flying Aces*, *Air Stories*, and *Air Adventures*.

The narrowing of these magazines' topics promoted a close relationship between readers, writers, editors, illustrators, and publishers. The stories in these magazines are surrounded by paratexts, including editorials, letters to the editor, advertisements, author interviews, and introductions to the individual stories. These paratexts often evince a conscious effort to construct and define the magazine's genre, with editors explicitly asserting their agenda in terms comparable to a manifesto, while readers provide feedback (both solicited and unsolicited) as to

the kind of stories that they like or dislike. Historian John Cheng analyzes these exchanges in detail in his examination of early science fiction pulps, *Astounding Wonder*, noting, "To read these conversations from the backyard [the industry term for the letters to the editor section] is to recognize that reading was a dialogic process of production and reception and that it was a social as well as an individual practice…readers established a sense of community in the public space of its backyard" (52-53). Interpreting these self-conscious attempts at cultural construction is often revealing of how these magazines evince an emerging understanding of everyday life that is shared by its users.

Also revealing are moments when different users of a genre conflict over understandings as to what the genre is or ought to be. Such conflicts are often generational and reflect shifting tastes or priorities. For example, when science fiction writer Brian Aldiss said that pulp magazine publisher Hugo Gernsback "was one of the worst disasters to hit the science fiction field," it was at a time—1973—when users of the genre prioritized literary respectability over Gernsback's preference for scientific didacticism (Aldiss 209). Other times, these intergenerational conflicts signal not a shift in priorities but a rupture that results in one culture of letters splitting into two. Prior to the advent of *Black Mask* magazine, for example, detective fiction could be understood as a single, more or less capacious culture of letters, but after Joseph Shaw's conscious break with the Arthur Conan Doyle tradition, "hardboiled" and "scientific" detectives existed in more or less discrete domains for most of the twentieth century. Still other times, these conflicts reflect individual users' attempts to "switch teams" and identify with a different culture of letters. This is what Sinclair Lewis can be seen as doing when he pokes fun at the eponymous Elmer Gantry for reading pulp fiction. Lewis uses pulp fiction as a shorthand to signal that Gantry is unintellectual, despite the fact that Lewis began his career in the pulps as an

editor of *Adventure*, and despite the fact that many of his friends and influences—including H.L. Mencken and H.G. Wells—either published pulp magazines or had their work reprinted in them. The cultures of letters that comprised the literary field in the 1920s were messy and complex, but an analysis of the fiction of this period shows that realism, the everyday, and scientific expertise are all variable concepts that take on different meanings in different cultural contexts..

Each of the following three chapters considers a different culture of letters and analyzes works of fiction that were central to that culture of letters in 1926. In addition to the fiction, each chapter analyzes some of the paratexts that help construct the culture of letters at that time. Each chapter treats the contribution of one or two users of the genre as central in the formation (or reformation) of the culture of letters.

Works that can be identified as science fiction go back many centuries, but a distinct culture of letters did not emerge around science fiction texts until Hugo Gernsback gave the genre its own magazine, *Amazing Stories*. Chapter two examines *Amazing Stories* during Gernsback's three-year tenure as publisher and editor, from April 1926 until April 1929. While many people assume that early pulp science fiction emphasizes the sublime and exciting aspects of science, I contend that greater emphasis should be placed on the ways in which the genre works to familiarize its readers with the workings of science. Efforts to make science more accessible and bring it quite literally into the family can be seen in the magazine's characterization of scientists, its depiction of technology, and the significant role that it gave to women. Gernsback's utopianism imagines science and technology bringing people together and making the world more peaceful. While science fiction sometimes imagines the sublime and the

grotesque, even at its most horrific, Gernsbackian science fiction sees curiosity as more important than horror or shock.

Black Mask provides a contrasting, hardboiled vision of science's role in everyday life, portraying scientific detection, both in fiction and in reality, as an uncertain representation of an everyday reality that science is insufficient to handle. Chapter three examines how detective fiction bifurcated into two distinct cultures of letters—a culture of the scientific detective, probably best represented at the time by S.S. Van Dine's Philo Vance, and a culture of the hardboiled detective, probably best represented by Dashiell Hammett's Continental Op. The hardboiled detective fiction in *Black Mask* both implicitly and explicitly critiqued the scientific detective and the authority of science more generally. Dashiell Hammett lodged that critique in a 1925 letter to the magazine and developed it in several stories after Joseph Shaw took over as editor in October of 1926. In these early years, the genre came to be concerned with the difficulty of navigating a dangerous and uncertain world and the need to prioritize direct knowledge—going with your gut—over mediated knowledge such as that which science and technology can provide.

Popular fiction tends to be aesthetically conservative, reinforcing stereotypes and relying on storytelling formulas that succeed with its audience. Both *Amazing Stories*' message that science can improve everyday reality and *Black Mask*'s message that science is insufficient to reliably understand everyday reality evince this aesthetic conservatism but for audiences bringing different assumptions to their reading. Operating according to a different set of aesthetic criteria, high culture genres such as the realist novel often afford writers the opportunity to create a more complex portrayal of their subject. This is what Sinclair Lewis does in his Pulitzer Prize winning novel about a medical doctor turned research scientist, *Arrowsmith*. Chapter four

examines Lewis's novel and his letter rejecting the Pulitzer Prize. In both, Lewis questions the norms and institutions by which expert authority is constructed. The novel depicts the pure research scientist as a figure who stands in oppositions to institutional authority, but also shows pure research to be problematically divorced from everyday reality.

These three cultures of letters—science fiction, hardboiled detective fiction, and the realist novel—can be understood as a dialectic. *Amazing Stories* crystalizes the view that science is beneficial to everyday reality. *Black Mask* resists this interpretation. *Arrowsmith* encompasses both sides of the dialectic, venerating the possibility of advancement through scientific discovery while also emphasizing the importance of placing critical pressure on expert authority.

Chapter 2
"Extravagant fiction today…….cold fact tomorrow."
Amazing Stories and Familiar Science Fiction

In *Astounding Wonder* (2012), his history of *Amazing Stories*, David Cheng writes, "For interwar science fiction, 'amazing,' 'astounding,' and 'wonder' were more than magazine titles; they were also metaphors for a specific style to imagine science, clarion calls for its conversation" (84). Cheng's assertion represents the conventional wisdom within science fiction studies, but I contend that an overemphasis on wonder has led to misunderstandings of the genre and particularly of interwar science fiction. This chapter critiques assumptions that scholars like Cheng have made about the place of wonder in interwar science fiction and attempts to correct those assumptions by calling attention to familiarity as a significant theme in *Amazing Stories*. During his three-year tenure as editor of the magazine, Hugo Gernsback showed great interest in the potential of science to improve everyday life, and encouraged his readers to familiarize themselves with science's workings.

- **The magazine's inaugural issue** points to some of these other themes and motifs as both the cover art and editorial statement explore the relationship between the fantastic and the everyday.
- Existing **theoretical understandings** of the genre tend to overlook the everyday in science fiction, focusing instead on "wonder," "the sublime," "estrangement," and "defamiliarization." I propose "familiarization" as an alternate framework.

- "Familiarization" is useful in part because it helps to underscore the role of family and friends in the **characterization of scientists**. Personal relationships in *Amazing Stories* help scientist characters see the world in less coldly objective ways.
- **Technology**, especially radio, helps forge these personal relationships by serving as a medium through which different people can make a connection.
- **Women** connected to the genre from the beginning, but, contrary to popular belief, early women readers and writers appreciated, not its themes of domesticity, but rather its escapist elements and its radical reconfigurations of everyday life.
- The legacy of **World War I** posed a challenge to Gernsback's advocacy for scientific progress, but he responded by presenting a vision of how technology could lead to bloodless war.
- H.P. Lovecraft's ***The Color Out of Space*** poses a different challenge to the editor's legacy, but ultimately points to both the strengths and weaknesses of familiarity as a theme in science fiction.

"A New Sort of Magazine": The inaugural issue

When people think about the cover of *Amazing Stories*, they tend to focus on the top half of the page. Isaac Asimov once wrote that when he encountered the classic pulp as a young child, "The most characteristic aspect of the cover of that magazine, at least to me, was the lettering of the name. It began with a giant A in the upper left of the magazine (which was 8½ by 11 inches in size). Naturally, the remaining letters couldn't be that large; there wasn't room. They tailed off smaller and smaller therefore. The entire effect was that of an onrushing (or, perhaps, leave-taking) comet or rocket ship" (226). Asimov's description of the magazine's

cover conveys his initial impression that this magazine was what its name promised: amazing. This quality of amazement which science fiction often produces—through, for instance, vivid descriptions of onrushing comets and leave-taking rockets—has been central to many critical and theoretical examinations of both the magazine and the genre. Let's look at the very first issue of the magazine (Figure 1). There, it seems that "amazing" is most important in describing the top half of the image, while the bottom half conveys a range of equally significant but often underappreciated qualities: sentimentality, playfulness, and perhaps most importantly, familiarity.

The image's color scheme signals this distinction between top and bottom: while the top utilizes primary colors and sharp contrasts (yellow backdrop; blue lettering; red and white planet with blue and white rings), the bottom features a much duller set of grays and browns. In the top half, in the space left open by the shrinking letters of the magazine's name, a large ringed planet dominates the reader's view. At the top right corner of the page, the rings are partially obstructed by the words "Hugo Gernsback Editor." In front of the ringed planet but still in the background of the image are two icy mountains, each of which is topped by sailing vessels, and several figures appear to be rappelling down the mountain from the ships. The exhilarating contradictions implied by these elements of the picture make the image a textbook example of the fantastic, the affect produced when "the perspectives enforced by the ground rules of the narrative world must be diametrically contradicted" (Rabkin 8). As far as the viewer of this image knows, sailing ships do not belong on top of mountains, nor do they belong somewhere other than earth, so their presence invites an array of questions and speculations: How did the ships get there? Are they alien vessels that, though shaped like sailboats, are in fact spaceships?

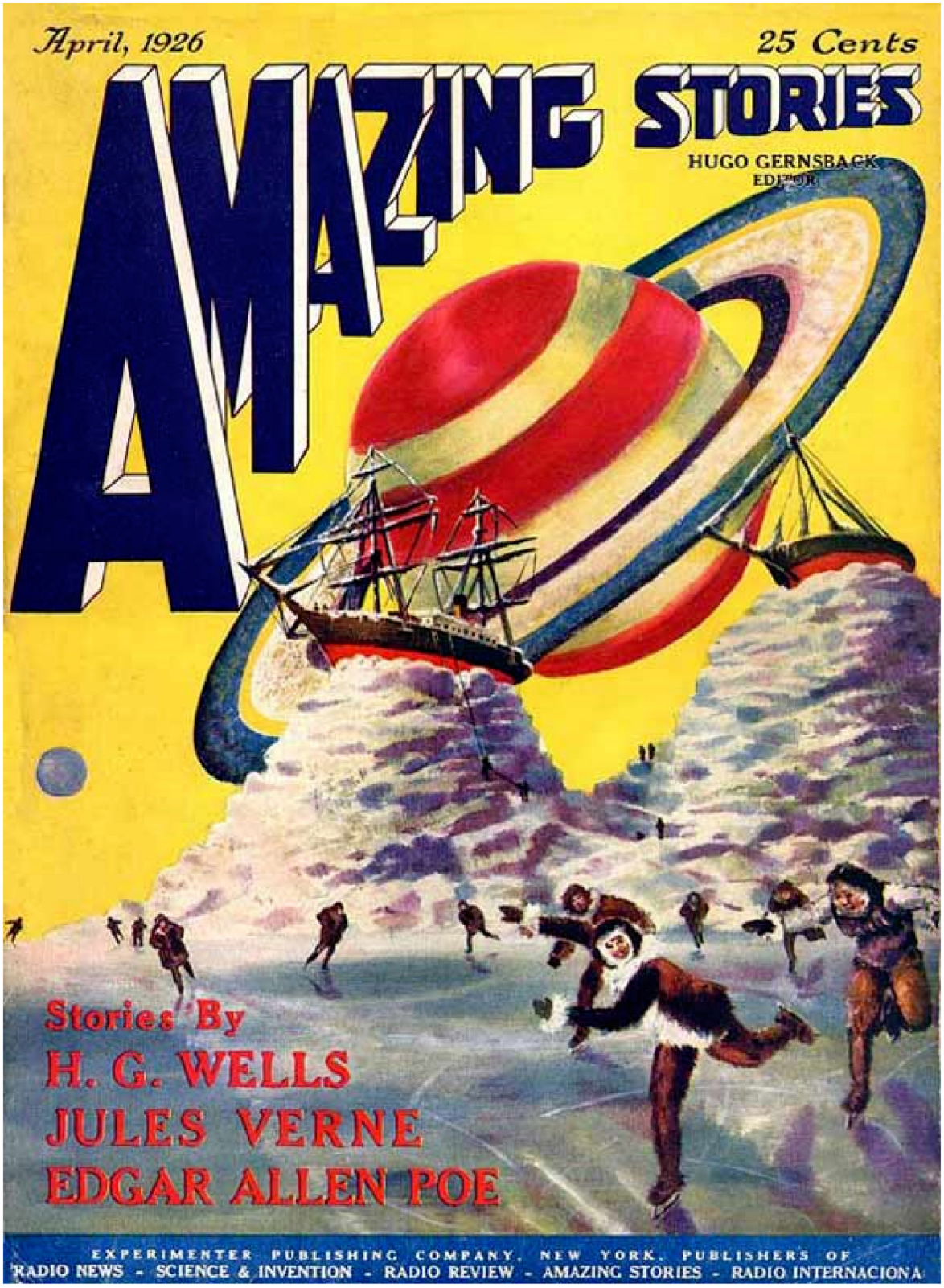

Figure 1. Cover of *Amazing Stories*, April 1926, by Frank Paul.

Or are they the transports of an advanced human civilization? Or are they rather unexceptional seafaring ships that simply arrived in this strange locale through exceptional means?

The bottom portion of the picture does nothing to answer these questions, but it substantially alters the emotional content of the image from what one might expect by looking only at the top. In the foreground of the picture, several figures, apparently humans wearing thick fur clothing, are skating on a frozen lake. The positions of their bodies indicate variously calm or playfulness, and the faces that can be discerned bear smiles. This portion of the picture does not undermine the fantastic nature of the image as a whole—indeed, the uncanny nature of the juxtaposition only heightens the viewer's sense of wonder—but it does add a different dimension to any interpretation of the cover. The top of the image, from the lettering of the name to the ringed planet to the ships to the climbing people on the mountain, tells us unambiguously that we are in the realm of the extraordinary. But the bottom is disarmingly ordinary. Except for the slightly unusual clothes, everything about the skaters appears to be straight out of a Currier and Ives print.

The drawing's resemblance to Currier and Ives is telling. As historian Bryan LeBeau has noted, nineteenth century Americans felt a skepticism towards cities that posed a problem for visual representation. Charles Parsons's *Central Park, Winter: The Skating Pond* (Figure 2), the famous Currier and Ives print to which the cover likely alludes, attempts to resolve this problem: "City residents appear to be having a wonderful time, belying any stories about the sordid conditions of city life in America. A small dog barks at the skaters from the edge of the ice, a child on wobbly ankles learns to skate, some beginners fall on the ice, and experts show their talent" (LeBeau 164). Parsons's print provides reassurance to ambivalent rural Americans that New York City is nothing to be feared because life there is not nearly as dangerous or alien as it

Figure 2. Currier and Ives lithograph, *Central Park, Winter: The Skating Pond*, 1862, by Charles Parsons.

may at first seem. Frank Paul, the artist who painted the cover of *Amazing Stories* and who provided all of the artwork for the magazine during its early years, produces a similarly reassuring effect, and both Parsons and Paul appear to subscribe to a common set of cultural motifs. The *Amazing Stories* cover conveys an implicit message that, while the stories inside may be amazing, they are also pleasant and recognizable. Or at least, if the stories are not recognizable to us, they are to those characters with whom we will be traveling. We readers may consider ice skating on a distant planetary body to be an extremely exotic activity, but from this image we can infer that there are those in some narrative world for whom it is quite familiar.

This implicit assurance of familiarity was not always borne out by the stories in the magazine or by the cover art of later issues, but it is nonetheless an important and often

unexamined component of Hugo Gernsback's agenda as the writer, publisher, and editor who crystalized the science fiction genre.* Specifically, Gernsback attempts to foster a sense of familiarity in his readers with regard to the wonders of science and technology. In the editorial statement accompanying the first issue of *Amazing*, Gernsback includes comments about people's relationship with science:

> Science, through its various branches of mechanics, electricity, astronomy, etc., enters so immediately into all our lives today, and we are so much immersed in this science, that we have become rather prone to take new inventions and discoveries for granted. Our entire mode of living has changed with the present progress, and it is little wonder, therefore, that many fantastic situations—impossible 100 years ago—are brought about today (1:3).

In this observation, Gernsback tacitly asserts that science—a somewhat vague term in his hands—is a powerful method by which the world is known and experienced. As with the Horace McCoy quotation discussed in the introduction, the very fact we take science for granted serves as evidence of our immersion in it. Gernsback's words contain within them the first three notions I identified as present in the worldview discussed earlier: (1) Science is so widespread that we are "immersed" in it, (2) Scientists affect "our entire mode of living," and (3) Science can be discussed as a collective entity, reflected in Gernsback's informal list of "its various branches of mechanics, electricity, astronomy, etc."

In observing that we take scientific innovations for granted, it would seem that Gernsback's goal is to estrange his readers from the present state of affairs—to encourage them to step back from their immersion in science and marvel at it. But he is not simply fostering a sense of excitement about scientific progress; he is also arguing for the utility of the emergent genre which he initially terms "scientifiction." Gernsback asserts that the stories published in

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* Gernsback's precise place in the genealogy of science fiction—whether or not he was "the father of science fiction" and what influence he had on the genre—is a source of some debate among writers and critics. For an extended discussion of this debate, see Appendix I.

Amazing Stories will be able to teach readers scientific concepts, inspire future innovations, and predict future discoveries. Furthermore, he states that these concepts, innovations, and discoveries may drastically alter our daily lives. Two key ideas, then, are at play in Gernsback's April 1926 editorial—the fantastic and the everyday. These two would seem to be at odds with one another, but Gernsback aligns them by positing an historical narrative within which that which was fantastic 100 years ago is now everyday, and that which is fantastic today will be everyday even sooner. This narrative is evoked by the banner above Gernsback's editorials in every issue of the magazine: "Extravagant fiction today.....cold fact tomorrow." Scientifiction, according to Gernsback's argument, can actively encourage this form of historical progress through education, inspiration, and prediction. Gernsbackian science fiction encourages readers not to step back from and reflect upon science, but rather to actively familiarize themselves with science's workings.

Science fiction theory and familiarization

Asserting that familiarization is a key element of Gernsbackian science fiction goes against the grain of much science fiction theory. The vocabulary of science fiction scholarship has typically been geared towards highlighting the ways in which the genre presents otherness and capitalizes on readers' reactions to that which is outside of the ordinary. This tendency dates back at least to the coining of the term "sense of wonder" within science fiction fandom in the 1940's to describe the sensation that science fiction should inspire. According to John Clute and Peter Nicholls:

> The 'sense of wonder' comes not from brilliant writing or even from brilliant conceptualizing; it comes from a sudden opening of a closed door in the reader's mind…. In other words, the 'sense of wonder' may not necessarily be something generated *in the text* by a writer…it is created by the writer putting the readers in a position from which

> they can glimpse themselves, with no further auctorial aid, a scheme of things where mankind is seen in a new perspective (1084).

Clute, Nicholls and others relate the sense of wonder to another critical term, "conceptual breakthrough," which is defined as the enlightenment that comes from a radical change in a reader's perspective. "Sense of wonder" thus describes an emotional experience, while "conceptual breakthrough" represents a concomitant intellectual experience. But from the above description, "sense of wonder" would appear to also relate to another, more traditional critical concept, that of the sublime.

The sublime, according to Edmund Burke, is a sense of terror produced by a circumstance within which no actual danger exists. Burke asserts that our awareness that there is no actual danger produces delight. Immanuel Kant's definition of the sublime differs from Burke's in its emphasis on the relationship between the sensory breakdown that sublime objects produce and the cognitive recuperation that follows. He divides the sublime into two types. The dynamic sublime, like the Burkean sublime, arouses terror but is viewed from a position of safety; images of tornadoes and volcanoes may be described as dynamically sublime. The mathematical sublime refers to objects that are so large that they initially appear to be infinitely great, objects "*that in comparison with which everything else is small*" (109). However, as Kant goes on to note, objects are only relatively great; an absolutely great object does not exist in nature:

> Consequently it is the state of mind produced by a certain representation with which the reflective Judgement is occupied, and not the Object, that is to be called sublime…*the sublime is that, the mere ability to think which, shows a faculty of the mind surpassing every standard of Sense* (110).

A sensation that seems to be directed outward at that which appears great ultimately leads inward towards a greater understanding of the self, one's mind, and the relationship between one's

perception and the outside world. A classic example of this process can be found in Wordsworth's *The Prelude*. This episode comes after the speaker has taken a boat that had been tied to a willow tree:

> The horizon's bound, a huge peak, black and huge,
> As if with voluntary power instinct,
> Upreared its head. I struck and struck again,
> And growing still in stature the grim shape
> Towered up between me and the stars, and still,
> For so it seemed, with purpose of its own
> And measured motion like a living thing,
> Strode after me. With trembling oars I turned,
> And through the silent water stole my way
> Back to the covert of the willow tree;
> There in her mooring-place I left my bark,--
> And through the meadows homeward went, in grave
> And serious mood; but after I had seen
> That spectacle, for many days, my brain
> Worked with a dim and undetermined sense
> Of unknown modes of being; o'er my thoughts
> There hung a darkness, call it solitude
> Or blank desertion. No familiar shapes
> Remained, no pleasant images of trees,
> Of sea or sky, no colours of green fields;
> But huge and mighty forms, that do not live
> Like living men, moved slowly through the mind
> By day, and were a trouble to my dreams (406-28).

Here, the grandiosity of nature has such a profound effect on the speaker that it prompts a serious and sustained contemplation of existence itself. On a casual reading these lines would seem to exemplify the pathetic fallacy. But Wordsworth is not personifying the peak; the speaker's repeated use of similes serve as a reminder of his awareness that there is a disjuncture between semblance and reality even as his descriptions call that disjuncture into question. The mountain rose *as if* with instinct, it *seemed* to tower up with purpose of its own, and it moved *like* a living thing. The emotional impact of this semblance is suggested by the trembling of the oars and made explicit by the speaker's description of his grave and serious mood, but the emphasis here

is placed not on feelings but on thoughts. The encounter causes the speaker to turn back and leave the boat with which he made his journey, but Wordsworth's pun on the word bark suggests that the speaker is also leaving behind the familiar ways in which he perceives nature. The bark represents the surface of nature, but now the speaker is looking more deeply. The passage's final lines imagine forms that do not live like living men, suggesting that those forms do live in some alien sense of the term. If the speaker's perception can be proven so jarringly incorrect, then how could he be certain of any of his perceptions regarding how life works? Who can imagine what nature can present us with?

With those lines, the speaker's thoughts take on a distinctly science fictional aspect, and Wordsworth depicts the kind of thinking that Gernsback himself evokes in many of his editorials. Repeatedly in his editorials, Gernsback defends what may be seen as the imaginative excesses of the magazine's stories: "AS we read the average scientifiction story, particularly of the class where the hero is sending power by means of some 'impossible' ray and does other probably 'impossible' and certainly extravagant things, we sometimes are apt to smile and marvel on the audacity of the author…. On the other hand, I maintain that the average fiction writer seems entirely too tame and will have to draw a great deal more from his imagination if he is to keep going" (2:101). His strategy for defending this claim is to present recent real-world scientific inventions and discoveries in highly sensational terms so as to arouse the senses of his readers in a manner analogous to Wordsworth's speaker. For example, he writes, "If someone should come along and tell you of ice, boiling hot, you would probably laugh at him. Nevertheless, Professor P.W. Bridgman, of the Carnegie Institute, in Washington, while subjecting water to a pressure of 300,000 pounds to the square inch, found that under such tremendous pressure water first becomes solid, turning into ice" (1:382). These sorts of

descriptions serve to disrupt the reader's common sense understanding of the boundaries between fact and imagination. Gernsback signals this disruption in many of the editorials' titles: "Fiction versus Facts," "'Impossible' Facts," "Incredible Facts," "Surprising Facts," "Strange Facts," "Facts Outfictioned," "New Amazing Facts," and so on.

While still potentially useful in some contexts, "wonder" has become a somewhat stale catchword within science fiction criticism. Take a quick survey of titles in the field—*Astounding Wonder*, *Anatomy of Wonder*, *Mechanics of Wonder*, *In Search of Wonder*, *Women of Wonder*, *Partners in Wonder*, etc.—and it becomes apparent that critics evoke wonder not as a hermeneutic tool but rather as a generic signifier for science fiction. Gernsback himself may be partly to blame for this slippage; his two magazines after *Amazing Stories* were *Air Wonder Stories* and *Science Wonder Stories*, later consolidated into *Wonder Stories*. But as evocative of wonder as Gernsback's editorials often are, this sense is not an important component of the stories themselves. Alien life forms rarely if ever trouble the dreams of the typical *Amazing Stories* character; on the contrary, they tend to respond to aliens as an opportunity to learn rather than as representatives of the unknown or unknowable. For example, in Curt Siodmak's "Eggs from Lake Tanganyika," published in July 1926, Professor Meyer-Maier brings several large eggs from Africa back to his home in Berlin. When the eggs break open, revealing dangerous giant insects, the story describes the Professor's response: "'It breaks out of its shell like a chicken, it does not change into a chrysalis,' he thought mechanically. At last his mind cleared and he awoke to the emergency" (1:497). His automatic reaction—described, significantly, with the technological adverb "mechanically"—is one of intellectual curiosity.[8] Even when he realizes the danger, that realization is described as mental awakening rather than as an overwhelming emotion. This sentiment holds at the story's conclusion, when Meyer-Maier says, "It is well that

there is a supreme wisdom which controls the laws of nature. Otherwise the world would be subject to the strangest surprises" (1:501). Most would consider a giant insect attack itself to be the strangest surprise, but by the story's end, the scientifically informed professor is able to incorporate this phenomenon into a reasoned understanding of nature's workings. The notion of a supreme wisdom suggests divine providence, but more importantly, it affirms the scientist's belief in an ordered and rule-governed universe.

In order to appreciate the attitude that Meyer-Maier displays here, it may be useful to distinguish between wonder and amazement. Upon the hatching of the eggs, readers may experience "a sudden opening of a closed door" in their minds as Clute and Nicholls define sense of wonder. That suddenly opened door may astonish, producing the sensation that Wordsworth's speaker experiences when he describes a "blank desertion" where "no familiar shapes" remain. But for Meyer-Maier that door opens into a maze that is presumed to have a solution that can be discerned through reason. That confidence in the existence of a solution is central to *Amazing Stories*. "Wonder" is only the first step in the process leading from astonishment to conceptual breakthrough that constitutes *Amazing Stories*' science fictional sublime. Through observation of Meyer-Maier's reaction, readers are taken from a sense of wonder to a sense of amazement, and by the end of the story they arrive at a sense of familiarity, as the giant insects have themselves become "familiar shapes."

For a different method of interpreting science fiction's use of alienness, one might turn to Darko Suvin, who observes that the genre develops a fictional premise, which he sometimes refers to as the *novum*, with scientific rigor. He writes, "the effect of such factual reporting of fictions is one of confronting a new set of normative systems—a Ptolemaic-type closed-world

picture—with a point of view or look implying a new set of norms; in literary theory this is known as the attitude of *estrangement*" (Suvin 6). Suvin derives his understanding of estrangement largely from Russian formalist Viktor Shklovsky's concept of "ostranenie," a term more commonly translated into English as "defamiliarization." As Shklovsky puts it, "After we see an object several times, we begin to recognize it. The object is in front of us and we know about it, but we do not see it—hence we cannot say anything significant about it. Art removes us from the automatism of perception" (Shklovsky 721). That such defamiliarization can have significant sociopolitical content is of clear importance to both Shklovsky and Suvin. Shklovsky, for example, provides an excerpt from Tolstoy's story, "Kholstomer," in which the narrator, a horse, provides his opinion on humans' idea of private property. In this classic example, a rather ordinary institution is rendered unusual—and, implicitly, is called into question—because it is presented from an unusual perspective.[9]

For Suvin, what makes science fiction unique as a genre is the cognitive rigor with which it undertakes this effort of normalizing the unusual. He defines science fiction as, "*a literary genre whose necessary and sufficient conditions are the presence and interaction of estrangement and cognition, and whose main formal device is an imaginative framework alternative to the author's empirical environment*" (7-8). Cognition is, in this definition, the particular way in which science fiction removes us from "the automatism of perception," to use Shklovsky's terminology. Suvin's definition parallels, to a certain extent, that provided by Eric Rabkin: "a work belongs to the genre of science fiction if its narrative world is at least somewhat different from our own, and if that difference is apparent against the background of an organized body of knowledge" (119). Both of these definitions contain two elements; (1) a difference between the world in the story and the empirical world of the reader or author, and (2) an

intellectual component described either as "cognition" or "an organized body of knowledge." The challenge in interpreting Gernsback is due in no small part to the fact that, while the former makes science fiction easier to situate within more established literary traditions, Gernsback clearly places more emphasis on the latter.

From the beginning, Gernsback asserted that science fiction stories were "almost always instructive," and this emphasis on the didactic aspect of the genre informed his editorial practices throughout his tenure at the magazine (1:3). He hired natural science professor Dr. T. O'Connor Sloane, Ph.D. (always credited with his degree on the masthead) as Associate Editor to check the scientific veracity of the stories. And he touted this commitment both to accuracy and educational value in the magazine's pages. The editorial prefaces at the beginnings of stories typically feature comments such as, "*The story not only is good fiction, but contains excellent science*" (2:215), or more specific remarks like, "*The present story…is excellent for anyone who wants to brush up his knowledge of comets*" (2:261). In the September 1927 issue, Gernsback introduced a new segment of the magazine titled "What do you know?" which quizzed readers on the scientific and historical facts they should have learned from the magazine. This material does not estrange anyone from anything; to be estranged from something means to see it from a new perspective, which requires that one already know it from one perspective. Gernsback's didacticism makes no presumption of foreknowledge, a position that likely stems from the fact that he began publishing scientifiction not in fiction magazines but in popular science magazines. This position also probably helped him develop the young fan base that would become the next generation of science fiction writers. Isaac Asimov's father, for example, only allowed him to buy his first science fiction magazine, a copy of *Science Wonder Stories*, because "science" was in the title (Gunn *Isaac Asimov* 8).

Both "sense of wonder" and "cognitive estrangement" (as well as their more traditional literary analogues, sublimity and defamiliarization) have their utility in offering different perspectives on science fiction as a genre. "Sense of wonder" refers primarily to science fiction's emotional content and underscores the genre's origins within a romantic tradition. A line can be drawn from the startling landscapes of Wordsworth, Radcliffe, and Shelley to the starscapes of Clarke and the cityscapes of Gibson. "Cognitive estrangement," meanwhile, can describe science fiction works' intellectual and sociopolitical content and emphasizes the genre's relationship with an allegorical tradition. Tolstoy's and Orwell's talking creatures are the literary cousins of Bradbury's Martians and LeGuin's Ekumen.

Both effects can be found in Gernsback's *Amazing Stories*, but neither effect seems adequate in describing Gernsback's professed agenda or in capturing the most salient features of a typical Gernsbackian science fiction story. For this reason, I would like to propose that what is crucial to appreciating Gernsbackian science fiction is not wonder or defamiliarization but rather familiarization. "Familiarity" holds a dual meaning: it signifies both knowledge and kinship. The agenda of Gernsbackian science fiction hinges on this dualism. Gernsback encourages his readers not simply to learn about science but to become *acquainted* with it, to treat scientific advancement as an integral component of modern family life.

"Eyes of a poet": The scientist's friends and family

In their book, *Objectivity* (2007), Lorraine Daston and Peter Galison examine how the history of scientific objectivity is tied to the production of images and the cultivation of a disinterested persona that could present an "objective view." They write, "First and foremost,

objectivity is the suppression of some aspect of the self" (36). Objectivity emerged as an aspiration for scientists around the mid-nineteenth century, and the emergence of that aspiration helped to reinforce a widespread image of scientists as cold and mechanical. Daston and Galison write, "The public personas of artist and scientist polarized during this period" (37). The scientific romances of the Victorian and Edwardian periods pick up on these new scientific priorities. Many works by Jules Verne, H.G. Wells, and Arthur Conan Doyle take as their impetus the need to produce a fact within a primarily visual epistemological field. Romances like *Voyage au Centre de la Terre* (1864)[10] or *The Lost World* (1912) are built on the premise that seeing is believing, and they feature scientists who subordinate their subjective vision for an objective view. In these stories, there are two ways to experience nature: the purely sublime, as represented by the nonscientist characters (such as Axel in *Voyage au Centre de la Terre* or Edward Malone in *The Lost World*) or the purely rational, as represented by the scientists. Verne's Professor Lidenbrock and Conan Doyle's Professor Challenger care only about visually confirming their discoveries, and their pursuit of these discoveries leads these scientist characters to be highly socially awkward if not downright abrasive.[11] The alienated scientific genius, whose pursuit of discovery was incommensurable with normal interpersonal relationships, was a staple of the scientific romance, and revising this stock character is one of the most striking ways in which *Amazing Stories* familiarizes its readers with science.[12] The magazine's revision of this stock character is tied to symbols of vision; the scientist character sees the world differently thanks to his relationship with his friends and family.

The magazine's very first issue features a story that revises this stock character, "The Man Who Saved the Earth," written by Austin Hall. First published in *All-Story* in 1919, Hall's piece depicts a plot on the part of Martian invaders to steal the Earth's oceans. Before that plot

unfolds, the story introduces us to Dr. Robold. Dr. Robold is described as "the sternest product of science: unbending, hardened by experiment, and caustic in his condemnation of the frailness of human nature" (1:75). The story suggests that Dr. Robold has cultivated the scientific aspects of his mind to such an extent that it has over-ridden all other modes of thought, including respectfulness and collegiality: "Even into the castles of science he had gone like a juggernaut. It is hard to have one's theories derided—yea, even for a scientist—and to be called a fool! Dr. Robold knew no middle language; he was not relished by science" (1:75). Acerbic towards both nonprofessionals and the professional establishment alike, Robold has much in common with Professor Lidenbrock or Professor Challenger. Like many of the story's forebears, the description of the curmudgeonly scientist comes on the very first page, giving a sense that these descriptions are not so much important elements of the story as they are applications of a formula. Verne and Conan Doyle similarly dispense with this convention up front and place focus not on the scientists but on the scientists' less-educated associates, who serve as the viewpoint characters and sometimes as the narrators.

Hall initially gives the impression that his story will follow this route as well, introducing us to the ten-year-old Charley Hyuck, a newsboy whom Robold takes under his wing. Unexpectedly, however, the story then jumps to Charley' adulthood. Describing the adult Charley, Hall writes, "Surely no one at first glance would have taken him for a scientist. Which he was and was not" (1:81). Charley is figured as having the knowledge sufficient to be an accomplished scientist, as well as the insight characteristic of great scientists such as Challenger, Lidenbrock, or his own mentor, Robold. But where said insights left those earlier characters calloused and emotionally insensitive, in Charley they are married to "the dreaming eyes of a poet." Hall expounds on the difference between Charley and others in his field:

> We all of us know our schoolmasters; especially those of science and what they stand for. Facts, facts, nothing but facts; no dreams or romance. Looking back we can grant them just about the emotions of cucumbers. We remember their cold, hard features, the prodding after fact, the accumulation of data. Surely there is no poetry in them (1:81).

Significantly, Hall contrasts Charley with schoolmasters, setting him in opposition to institutional scientific authority and implicitly critiquing formal education as a traditional means of acquiring expertise.[*] Hall's depiction of Charley builds on the model of past apprentice characters such as Owen Warland in "The Artist of the Beautiful." Unsurprisingly, the poet-scientist Hyuck invents a means by which to repel the Martian threat, becoming the eponymous man who saved earth and illustrating the value of his particular mode of scientific practice. Hall's observations about scientists in this story signal an important paradigm shift; countering the Victorian images of the coldhearted scientist, *Amazing Stories* asserts that scientists can be emotionally mature and empathetic. While this is not without precedent, earlier examples of the artist-scientist character type, like Owen Warland, still tend to be socially withdrawn and/or they are identified as inventors in contexts where invention is not necessarily considered a scientific act. This is not to say that Gernsbackian characters were rounded in a literary sense—the average *Amazing Stories* character is undeniably two-dimensional—but they have concerns outside of facts, data, and research, and they began to spend time thinking without their lab coats on. In short, in Gernsback's magazine, the scientist got a life.

The most common way in which stories gave scientists lives was by emphasizing their personal relationships. One of Gernsback's staple writers, Clement Fezandié, gave his scientist character both a personal assistant and, later, an apprentice, with whom he formed a makeshift family. Fezandié's character, Dr. Hackensaw, appeared in 43 issues of *Science and Invention* and

[*] For a more extended discussion of *Amazing Stories*' criticism of formal education and its praise of nontraditional expertise, see Appendix II.

made his final two appearances in the June and July 1926 issues of *Amazing Stories*. This series, "Dr. Hackensaw's Secrets," typically features Hackensaw revealing the "secrets" of, for example, suspended animation or atomic energy by discoursing on the topic to a reporter or other non-expert. In the June 1926 story, "Some Minor Inventions," Hackensaw shows his assistant, Pep Perkins, some of his simple machines designed to lend convenience to everyday life. Most of these are practical, such as a dictation typewriter or an antitheft devise for cars, but they become more comically fanciful until ultimately Hackensaw shows Pep his Gynaionometer, a device to measure women's age. This invention caused Hackensaw to become estranged from his female friends and relatives, and he tells Pep, "There are some things it doesn't pay to monkey with. One of them is a buzz-saw. Another is a woman's age!" (1:284). While this story could easily be dismissed as casual sexism played for comic effect, it inadvertently gives us a sense of just how complex the relationship between social conventions and technology really is. When describing the dictating typewriter, an ostensibly successful invention, Hackensaw explains his solution to the problem of homophones: "I realized it would be a very easy matter for the dictator to learn to pronounce them slightly differently. Thus, the syllables for 'dough,' 'doe,' and 'do' could be pronounced somewhat as they are spelt" (1:282). The message of this story would seem to be that in the dialectic between people and technology, sometimes the latter must adapt to serve the former, and sometimes the former must adapt to serve the latter, and for the individual inventor, it is difficult to predict which party will yield in a particular circumstance.

Hackensaw, of course, did not lose all his female acquaintances thanks to the Gynaionometer; he still has Pep, and though Fezandié does not delve deeply into his characters' personal lives, he does suggest that their relationship is akin to that of father and daughter, with Pep referring to Hackensaw as "Pop." In the last Hackensaw story, "The Secret of the Invisible

Girl," their family unit expands to include Phessenden Keene, whom Hackensaw hires as a research assistant at Pep's behest. In the story, Keene discovers a young woman in Africa who is naturally invisible. He and Hackensaw capture her and bring her to New York so that they can study her. They clothe her and apply makeup to her face so that they can see her—they do not specify the color of the makeup used—and Keene falls in love with her "at first sight" (1:384). The invisible girl proves unable to deal with the change in climate and dies, but the story concludes with an assurance that, years later, Keene married Pep, and the two are very happy together. The story's colonialism and odd sexual politics are remarkable: Fezandié creates an association between invisibility and the "dark continent" and imposes that association on the African girl, quite literally rendering the racial and sexual other a blank slate onto whom the white American men can, however briefly, place whatever image he chooses. At first this seems appealing, but its tragic consequences paint Hackensaw and Keene's actions as an exercise in scientific hubris.

A. Hyatt Verrill makes similar symbolic use of invisibility in "The Man who Could Vanish," in which the personal relationship being emphasized is between Dr. Lemuel Unsinn and his best friend, the unnamed narrator of the story. Near the very beginning of the story, the narrator establishes his own ignorance while simultaneously explaining the premise of the story: "Although I could not, as a layman, see the importance of the discovery, my friend was most enthusiastic about the matter, and, among other statements, declared that it might yet be possible to render objects invisible" (1:902). Unsinn frequently chastises his friend for his ignorance, but that ignorance is in fact crucial. Unsinn is a member of the scientific establishment; indeed, his experiments in invisibility are prompted by what he has learned at an international conference of scientists. He could have, presumably, performed his experiments with a colleague, but instead

he called the narrator who, as a non-expert, provides a better sounding board for Unsinn's ideas as well as a better collaborator in brainstorming the real-world utility of his invention. "Think of what it would mean to a nation!" Unsinn says, "Armies, battleships, invisible! And—" His friend breaks in, "Think what it would mean to the crooks" (1:903). In this statement, we see the other purpose served by the non-expert friend, as an ethical check on the scientist's enthusiasm. Later, he tells Unsinn, "Won't you listen to reason and common sense? You're so carried away with your success that you haven't stopped to think what it would mean, if you let the world know of your invention" (1:908). Ultimately, in Verrill's story, Unsinn comes around to the narrator's way of thinking and does not disclose his invention to the public, instead handing the technology over to the government. The narrator's invocation of common sense is significant, as the moral of Gernsbackian stories often asserts that if scientific advancements are to be relevant to everyday life, science must be married to common sense. Both Verill and Fezandié symbolically link invisibility to the limits of the scientist's knowledge. In neither story do the scientists foresee the consequences of their actions, but in "The Man who Could Vanish," Unsinn avoids those consequences thanks to the counsel of his friend.

Amazing Stories shows an interest in friendships, not only between an expert and a nonexpert, but also between two experts. The existence of these friendships provides another point of contrast between these scientists and their forebears, hostile loners like Professor Lidenbrock and Professor Challenger. "The Appendix and the Spectacles," for example, is built around the friendship between a mathematics professor and a medical doctor. The story was written by Miles J. Breuer, a practicing physician and frequent pulp writer. Bookstrom, a medical student, is forced to drop out of school when Cladgett, the bank president, refuses an extension on Bookstrom's student loans. "This bank isn't looking after little boys and their dreams,"

Cladgett tells him (3:774). Fifteen years later, Cladgett has appendicitis, but resists surgery due to the time and money he would lose during recuperation. Bookstrom has become a dimensional mathematics professor and happens to be friends with Cladgett's doctor, Banza. He proposes removing his appendix by shifting it into the fourth dimension. They do so, but shortly thereafter, Cladgett becomes ill again, and discovers it is due to a pair of spectacles left in his abdomen. Bookstrom tells him, "If you want me to get those spectacles out of you, right here and now you settle a sum to found a Students' Fund to loan money to worthy and needy scientific students, which they may pay back when they are established and earning money" (3:778). They come up with the idea for this revenge scheme while having dinner together at a tavern. Not even Hackensaw or Unsinn are seen out to dinner with a fellow scientist. Bookstrom's advances in dimensional mathematics aside, the story does not encourage readers to see either man as a genius; they are just a couple of regular guys griping about money and job problems and coming up with a creative solution to those problems together. Their accomplishment comes not only from genius but also from how well they have harmonized their social lives and their careers.

By using spectacles, Breuer's story again associates the scientists' work with a symbol of sight. Gernsback detractor Brian Aldiss once wrote that in *Amazing Stories*, "screwdrivers substitute for vision," but vision is quite literally all over the magazine in surprising ways (177). *Amazing Stories* suggests that vision is important to the scientists, but not because it reinforces a self-effacing objectivity as it did for the scientists who Lorraine Daston and Peter Galison analyze. Symbols of vision represent collaboration between the personal and the professional, the objective and the subjective. In *Amazing Stories*, the scientist got a life and began to look at the world through "the dreaming eyes of a poet," eyes that see not only sublimely or objectively, but from a more personal perspective. When the scientist got a life, the

kind of science he did changed. When he came from a modest background, his professional interests became more modest, and when he gained friends and family, his professional interests became more friend- and family-oriented.

Electro-importing: Personal connections through technology

Aldiss writes that in Gernsbackian science fiction, "screwdrivers substitute for vision," but for the very materialist Gernsback, it might reasonably be said that screwdrivers are necessary for vision to be meaningful or plausible (177). Gadget fiction dominates the stories published in this period,[13] and much of this gadget fiction centers on a different character type, the amateur inventor. Surpassing his interest in traditional scientific experts, Gernsback's interest in these lay experts can be traced to his first business, The Electro-Importing Company, which, in 1906, became the first in the United States to sell wireless apparatus directly to the public for home use (Douglas 199). Gernsback remained an advocate for amateur inventors and radio hobbyists for his entire life. Vision might've been crucial for the scientific thinkers, but radio was the ideal symbol for these amateur tinkerers, as Gernsbackian fiction emphasized the potential for technology to bring disparate people closer together.

Amazing Stories' gadget stories typically do not feature radical breakthroughs like rockets or time machines, but more commonly depict small inventions that will improve the quality of everyday activities. Examples of this would include Hackensaw's minor inventions or the baseball in Bob Olsen's "The Educated Pill." Olsen's story, narrated by a baseball team's manager, recounts the career of an inventor and pitcher, "A Scotch guy named Gottlieb Schnitzelkuchen" (3:365). Schnitzelkuchen, "a little dried up runt of a guy," has invented a baseball with a motor in it that throws impossible pitches (3:366). Schnitzelkuchen leads the

team to the pennant, but injures himself chasing after a wild pitch. The team wins the pennant anyway, and at the conclusion of the story, the manager tells Schnitzelkuchen the news. Describing the pitcher's reaction, the manager says, "I never realized what a loyal scout he was, until I seen the way he carried on about us winning the pennant. It wasn't on account of his part in it, neither" (3:368-369). A physically unassuming immigrant, so anonymous at first that the manager even gets his nationality wrong, has by the end of the story become a proud member of the team and a part of America's national pastime. Ultimately, this story seems to be not about how technology can improve sports, but rather the opportunities that technology can create to bring outsiders into the in-group.

In the context of families, Ellis Parker Butler provides perhaps the single most comedic example of this theme in "An Experiment in Gyro-Hats." The narrator, a hat salesman named Henry, has a daughter who, to Henry's chagrin, falls in love with Walsingham Gribbs. "The thing that staggered me," Henry says, "was that Walsingham was a staggerer" (2:267). Henry initially infers that Walsingham is a drunk, but he later discovers that his chronic imbalance is due to a childhood accident. Walsingham's father had invented a device called the Gribbs Mule Reverser, a spinning platform designed to turn stubborn mules to face the direction they needed to go. One day Walsingham was standing on the device when the motor was activated. He was trapped on the rapidly spinning platform for several hours before it was turned off, and Walsingham has been perpetually dizzy ever since. Henry invents a "gyrohat," a stovepipe hat with a gyroscope in the vacant space at the top designed to keep staggerers such as Walsingham straight. Henry tests the hat on himself while thoroughly drunk and it succeeds in keeping him upright, even when he tries to lie down to go to sleep. Walsingham then tries the hat, but rather than keeping him upright, it causes him to spin for several hours. When they finally get the hat

off of him, he ceases to spin and no longer staggers; the hat had spun him in the opposite direction of the mule reverser, essentially unwinding him and making him a suitable husband for Henry's daughter. The science behind gyroscopes plays an integral part in bringing Walsingham into Henry's family.

All of these gadgets function as media that facilitate connections between people, and no technology at the time served that purpose better than radio. For Gernsback, "radio" refers not only to broadcast technology as the term is used today, but to the entire range of wireless communication devices, including person-to-person audio and visual transmissions such as the telephot in *Ralph 124C 41+*, as well as remote control technologies. What seems most important about the Gernsbackian use of "radio" is that it operates as a prosthetic limb, much like Marshall McLuhan's description of media as "the extensions of man." By means of radio, people extend their mouth, ears, eyes, arms, and legs out infinitely in any direction. Radio extends human subjectivity exponentially, and the universe that humans occupy becomes proportionately smaller as a result.

In "To the Moon by Proxy" by Joseph Schlossel, a paraplegic inventor named Emil has had a lifelong ambition to go to the Moon. He tells the story's narrator, Emil's non-expert friend, "This is the mechanical and wireless age. Hearing, seeing and doing can all be performed mechanically. The vast strides that science has taken, particularly in the fields of radio, have made my task comparatively simple" (3:602). Emil has invented a mechanical man that can go to the Moon for him. Emil tests the device on Earth by thwarting a mugging and killing an escaped circus lion before blasting off to the Moon. There he explores the surface until an alien bashes the proxy's head. The story ends with the narrator leaving Emil's home, and he writes, "I heard him berating himself for not putting the controlling apparatus in a less vulnerable place than the

head" (3:609). Of course, it's better the proxy's head than a human's head, and compared to the automobile stories, it's clear that in science fiction of this period wireless communication technology holds the same promise as transportation technology—to take someone to another place—without the dangers associated with physical movement. But that final line also reveals the irony in Emil's construction of his robotic proxy; envisioning his proxy as humanity's ambassador to the moon, he modeled its form on a non-disabled human body, but this also gave the proxy the same vulnerabilities as a human body (3:603). Not until the end of the story does the real value of radio-controlled appendages become apparent to Emil and the implied reader: they can take whatever shape the designer wants.

Of course, not all radio stories suggest this sort of cyborg utopianism. George McLeod Winsor's *Station X*, originally published in 1919 and serialized from July to September of 1926, was considerably darker, but Gernsback said that it was "by far the greatest radio story that was ever written" (1:293). The story begins with Macrae, an operator in a radio relay station, picking up a transmission from Venus. The Venusians warn him of an impending invasion by the former inhabitants of the moon. These Lunarians had developed a means, via wireless technology, to take over the minds of alien life forms:

> It was an easy thing for a Lunarian to establish with a fellow-being, by mutual consent, a mental rapport, and not only thus to exchange ideas without outward physical means, but even to exchange personalities, which practically amounts to exchanging bodies. But it need not be with a fellow Lunarian. It could be with any being of sufficiently high mental status to be brought on the same plane of mental rapport, and mere physical distance had nothing to do with it. In the case of weaker beings, no mutual consent was necessary (1:306).

By this means, the Lunarians have already taken over the minds of Martians, and are planning on taking over earth. This form of mental invasion is necessary because McLeod, building on H.G. Wells, depicts physical invasion as impossible:

> The conditions of health[,] quite as much as the conditions of disease, depend on the microscopic forms of life, which team both in our bodies and our surroundings. The greater number of the latter are only innocuous because, by being, ab initio, accustomed to their action, we have acquired immunity. But these bacterial and other low forms of life are quite different on Mars from those which are common to the Earth and her satellite. The result would be that no animal form of life from the one could continue to exist on the other (1:306).

Radio-facilitated telepathy is thus the only safe means of interplanetary travel. While the Lunarians' use of this technology is horrifying, establishing a mental rapport irrespective of distance is an appealing and provocative idea. Neither telepathy nor metempsychosis is a new trope in literature at this time, but Winsor gives new life to these tropes by reframing them as technological rather than spiritual phenomena. In *Station X*, radio isn't the bad guy, the Lunarians are. The later chapters of *Station X* focus on the efforts to thwart the invasion by Professor Stanley Rudge, "the most eminent scientists of the day [*sic*]" and a man so committed to his work as to make no time for romance, much to his sister's chagrin (1:453). Unsurprisingly, by the end of the story Rudge has repelled the aliens and found a fiancé.

The romance narrative, typically a subplot in *Amazing Stories*, takes center stage in Benjamin Witwer's "Radio Mates," published in July 1927. Discovering that the love of his life has been deceived into marrying another man, the protagonist invents a means of disintegrating and transporting living beings via radio. He and his love disintegrate themselves in hopes of being reassembled in the future under happier circumstances. With this concluding scene of physical transcendence, Witwer produces an image evocative of the cyberpunk that would emerge 60 years later, with its aspirations to exist beyond the limitations imposed by the "meat" of the body and its interest in technological transformation into a different plane of existence. Westfahl has previously argued that cyberpunk has much in common with Gernsbackian science fiction. Comparing William Gibson's *Neuromancer* to *Ralph 124C 41+*, he observes that in the

two novels, "Both protagonists are initially pictured as being connected to a large, technological network which benefits and sustains them" (*Hugo* 198). According to this argument, the themes of technologically-based networks, so central to science fiction of the internet age, have their beginnings in the ways that Gernsback and his cohort wrestle with the potential uses for radio. Reading these radio stories from a twenty-first century perspective, it is easy to empathize with Westfahl's enthusiasm in identifying Gernsback's stamp on subsequent science fiction. Not only cyberpunk but countless episodes of *Star Trek* build on the transporter premise developed in "Radio Mates." *The Puppet Masters* and *Invasion of the Body Snatchers* hold traces of *Station X*. "To the Moon by Proxy" lays the groundwork for *Avatar*. But rather than simply draw connections between stories from different eras, I want to consider more fundamentally what this artificial extension of human subjectivity means in the Gernsback era. Answering that question comprehensively may be impossible, and doing so may or may not speak to the continued proliferation of this theme in subsequent science fiction, but doing so will address the historical relationship between science and everyday life.

One of the elements that seems to recur in these stories is the idea that radio can facilitate intimacy. The Lunarian idea of a mental rapport, like Gernsback's telephot, provides a modern spin on our understanding of intimacy, which has been described as "an affair (or a technology, or a discourse) of near and knowing bodies" (McLane 435). In the past, love letters could facilitate communication when proximity was impossible, and love tokens could metonymically stand in for absent partners, but only with the advent of the telephone was it possible synchronically to experience mental or emotional closeness decoupled from bodily closeness. And with the advent of radio it became possible to do this wirelessly. This may be a good thing or it may be a bad thing, but one of its inevitable consequences is to dramatically expand the

physical boundaries of what constitutes familiar territory. The Venusians, for example, introduce themselves to Macrae as "your nearest neighbor" (1:302). This concern with intimacy may be an instance where form mirrors content; the literary critic Lauren Berlant has suggested that popular genres foster and arise in response to "intimate publics": "An intimate public operates when a market opens up to a bloc of consumers, claiming to circulate texts and things that express those people's particular core interests and desires. When this kind of 'culture of circulation' takes hold, participants in the intimate public *feel* as though it expresses what is common among them, a subjective likeness that seems to emanate from their history and their ongoing attachments and actions" (5). Berlant's examination of this concept in the context of "women's culture" suggests that intimate publics are gendered, just as the concept of intimacy often is, but Berlant's description of an intimate public applies equally well to science fiction fandom. This suggests that the gendering of intimacy, and of science fiction, may be more complex than one might initially suppose.

Space soap operas: Women and domesticity in *Amazing Stories*

From "An Experiment in Gyro-Hats" to "Radio Mates," the gadget stories discussed in the previous section all share a common interest in utilizing scientific and technological innovation for the purpose of easing everyday domestic tasks. For some writers, this often involves the male scientist—professional or amateur—concerning himself with "women's work" like cooking, cleaning, child-rearing, etc. Few critics have examined this mixing of the conventionally gendered-female domestic sphere with conventionally male-dominated scientific practice. In her analysis of the handful of women writers whose careers in science fiction pulps began in 1929 or 1930, Jane L. Donawerth attributes this concern with domesticity to the

influence of women writers, stating, "Although these women shared with men the romanticizing of science, they offered one particular application that the male writers rarely offered: the transformation of domestic spaces and duties through technology" (138). However, all of the aforementioned tales of domestic gadgetry were written by men. While the cohort of women in science fiction post-1929 may have had a particular interest in transforming domestic spaces, that interest was not shared by the women reading or writing in *Amazing Stories* during its first three years. Those women went to science fiction for an escape from or interrogation of those domestic spaces, not simply a transformation.

Women as readers

It would be inaccurate to say that *Amazing Stories* evinces a progressive gender politics, but it would be equally inaccurate to assume that early pulp science fiction was a single-gendered environment overrun with masculine themes and phallic rockets. *Amazing Stories* was not a hyper-masculine environment, and women were never absent from the culture of letters that emerged around the magazine. It is a commonly held misconception that, prior to the emergence of feminist science fiction writers in the 1960's, women were marginalized figures in the production of science fiction and were mostly if not entirely excluded from both the implied and empirical readership of the genre. In an essay examining the presumed lack of romance and glamour in early science fiction, Anne McCaffrey, evincing the conventional wisdom, writes, "Originally science fiction was predominantly male-authored and written for a specifically science-trained male readership" (287). The notion that science fiction was written for a science-trained readership has already been demonstrated to be untrue; *Amazing Stories* construes the reading of science fiction to be the beginning rather than the end of any scientific training. And

furthermore, the magazine itself suggests that, from the beginning, women were readers of the magazine and were explicitly recognized and courted by its publisher.

In the editorial to the second issue, Gernsback makes his often-repeated assertion, "It is *your* magazine," and he goes on to publish three readers' letters praising the magazine (1:99). The selection of letters—one from Brooklyn, New York, one from West Virginia, and one from Iowa—seems designed to reflect the breadth of the readers on whom the editor conferred this sense of ownership. The writer from Brooklyn says, "Even now my wife is anxiously waiting for me to finish this first issue, so that she may read it herself" (1:99). This letter can be placed alongside Gernsback's later assertion, in his editorial on "Amazing Youth," that "the younger generation makes a dash for each copy [of the magazine], even before father gets a chance to read it" (2:625). Both children and wives, according to Gernsback's editorials, are clamoring to read scientifiction. While, as was discussed earlier, *Amazing Stories* may sometimes suggest an intergenerational conflict, the implied readership nonetheless consists of the entire family—parents *and* children, husbands *and* wives. Gernsback at no point excludes one group so as to more fully court the other. This becomes more explicit in the September 1926 editorial, when Gernsback writes, "A great many women are already reading the new magazine. This is most encouraging" (1:483). The erroneous stereotype that science fiction was a men's genre existed even during the editor's tenure, but Gernsback attempted to correct it whenever he could. In October of 1928 a letter writer stated, "I believed that I was the only feminine reader of your publication," to which Gernsback responded, "We are very glad to hear from one of the fair sex and would be glad if more of the weaker (?) sex were contributors to the Discussions Column" (3:667). The comedic use of a parenthetical question mark suggests an uncertain attitude towards contemporary gender stereotypes, but the editor is serious in soliciting female readers. In January

1930, Gernsback's new magazine, *Science Wonder Stories*, received a letter from Verna Pullen, who supposed that Gernsback would not publish a letter from a woman. He replied, "We have no discrimination against women. Perish the thought—we want them! As a matter of fact, there are almost as many women among our readers as there are men" (Davin 135-136). There is no subscription data to support this boast, but the fact that he would make this claim goes a long way in dispelling the image of pulp science fiction as a boys' club.

It is worth speculating that the prevalence of domestic settings in *Amazing Stories*, the importance of wives and girlfriends as characters, and the resolution of stories like *Station X* in marriage all might reflect a somewhat immature effort on the part of Gernsback's male writers to court this female readership. If this is the case, then Gernsback's cohort very likely misread their audience. In June 1928, *Amazing Stories* published a letter under the headline, "A KIND LETTER FROM A LADY FRIEND AND READER." After commenting on what stories she liked and disliked, the writer, Mrs. H.O. De Hart from Anderson, Indiana, concludes by writing:

> I am only a comparatively uneducated young (is twenty-six young? Thank you!) wife and mother of two babies, so about the only chance I get to travel beyond the four walls of my home is when I pick up your magazine.
>
> Ah, but then I travel indeed! For I journey to Mars and Venus, with side trips to the moon, and down to the heart of the earth, yea, even into the fourth Dimension! And *who* could do more? (3:277).

Mrs. De Hart, precisely the sort of wife and mother who Gernsback claims to value as a reader, enjoys the magazine not for the gadget fiction that shows her a better way of serving dinner; she enjoys it for the escapist qualities of the interplanetary adventure fiction. Suvin writes, "At the beginnings of a literature, the concern with a domestication of the amazing is very strong" (4). Early science fiction, however, had had an equally strong concern with an amazement of the domestic, as can be seen in the work of Butler, Morgan, Keller, and others. The balance between these two impulses remained dynamic throughout Gernsback's tenure, and it appears that

women's contribution to the magazine as both readers and writers was to move it towards the amazing. If, as David Cheng asserts, "amazing," "astounding," and "wonder" were metaphors for how to understand science, it is due in no small part to the influence of women, particularly the writers Clare Winger Harris and Lee Hawkins Garby.

Clare Winger Harris

The magazine began to favor amazing adventure stories at the moment when the first woman writer entered the field. Clare Winger Harris published her first story in *Weird Tales* in July of 1926 and her second in *Amazing Stories* in June of 1927. She went on to publish twelve stories, nine of which were published in Gernsback's magazines. Mary Shelley was the first woman to write science fiction. Clare Winger Harris was the first woman to be a science fiction writer.

Her first story for *Amazing Stories*, "The Fate of the Poseidena," was submitted to a contest to write a story to accompany the December 1926 cover (Figure 3). That cover echoes the precarious boat-out-of-water scenario of the magazine's first issue, this time with an ocean liner suspended from a spherical alien vessel. In place of the familiar skaters, however, the foreground features a group of nude red-skinned humanoids who have a row of white feathers coming from their heads and arms. The June 1927 issue published the top three stories submitted to the contest. First place went to Cyril C. Wates's "The Visitation," in which the creatures are a race of people called the Deelathon who live in a utopian island off of South America. The story describes their rescue of a crashed ship by means of antigravity technology. Their advanced machines are powered by "thon," an energy source similar to Vril in Edward Bulwer-Lytton's *The Coming Race*. The second place winner, George Fox's "The Electric Wall," depicts a

Figure 3. Cover of *Amazing Stories*, December 1926, by Frank Paul.

Martian abduction of a military transport ship. Mars has a shortage of men, and the servicemen are asked to stay on Mars and breed with the beautiful Martian women.

"The Fate of the Poseidena" finished third. In Harris's story, the narrator, George, finds himself competing with his red-skinned neighbor, Martell, for the love of Margaret. At the same time, around the world, ships and planes are disappearing and ocean levels are receding. George eventually breaks into Martell's apartment and discovers a television showing red-skinned men like Martell, but these men have feathers. Observing their actions, George discovers that they are Martians in the process of stealing earth's water, and he concludes that Martell is a Martian spy. By the time he realizes this, the ocean liner Poseidena, on which Margaret was traveling, has disappeared. Margaret eventually sends George a television message from Mars, explaining that Martell has abducted her, and that the Martians are done stealing earth's water, having finished replenishing their own planet.

It is worth noting that all three stories pick up on the nudity in Frank Paul's cover, but while Wates and Fox both take the creatures' nudity to be an indication of utopian freedom and sexual possibility, for Harris it is a reminder of the threat posed by George's sexual competitor. The fact that George's romantic rival happens to be a Martian invader only serves to amplify an already familiar menace. The common thread in Harris's stories seems to involve addressing everyday twentieth century anxieties by taking the source of those anxieties to science-fictional extremes. Her second story for the magazine, "The Miracle of the Lily," is fundamentally about pest control, but pest control is figured as a 2000-year war between humans and insects. In the epistolary tale, a man named Nathano splices his own narrative with diary entries from the years 1928, when insects were a mundane concern, and 2928, by which time insects had ravaged all plant life to the point of extinction before becoming extinct themselves. Nathano, writing in the

year 3928, discovers seeds and begins to grow lilies, the first plants the planet has seen in generations. At the same time, humans are in radio contact with Venusians, who claim to have their own insect problem. When television contact is established, however, Nathano describes the sight thus:

> The figure that stood facing us was a huge six-legged beetle, not identical in every detail with our earthly enemies of past years, but unmistakably an insect of gigantic proportions! … It spoke, and we had to close our eyes to convince ourselves that it was the familiar voice of Wayona, the leading Venusian radio broadcaster (3:54).

These Venusians go on to show their "insects," which are in fact tiny ape-like mammals. In this twist ending, Harris provides the sort of satiric commentary on radio that the always optimistic Gernsback tends to overlook. Radio can create a false sense of familiarity, generating the illusion of closeness where none actually exists. This satire works as both a literal commentary about radio and an allegorical commentary about humanity's place in the universe; the fact that Venus is feminine and the miraculous flower is a lily, a symbol of the Virgin Mary, pokes at the notion that Man is created in (an implicitly male) God's image while also pointing to the generative power of women.

"The Miracle of the Lilly" concludes tragically. Many humans are contemplating invading Venus, but Nathano thinks that this will be unnecessary: "A short time ago, when I went out into my field to see how my crops were faring, I found a six-pronged beetle voraciously eating. No—man will not need to go to Venus to fight 'insects'" (3:55). This ending suggests that history will repeat itself, and Harris has a recurring interest in tragedies of this sort, where humans come up against the limits of what they know. The tragedies of "The Fate of the Poseidena" and "The Miracle of the Lilly" stem in part from what humans do not know about Mars and Venus, respectively (and, allegorically, what men and women do not know about each other). Harris returns to this theme in her third story for the magazine, "The Menace of Mars."

The story is narrated by an astronomy student named Hildreth and recounts his survival of a series of natural disasters along with two of his teachers, Professors Harley and Aldrich, as well as Professor Harley's daughter Vivian. Professor Aldrich eventually discovers that the disasters are being caused by Mars altering the earth's orbit in order to better shield itself from the sun. Aldrich explains, "Mars is a living world; vital, selfish, malignant! He is not vital in the sense that earth is—(Earth, a huge ball of inert ash covered with human fungi). He is intelligent as a *whole*, as an *entity*" (3:591). By the story's conclusion, Earth's orbit has changed to such an extent that humans can only live near the poles. The moral of the story comes early on, when Aldrich is first developing his theory about Mars: "Life may not always be vested with the attributes with which our existence clothes it" (3:589). This is discovered to be true of Mars, but it becomes true of humans on earth as well, as the disaster forces the survivors to adapt to a radically different lifestyle.

This and Harris's other early stories are noteworthy for their persistent interest in scale. Whether they are romantic rivals, crop-eating insects, or alien life forms, the antagonists in these stories are always literally larger than the characters initially anticipate, and they are metaphorically larger than what the characters have the capacity to handle in their everyday lives. Harris's use of exclamation points and italics drives home Aldrich's shock at his own discovery, and the other characters are incredulous at his findings. This contrasts substantially with other writers in *Amazing Stories*; no one in Harris's fiction evinces the cool composure that Professor Meyer-Maier displays in dealing with the giant insects in "Eggs from Lake Tanganyika." Harris's stories develop a form of the sublime that, in its grandiosity as well as in its concern with radically different forms of life, adumbrates the work of authors such as Arthur C. Clarke and Stanislaw Lem. This is not to say, however, that the familiar simply drops away in

Harris's fiction; the fact that her stories feature such large challenges simultaneously diminishes the significance of individual people's problems while replicating those problems in a context with much higher stakes.

In the middle of "The Menace of Mars," just after Aldrich's musings about the nature of life and just before the definitive revelation that Mars is a living organism, Harris quotes the second and thirty-fourth lines of Alfred Tennyson's poem, "Vastness," as an epigraph to one of the chapters:

> Many a planet by many a sun
> May roll with a dust of a vanish'd race.
> Swallow'd in Vastness, lost in Silence,
> Drown'd in the deeps of a meaningless Past (3:589).

Harris alters the lines somewhat from how Tennyson presents them. She gives no indication that they are from separate parts of the poem and she divides the two lines in half, making four. She also alters the punctuation; in the original, lines 33-34 of the poem form a question: "What is it all, if we all of us end but in being our own corpse-coffins at last, / Swallow'd in Vastness, lost in Silence, drown'd in the deeps of a meaningless Past?" While the original poem serves as a meditation on death, Harris presents it as a discourse on the meaning of whole civilizations and species when considered on the vast scale of time and space. In so doing, she draws out a secondary theme of Tennyson's work which is central in Harris's fiction. In the poem's first two couplets, Tennyson writes:

> MANY a hearth upon our dark globe sighs after many a vanish'd face,
> Many a planet by many a sun may roll with a dust of a vanish'd race.
> Raving politics, never at rest—as this poor earth's pale history runs,—
> What is it all but a trouble of ants in the gleam of a million million of suns? (1-4).

In the first two lines, individual homes and people appear to bear a synecdochal relationship with whole worlds and species. The third line brings the reader back to earth—not down to the

individual level but down to the level of groups and nations, at which political discourse takes place. The fourth line then brings the entire galaxy into view, emphasizing the unimportance of politics. The second couplet contradicts the first—the poem's speaker seems uncertain as to whether the small is significant in how it stands for the large or insignificant in comparison to the large. This tension recurs throughout Harris's early work. Hildreth feels it in an early scene of "The Menace of Mars" when he and Vivian attend Professor Aldrich's lecture. Hildreth describes his thoughts:

> How insignificant seemed man, even as learned a man as Professor Aldrich, when one could lift the eyes but a little higher and behold with one glance the mighty Vega, Altair, and Deneb. Yet I knew in my heart that as much as I loved my astronomical pursuits, a certain small figure in yonder group of humanity was dearer to me than all the suns that shine in the eternal ether and so tell us we are not alone.
>
> "And so we believe there *is* an analogy between the universe of chemistry and that of the stars," the professor was saying (3:582).

Hildreth nearly plays out the scene in Whitman's "WHEN I heard the learn'd astronomer," but where Whitman's speaker only moves from the classroom to the stars, Hildreth progresses a step further when his gaze returns to earth and fixes on Vivian. The romance of the stars may prove more enticing than charts and diagrams, but romance between a man and a woman are more enticing still. Then, just at the moment when Hildreth is starting to feel some chemistry between himself and his infatuation, his thoughts are interrupted by Aldrich, whose scientific lecture brings him back to the world of literal chemistry as well as astronomy. Aldrich goes on to explain the hypothesis that our universe may be an atom in another larger universe, an idea which Harris was the first to develop in her 1926 story for *Weird Tales*, "A Runaway World" (Bleiler 172). This fixation on macrocosm and microcosm is thematically central to Harris's work: astronomy is chemistry enlarged by several orders of magnitude; planets are living beings on a grand scale; entire races are individual faces multiplied many times over.

Harris's later stories move away from this theme. Her fourth piece for *Amazing Stories*, "The Fifth Dimension," centers on a woman with precognitive powers who saves her husband from a train wreck. Her fifth piece is "The Diabolical Drug," a story in which a man experiments with drugs that slow or speed up his metabolism so that he can marry a woman who is older than him. "The Fifth Dimension" is noteworthy for being one of the only stories in the magazine to feature a female narrator, but both of these later narratives are fairly recognizable domestic stories with relatively modest scopes.

Lee Hawkins Garby

Besides Harris, only one other woman was featured as an author in the 37 issues of *Amazing Stories* that Gernsback edited: Lee Hawkins Garby. Garby was the coauthor of a novel that ran from August to October of 1928, a space adventure story titled *The Skylark of Space*. As was mentioned before, *Amazing Stories* always evinced a dual set of sensibilities: On the one hand, small scale domestic stories brought science into the realm of everyday life, while, on the other hand, grandiose interplanetary adventures provided an escape from that everyday life. In that regard, the August 1928 issue is perhaps the single most significant issue of the magazine. Two of the issue's five stories are relatively inconsequential; one is a reprint of H.G. Wells's "The Moth," and the other is a gothic story about keeping a severed head alive titled "The Head." But the issue also features "The Perambulating Home," Fezandié's last Hicks story and the magazine's last story to feature a bumbling inventor as the protagonist. The other two stories of the issue were "Armageddon – 2415 A.D."—the origin story for Buck Rogers—and the first part of *The Skylark of Space*. The juxtaposition of Fezandié's last piece with "Armageddon" and

Skylark seems very fitting. In this issue, the home literally walks away from *Amazing Stories* to be replaced by more of the adventure stories that Mrs. H.O. De Hart prefers.

The Skylark of Space is credited as being written "by Edward Elmer Smith in collaboration with Lee Hawkins Garby" (3:390). Though the novel was originally written in 1916, its appearance in *Amazing Stories* was its first publication. "Doc" Smith would go on to become a highly regarded author, but Garby's contributions to *Skylark* constitute her only credit as a science fiction writer. Even this recognition was lost for a time. The first two editions of the book retain Garby's credit as coauthor, but Smith revised the novel for publication in 1958, and her credit was omitted from that point until the republication of the original edition in 2007 ("Lee Hawkins Garby"). By all accounts, Smith, a chemist working in Washington for the Bureau of Agriculture, came up with the idea for the novel. He approached Garby, the wife of Smith's college roommate, the chemist Carl Garby, about collaborating on the project because Smith did not feel up to the task of developing the novel's romantic subplot. It is generally agreed that the story and the scientific ideas are Smith's, while much of the dialogue and the character development, as well as the wedding scene late in the novel, are Garby's contributions. However, the exact nature of the collaboration and the extent of Garby's input are unclear.

The novel begins in the near future with Richard Seaton's discovery of a tremendous power source, some form of atomic energy which he refers to as "X." Financed by his friend, the wealthy inventor M. Reynolds Crane, Seaton begins work on a power plant of tremendous capacity, as well as a space ship powered by X, christened the *Skylark*. Meanwhile, with the backing of the World Steel Corporation, Marc DuQuesne, Seaton's intellectual rival, steals a portion of X and constructs his own vessel; however, he does not steal enough to uncover its workings or build his own power plant. Part one ends with DuQuesne's plans for corporate

espionage still frustrated, while Seaton and Crane take their inaugural voyage to the moon. Part two begins with DuQuesne abducting Dorothy Vaneman, Seaton's fiancé, and taking her to outer space in a ploy to extort X from the scientist and his partner. On DuQuense's ship with him and Dorothy is Perkins, a criminal working for World Steel Corporation, and Margaret Spencer. Spencer, who goes by Peggy, was working for World Steel and covertly gathering evidence to prove that the company had swindled her father out of a valuable invention. Perkins abducted her and brought her along in order to get her out of the way while others tried to find the evidence that she had discovered. Seaton and Crane head off in pursuit of DuQuesne, and they find his ship trapped by the gravity of a dead star. They are able to rescue Dorothy, Peggy and DuQuesne, bringing them aboard the *Skylark*, but this depletes their fuel to such an extent that they must seek a world on which they can refuel before heading to earth. They land on the planet Osnome, and the final third of the novel depicts the human characters' becoming embroiled in the internal politics of Osnome and learning about their culture. This includes Seaton and Dorothy being married in an Osnome wedding ceremony. They return to earth and DuQuesne, who had been treated decently as Seaton's captive, is allowed to escape with a small fortune in jewels and a tube of radium given to him by people of the alien planet.

In *The Prelude*, Wordsworth's speaker had to leave his bark in order to head homeward, but Seaton and Crane turn the ship itself into a home. Near the end of Part I, Seaton gives Dorothy and her father a tour of the *Skylark*:

> We have all the comforts of home. This bathroom, however, is practical only when we have some force downward, either gravitation or our own acceleration.… If I should want to wash my face while we are drifting, I just press this button here, and the pilot will put on enough acceleration to make the correct use of the water possible. There are a lot of surprising things about a trip into space (3:416).

Here, Smith and Garby show a keen awareness of how space travel would alter the conditions in which people live, and the reader has the opportunity to take pleasure in their appreciation of this alteration with Seaton's observation that there are a lot of surprising things about space travel. But just as they present these surprising things, they also display the scientific knowhow that allows them to minimize the effect of these surprising things on the travelers' lifestyle; all they need to do is accelerate to simulate gravity and using the bathroom becomes as simple as if they were on earth. Significantly, this passage is omitted from Smith's 1958 revision. Instead, that version has Seaton expounding on the ship's technology, only to be interrupted by Dorothy telling him, "Enough of the jargon. Show us the important things—kitchen, bedrooms, bath" (50-51). This version sharpens the line between masculine concern with engineering and feminine concern with domesticity which is blurry in *Amazing Stories*. The next line in the 1958 version paraphrases several paragraphs of description from the 1928 version: "Seaton did so, explaining in detail some of the many differences between living on earth and in a small, necessarily self-sufficient worldlet out in airless, lightless, heatless space" (51). This rendering substantially downplays the scientist's original interest in bringing the comforts of home with him into space.

Despite the strength of Seaton's initial interest in this regard, *The Skylark of Space* does not evince the colonialist mentality of a Robinsonade; the humans do not intentionally or unintentionally spread their (White bourgeois American) culture to the stars. Rather, they embrace Osnomian social mores—though those mores are already conveniently similar to those of earth. This embrace reaches its apotheosis with Dorothy's proposal that she and Seaton get married on Osnome. She explains, "A grand wedding, of the kind we would simply have to have in Washington, doesn't appeal to me any more than it does to you—and it would bore you to extinction. Dad would hate it too—it's better all around to be married here" (3:621). By this

point, near the end of the narrative, grandness is associated with earth, while, ironically, outer space is the realm of the personal. Again, a comparison with Smith's revisions is illuminating. In his version, Dorothy says, "Dad would hate a grand Washington wedding, and so would you. It's better all around to be married here" (124). In Smith and Garby's version, Dorothy proposes an Osnomian marriage firstly because she prefers it, and secondarily because Seaton and her father would prefer it. In Smith's version, Dorothy lacks any professed opinion of her own, and is motivated only by the desire to please the men in her life.

Smith's alterations are disappointing, but even in the 1958 version—and especially in the 1928 version—Dorothy remains a significant and strong character with an unexpectedly important role both in the story and in Seaton's work. Everett F. Bleiler describes her simply as "Seaton's presumably platonic girlfriend," but this is inaccurate (394). As Seaton tells her early in the novel, "I love you, mind, body, and spirit, love you as a man should love the one and only woman…. I love you morally, physically, intellectually, and every other way there is" (3:397). This does not sound like a "presumably platonic" relationship. Nor is Dorothy an ignorant sidekick or a damsel in distress. In the novel, Crane praises her as Seaton's "anchor, his only hold on known things" (3:396). At several points, Dorothy does profess her scientific ignorance. These assertions place her in the role of the non-expert friend and provide Seaton, Crane, and DuQuesne opportunities to give exposition through dialogue. But she is not unintelligent; she is a talented violinist and a "language shark" capable of speaking five or six languages (3:397, 3:610). She even picks up some conversational skills in an alien tongue within a day of their arrival on Osnome. And she has the capacity to stand up to her abductors, stealing Perkins's gun. She is by no means defined solely in terms of her relationship with Seaton.

Nonetheless, that romantic aspect of the story is frequently characterized by fans as its most salient quality. Writing an account of *Amazing Stories*' early years, fan writer Robert Lowndes pauses on July 1928 to note that in the same month, two interstellar epics hit newsstands, *Skylark* in *Amazing Stories* and "Crashing Suns" in *Weird Tales*. "Crashing Suns" was written by Edmond Hamilton, who along with Smith would be credited as the father of the space opera. Lowndes notes, "For those disturbed by the romantic mush in Smith's novel, Hamilton's all-male epics were welcome" (272). While "Crashing Suns" was all-male, its sequel, "The Star-Stealers," was not, and that story provides an interesting contrast with Smith and Garby in terms of how early pulp science fiction addressed sexuality and gender. Both "Crashing Suns" and "The Star-Stealers" were part of a series of stories about The Interstellar Patrol, a military fleet that in each story prevents some alien species from committing an atrocity on a planetary scale. The stories take place 100,000 years in the future and are narrated by ship captain Jan Tor. The science fictional character names and lack of romantic subplots both serve to eschew gender distinctions, but in "The Star-Stealers," Jan Tor's second officer, Dal Nara, is a woman. Aside from the use of "she" throughout the story, Dal Nara's sex goes unnoted until the second-to-last page, when, crisis averted, the characters go on leave. Jan Tor writes, "Dal Nara, after the manner of her sex through all the ages, sought a beauty parlor" (89).

On the one hand, Hamilton's story provides a fairly progressive vision where a woman can rise to a position of substantial authority in a military system. On the other hand, the beauty parlor reference suggests a strong bifurcation between a sexless and genderless professional sphere and a very traditionally gendered private life. When she steps aboard Jan Tor's phallic rocket, the fact that Dal Nara is a woman no longer matters, but, almost as if to compensate for this genderless state, when she steps off of the rocket, her femininity matters in a highly

stereotypical way. By contrast, Smith and Garby do not depict female social and professional advancement, but Dorothy gets to be the same person both off and on the *Skylark* (And of course, the *Skylark* is a spherical ship rather than a phallic rocket). And while not a scientist herself, she constitutes an important intellectual partner in Seaton's and Crane's adventure.

It was almost a decade after Marie Curie's 1921 tour of the United States before pulp fiction depicted women scientists as characters. That landmark would come almost immediately after Gernsback's departure from *Amazing Stories*, when he published Leslie F. Stone's first story, "When the Sun Went Out," as a paperbound booklet in his Stellar Science Fiction Series. Stone's story featured a professional female astronomer, but that landmark was anticipated by earlier female characters who, though they were nonexperts, participated in scientific practice, including chemistry student Vivan Harley in "The Menace of Mars," and even Pep Perkins in the Dr. Hackensaw stories. Characters like these indicate that *Amazing Stories*' democratization of scientific practice, embodied in characters like Charley Hyuck in "The Man Who Saved the Earth," extends to women as well. The depiction of strong, professional female characters rose along with the number of women writers. In *Partners in Wonder*, Eric Leif Davin identifies 203 women who published in American science fiction magazines between 1926 and 1960 (v). Even in the three years of Gernsback's *Amazing Stories*, both the genre of science fiction and the culture of letters that formed around it were inclusive with regard to women readers, women authors, and strong female characters. And the contributions of these women are not what we would expect.

Early women users of science fiction revel in radically expanding their field of vision beyond the domestic sphere,[14] and in this regard the space opera shares an affinity with its

generic cousin, the soap opera. When science fiction writer Bob Tucker coined the phrase in 1941, he said, "Westerns are called 'horse operas,' the morning housewife tear-jerkers are called 'soap operas.' For the hacky, grinding, stinking, outworn space-ship yarn, or world-saving for that matter, we offer 'space opera'" (Hartwell 10). As they were popularly conceived, these "operas" had two things in common: a preference for formulaic or outmoded stories, and over-the-top emotionality. Writing about the over-the-top qualities of soap operas, Louise Spence writes, "If the family and domesticity are defined as the negation of fantasy, if a strict duality is constructed with the family and domesticity valorized and fantasy relegated to a subordinate position, then perhaps the outlandishness of soap operas' excesses reinforces (antithetically) the status of the domestic" (27). In the extremity of its "fantasy," Spence argues, escapist fiction creates a sharp boundary between itself and reality, and because it does not engage with the real world, it supports rather than challenges the status quo. I have a more positive reading of escapist "operas," particularly in science fiction, because they do not simply present fantasy as outside of and discrete from the domestic sphere; they also imagine alternatives to the domestic sphere as it is conventionally construed, enthusiastically envisioning the possibility of both cultural and material changes. Through science fiction, readers are exposed to scenarios in which everyday life involves fighting alien invaders, traveling to distant stars, or inhabiting a more egalitarian world. Within the Gernsbackian paradigm, exposure to these possibilities in fiction makes their eventual realization more plausible; the extravagant fiction of today can become the cold fact of tomorrow.

Technological utopianism: Science and the great war

The same issue of the magazine that introduced *The Skylark of Space* also introduced Buck Rogers, though initially his first name was Anthony. "Armageddon – 2419 A.D." and its sequel, "The Airlords of Han," are more famous for the comic strip that they inspired than they are for the content of the stories themselves. In Philip Francis Nowlan's original stories, Rogers is a modern Rip Van Winkle whose exposure to radioactive gas puts him in suspended animation for 500 years. He awakens to find America colonized by the Hans, and Americans living a life of "rustic simplicity" in the forest (3:429). Rogers helps to lead an American resistance that, by the end of "The Airlords of Han," has massacred the foreign invaders. Nowlan is noteworthy for being one of the only authors in Gernsback's magazine to write a "future war" story, a subgenre that had enjoyed some popularity a generation earlier in Europe in the wake of the Franco-Prussian War. I.F. Clarke writes, "From 1871 to 1914, the tale of the next great war was a staple of the European Press" (15). The interest in these stories decreased sharply with the onset of World War I.

For advocates of science like Gernsback, World War I presented a difficulty. As Frederic Jameson observes, "Modernity has always had something to do with technology…and thus eventually with progress. But World War I dealt a very serious blow to ideologies of progress, particularly those related to technology" (*A Singular Modernity* 7). The war challenged any vision of a modernity led by scientists and engineers, and it seems very likely that the German-speaking Luxembourgian immigrant Gernsback felt this challenge particularly strongly. But by 1928 there was sufficient distance from the war that Gernsback could praise Nowlan for developing "*wholly new branches of science itself, particularly science as applied to warfare*" and could expect his audience's reaction to be enjoyment rather than horror (3:1106). Nowlan

depicts World War I itself not as a horrific memory but as a learning experience. When Rogers meets with Boss Hart, one of the leaders of the Americans, Hart tells him, "Maybe we can learn some things from you…you fought in the First World War. Do you know, we have very little left in the way of records of the details of that war" (3:428). This lost knowledge is a major weakness for the Americans, one that Rogers helps to rectify. The novel features ten more references to "the First World War" (the second being the Han invasion of America), all of which compare the weapons and tactics of 2419 with those of 1914. The Anthony Rogers pieces were some of the only war stories in *Amazing Stories*, but they were followed by numerous others in Gernsback's *Air Wonder Stories*. Ten years after the armistice with Germany, future war stories had returned, with World War I as a touchstone rather than as a trauma.

While Gernsback did not hesitate to publish these stories, he himself was no hawk. This is manifest in his own fiction. In addition to "The Most Amazing Thing," a short story published as an editorial, Gernsback published "The Electric Duel," a short story about two men fighting over a woman atop an electrified platform; "The Magnetic Storm," a somewhat longer story about an inventor who creates a death ray during World War I; and "Baron Munchhausen's Scientific Adventures," a six part series about the German noble's escapades in the twentieth century. "The Electric Duel" is a humorous, forgettable piece, but his other works display a serious distaste for the atrocities of the First World War. Out of step with their author's predictive ethos, neither "The Magnetic Storm" nor "Baron Munchhausen's Scientific Adventures" are tales of the future; rather, they are alternate histories, less visionary and more revisionary. Both create fantasies within which the war can be won with substantially fewer casualties.

Like *Ralph 124C 41+*, "Baron Munchhausen's Scientific Adventures" is mostly a showcase of possible technological advancements and scientific discoveries. Gernsback first serialized the adventures in *Electrical Experimenter* in 1915 and reprinted them in *Amazing Stories* from February to July of 1928. The story's narrator, Ignatz Montgomery Alier, finds himself communicating via radio with Baron Munchhausen, who, it turns out, faked his death in 1747 and, due to an embalming accident, fell asleep until 1907. For most of the series, Munchhausen tells Alier stories about his invention of a rocket and his explorations of the Moon and Mars. The second half of the series focuses almost exclusively on Munchhausen's tour of the artistic and technological advancements to be found in the utopian Martian civilization.

But before these tales, part one of the series focuses on Munchhausen's contributions to the allied war effort. Munchhausen welcomes the war as "an opportunity to get even with Prussia" (2:1066). But his tactics are decidedly nonlethal; he employs laughing gas in lieu of explosives and rock salt in lieu of bullets. His commitment to non-deadly force may be unrelated to his identity as a "scientific" adventurer, but the story provides evidence to suggest that these two aspects of his character are related. After being discharged from his service with the French, Munchhausen tells Alier, "I was able, shortly, to complete my inventions on which I had been experimenting in Paris before the war brought an abrupt termination to my work" (2:1070). Gernsback does not depict the great war as the result of modern progress the way that some of his literary contemporaries were doing. Instead, war is an interruption of progress. In taking this attitude, Munchhausen somewhat accurately reflects the attitudes of his eighteenth century contemporaries; historical work has shown that Enlightenment-era cosmopolitan science was severely frustrated by the French Revolutionary and Napoleonic Wars (Lipkowitz). This is very different from the gloss given to war by modernist writers. It is also very different from the

"military-industrial complex" model of scientific advancement that was common in the mid-to-late twentieth century, when both hot and cold wars motivated enormous investment in science and technology. Gernsback explores this model of coordination between scientific and military interests in "The Magnetic Storm," but there as well the inventor's methods are decidedly nonlethal.

Gernsback's "death ray" story first appeared in *Electrical Experimenter* in 1918, and Gernsback reprinted it in *Amazing Stories* in July 1926. By the mid-1920's, Americans were fascinated by the prospect of transmitting electrical energy without wires, and by the potential application of this capability as a weapon. With its theoretical ability to destroy living things and machines, many saw the death ray as the next logical advancement in the evolution of warfare. One inventor, H. Grindell Mathews, predicted, "In the near future, machine guns will be found only in museums" ("Invisible Death"). *The New York Times* closely followed developments in this technology, commenting in May of 1924, "The inventors of a death ray multiply every day" ("'Death Ray' Rivals"). Nikola Tesla was the most famous of these inventors, and he worked on a directed energy weapon from the turn of the century until his death in 1943. Naturally, Gernsback capitalized on this cultural fascination during the early months of his new magazine by reprinting "The Magnetic Storm." The introduction boasts:

> It is believed in some quarters that here we have the original germ of the death ray. In fact, the means chosen by the author to bring down enemy airplanes by means of electricity were exploited a number of years later by Grindell Mathews, although he admits today that the death ray was a pure fiction. Nevertheless at some future date it will be possible to do just what the author tells us in the story.
>
> Nikola Tesla, who read the original proofs of the story, endorses the idea. He himself was able to burn out electrical armatures thirteen miles from his famous Colorado Power Plant, in 1892, when he was also able to light electric lamps at this distance, without wires.

Tesla's authority permeates the story; Gernsback describes the aforementioned 1892 experiments in detail in the text, with a footnote attesting to the veracity of the account. Tesla himself appears as a character, and the protagonist is an assistant in the inventor's lab. Tesla extols this assistant as "America's youngest and greatest genius!" (1:351). He heaps this praise on the young man, who goes by the name "Sparks," for proposing the idea of "a titanic artificial *magnetic storm*" that can disable the German military's technology (1:355). The U.S. builds Sparks's device, and in one stroke, Gernsback writes, "The German Army was flung back into the Dark Ages" (1:354). The story concludes with the allies handily defeating the confused Germans, and with Sparks earning a commendation from the French president. The phrase "death ray" never appears in the story, and appropriately so, since the magnetic storm does not actually kill anyone; it merely incapacitates machinery. In the last line of the story, the proud inventor addresses his machine, "But you aren't doing a thing to the Germins! [*sic*]" (356). This form of bloodless warfare represents the apotheosis of Gernsback's technological utopianism.

Gernsback was not a prolific fiction writer. His output consisted of six pieces: four short stories, one novel, and the "Munchhausen" series. Of these six pieces, three—"The Most Amazing Thing," "The Magnetic Storm," and "Munchhausen"—contain explicit anti-war messages, and two of those—"The Magnetic Storm" and "Munchhausen"—provide counterfactual narratives of The Great War. Gernsback wrote both of these stories while his home country was under German occupation. War may not be a prevalent part of Gernsbackian science fiction, but that does not mean that it does not loom large over this period of the genre's development. Several critics have speculated that World War I is responsible for the demise in Europe of the "scientific romance," and that science fiction was able to develop and gain

prominence in America of the 1920's and 30's specifically because of the country's distance from and lesser involvement in that conflict (Panshin 142-143, Aldiss 175-176). That may be true, but Gernsback was nonetheless keenly aware that in the age of machine guns and mustard gas, it was never more crucial to foster public familiarity with science and technology.

Amazing Stories' weird tale: "The Colour Out of Space"

From a literary standpoint, H.P. Lovecraft's "The Colour Out of Space" is probably the most successful piece of original fiction to appear in Gernsback's *Amazing Stories*, having been placed on the short list for *The Best American Short Stories of 1927* and having been reprinted over 70 times. It is one of Lovecraft's best works, but the uncanny and disturbing story is difficult to situate within Gernsback's agenda of scientific familiarization. Gernsback seems to recognize that the story is an odd fit for his magazine; rather than praise its didactic value or highlight its accurate science, as was conventional, the editorial introduction calls "The Colour Out of Space" "a totally different story," describing it as "original," "fantastic," and "marvelous" (2:557).

The story begins with the narrator surveying for a new reservoir to be built in the hills outside of Arkham, Lovecraft's fictional New England town. While surveying he comes across a "blasted heath," scorched land that the narrator initially speculates was the result of a fire. The townsfolk's allusions to "evil" spark his curiosity, and eventually the narrator gets the story of the land from Ammi Pierce, the old neighbor of the man who once lived on the heath. It is significant that Pierce's name resembles Ambrose Bierce, as Bierce's story, "The Damned Thing" appears to be a major influence on Lovecraft here. From the beginning, the story's framing produces uncertainty due to its multiple levels of mediation; the narrator paraphrases an

account given to him by a man who witnessed the events concerning his neighbor more than 50 years ago. Presenting it as the retelling of a secondhand story, Lovecraft invites his readers to question the truth and accuracy of the account, an invitation that is compounded several times during the story when the narrator says that Pierce refused to give further details on a subject.

Pierce tells the narrator that the property belonged to Nahum Gardner, and that in 1882 a meteorite struck there. Three professors from the neighboring university investigated, but the meteorite shrank and disappeared, leaving them with little to study. Beginning shortly after the professors left and continuing over the course of more than a year, a series of increasingly bizarre phenomena occurred around the Gardner place, largely centered on the farm's well. Crops and livestock died, snow melted more quickly there than anywhere else, and insects plagued the family. Most disconcertingly, a strange miasma of an indescribable color seemed to cover the property. One by one, the members of the Gardner family descended into madness and died. After Nahum's death, the color coalesces into "that riot of luminous amorphousness, that alien and undimensioned rainbow of cryptic poison from the well—seething, feeling, lapping, reaching, scintillating, straining, and malignly bubbling in its cosmic and unrecognizable chromaticism" (2:566). The color then shot into the sky leaving no traces of itself behind. The story concludes with the narrator commenting that he is uncertain if the story is entirely true, but in any case he is grateful to Ammi for telling it to him and thankful that the whole area will soon be under water.

Certain elements of the story easily suggest that the piece serves as an allegory for the Fall, with the gardener Gardner, whose first name is an anagram for "human," eating the fruit of knowledge in the form of his own poisoned crops and well water. But ultimately, "The Colour Out of Space" is not a story about the corrupting influence of knowledge so much as it is about

the failure of knowledge, or, more precisely, the failure of modern scientific ways of knowing. When evidence of the meteorite disappears, the three professors leave as soon as they came. The bitterness at this abandonment evinces itself near the story's end when the narrator comments, "The rural tales are queer. They might be even queerer if city men and college chemists could be interested enough to analyse the water from that disused well, or the grey dust that no wind seems ever to disperse" (2:567). The surveyor, who himself makes use of scientific expertise in his work, critiques the scientific establishment for failing to engage with local forms of expert knowledge expressed in rural tales. Also interesting in this quotation is the notion that science does not necessarily resolve strangeness, but can in fact amplify it. This is very different from the relationship with strange phenomena that we have seen elsewhere in the magazine. Professor Meyer-Maier from Curt Siodmak's story would not have wanted to render the color "even queerer." But unlike "Eggs from Tanganyika," strangeness of the color is itself the point. When the color shoots back into the sky, the townspeople who see it are "too awed even to hint at theories" (2:566). This is the difference between horror and the sublime—with horror, there is no cognitive recuperation, only shock at the unknown. This is not to say, however, that science is wrong; with his dying breaths, Nahum appears to have an insight into the nature of the color: "It come from some place whar things ain't as they is here…one o' them professors said so…." (2:564). The professor appears to have had the correct insight into the color from the start. The tragedy stems from his failure to follow up on that insight, and the ultimate message of the story seems to be not that science can't provide the answers, but that scientists need to pay better attention.

It is unclear why Lovecraft submitted the story to *Amazing Stories*; the writer had had an ongoing relationship with *Weird Tales* since 1923. Sam Moskowitz and others have claimed that the story had been rejected by *Weird Tales* and/or *Argosy*, but Lovecraft scholar S.T. Joshi asserts that there is no evidence to suggest that *Amazing Stories* was not Lovecraft's first choice. Lovecraft may have approached the scientifiction magazine because, as Joshi observes, "'The Colour Out of Space' is the first of Lovecraft's major tales to effect that union of horror and science fiction which would become the hallmark of his later work" (399). Like this story, much of that later work deals with the horror of encountering that which is radically other, and often with the uncertainty as to whether this other is best understood in scientific or supernatural terms. Whatever Lovecraft's reasons for selling to *Amazing Stories*, it was a major coup for Gernsback. *Weird Tales* was at the time *Amazing Stories*' chief competitor. While it is better known today as a horror magazine, *Weird Tales* was a major venue for science fiction. Indeed, for the three years prior to *Amazing Stories*, *Weird Tales* was the only magazine that claimed science fiction stories as a specialty. In 1924, the one-year anniversary edition of the magazine included an anonymous editorial later attributed to Otis Adelbert Kline titled "Why *Weird Tales*." The article classified the two types of stories the magazine published. The first is the story of psychic phenomena or the occult. Kline writes:

> The second classification might be termed "highly imaginative stories." These are those stories of advancement in the sciences and the arts to which the generation of the writer who creates them has not attained. All writers of such stories are prophets, and in the years to come, many of these prophesies will come true.
>
> There are few people who sniff at such stories. They delude themselves with the statement that they are too practical to read such stuff. We can not please such readers, nor do we aim to do so. A man for whom this generation has found no equal in his particular field of investigation, none other than the illustrious Huxley, wrote a suitable answer for them long ago. He said: "Those who refuse to go beyond fact rarely get as far as fact" (569).

Kline struggles to name that genre for which Gernsback would provide a label less than two years later. Of course, even just by virtue of the juxtaposition with psychic or occult stories, science fiction in *Weird Tales* reads differently than science fiction in *Amazing Stories*. Simply put, they are weird. From Lovecraft's stories to Edward Hamilton's *Crashing Suns*, science fiction stories in *Weird Tales* tend to underscore the strange and marvelous nature of the things they describe rather than how those things are knowable and controllable through science.

It is fitting that both of the magazines claim Poe as their forefather, as between them the magazines pick up on Poe's dual sensibilities. *Weird Tales* inherits the version of Poe who wrote "The Tell-Tale Heart" and "The Mask of the Red Death"—both of which it reprinted—a man who revels in madness and grotesquery. *Amazing Stories* inherits Poe the experimenter and puzzle-solver who wrote "The Facts in the Case of M. Valdemar" and "The Gold Bug," both of which it reprinted. Of course, these two sides of Poe are not incompatible—both evince a general interest in probing the unknown—but they differ in tone, and those tonal differences had consequences for the community of pulp writers who wrestled with his legacy 80 years later.

In printing "The Colour Out of Space," Gernsback published what some might regard as the single best story by the single best pulp writer of the 1920's (or at least, as indicated by its recognition from *The Best American Short Stories*, the most successful pulp story in terms of mainstream literary acclaim). But it was the only story by Lovecraft that Gernsback ever published. Gernsback's relationship with Edgar Rice Burroughs was similarly limited; he published *The Master Mind of Mars* in *Amazing Stories Annual* in 1927, and he serialized *The Land that Time Forgot* in February-April of that same year, but that constituted the full extent of his relationship with the *Tarzan* writer. Only one Ray Cummings story appeared in the magazine,

"Around the Universe" in October 1927. Gernsback was able to cultivate relationships with a few writers, such as Clare Winger Harris, Joseph Keller, and Clement Fezandié, whose repeated publications in *Amazing Stories* amassed into a body of work with some literary merit. But Gernsback never found a go-to author who could do for *Amazing Stories* what Lovecraft did for *Weird Tales* or what Dashiell Hammett did for *Black Mask*. Lovecraft's and Hammett's names became synonymous with their respective magazines, while their bodies of work showed that the pulps could be a site of groundbreaking and ambitious storytelling.

One reason why Gernsback could not find an analogous figure for his magazine was because he was a foreigner, both to the United States and to the fiction shelves. While the publishers of *Black Mask* and *Weird Tales* developed their magazines out of prior experience with fiction, Gernsback entered fiction by way of popular science writing. This gave him both a different perspective and a different set of contacts, and while these differences sometimes helped him to create a unique aesthetic, they ultimately placed him at a competitive disadvantage.

Another reason for Gernsback's ultimate failure was a lack of business skills. *Amazing Stories*' sales were impressive, but Gernsback would always reinvest his profits into new ventures. In addition to *Amazing Stories*, Gernsback's company, Experimenter Publishing, was publishing *Science and Invention*, and *Radio News*, and they were constantly investing in new magazines, including the *Radio Listeners' Guide and Call Book*, *Practical Electrics*, *Your Body*, and *Motor Camper & Tourist*. Gernsback also published numerous general interest books and books on radio, to varying degrees of success, and in 1925 he purchased an AM radio station, WRNY, in New York City. In 1928, WRNY became the second radio station ever to broadcast television pictures. While he was managing all of this, Gernsback also maintained an association

with numerous fan organizations, amateur radio associations, and correspondence courses. These new projects took priority even over paying existing debts. Lovecraft had a notoriously difficult time getting payment for "The Colour Out of Space," for which he ultimately received a meager $25, or 1/5¢ per word. Out of frustration, Lovecraft never submitted a story to Gernsback again, and famously gave him the nickname "Hugo the rat." This doubtlessly hurt Gernsback's reputation among higher-quality pulp writers. Gernsback was similarly bad at paying creditors, a dereliction that ultimately led to his losing control of the magazine.

His failings as a businessman notwithstanding, Gernsback was a central actor in a culture of letters that has wrestled with and helped shape American culture's relationship with science and technology for most of the twentieth century. During his three-year tenure at *Amazing Stories*, he was party to a paradigm shift in science fiction's development away from an understanding of science as other and outside towards an understanding of science as an everyday thing with the ability to aid human understanding. I have asserted that the goal of *Amazing Stories* was to familiarize its readers with science, a goal that involved both educating readers about scientific concepts and fostering a particular emotional relationship with science. But familiarity itself is problematic. Near the middle of "The Colour Out of Space," Lovecraft describes how the Gardner family had become desensitized to the changes that the meteorite wrought: "Strangeness had come into everything growing now. Yet it was none of Nahum's family at all who made the next discovery. Familiarity had dulled them" (2:561). In expressing this risk that familiarity inures people, rendering them blind to the conditions around them, Lovecraft returns us to Shklovsky's argument about the utility of ostranenie.

In the final months before creditors took the magazine from him, this was clearly on Gernsback's mind. His January 1929 editorial, "Amazing Reading," discusses the cognitive and physiological processes involved in reading. He begins the editorial by writing, "'Familiarity breeds contempt!' is a well-known saying, and it is the very familiarity of all of our bodily functions which makes us look with contempt on what we term 'simple' things. Nevertheless, it is precisely the simple things which are so difficult of comprehension that nobody can really understand them completely" (3:871). Gernsback does not appear to be using *contempt* to mean hatred so much as dismissiveness; if something is familiar, we might take it for granted and regard it as unimportant. Gernsback repeated the aphorism "Familiarity breeds contempt!" two months later, in his second-to-last editorial, "Our Amazing Stars." He elaborates on the meaning of the phrase by observing, "The mere fact that we have always seen the stars in the heavens is responsible for the fact, that they no longer astonish us, as they would if we had never known of their very existence" (3:1063). There is no evidence to say definitively whether Gernsback arrived at this conclusion on his own, or whether he drew inspiration from Ralph Waldo Emerson, who wrote, "If the stars should appear one night in a thousand years, how would men believe and adore; and preserve for many generations the remembrance of the city of God." Nor is there evidence to say definitively whether either John W. Campbell or Isaac Asimov ever thought of Gernsback when they discussed this Emerson quotation in a conversation that would lead Asimov to write "Nightfall," the single most reprinted science fiction short story of all time.

In any case, Gernsback's words can be juxtaposed with a few lines from Leland S. Copeland, the only poet to appear in Gernsback's *Amazing Stories*. The first stanza from his poem "Lullaby," which contains the parenthetical epigraph, "(Songs like this will be sung in nurseries of 2000 A.D.)," accurately represents the tenor of his poems:

Hush, little nebula,
Don't you cry;
You'll be a blue star
By and by. (1:672)

Copeland addresses a nebula—one of the largest objects conceivable—as if it were a human infant, not only anthropomorphizing it but shrinking it to such an extent as to deny any conventional expression of the sublime. The science of this poem is actually accurate; the matter in nebulae can clump together to form stars, and nebulae are sometimes referred to as stellar nurseries. Blue stars are particularly bright and hot stars, so telling the nebula that it will be a blue star might be compared to telling a child that it will grow up to be a straight A student or a champion athlete. By one set of aesthetic standards—the standards likely to be applied by Brian Aldiss, for example—this is little more than a trite, ugly nursery rhyme. But remarkably, it counteracts the conventional use of stars employed by poets such as Whitman and Emerson as symbols of humans' insignificance. In this regard, it distills the essence of *Amazing Stories*. Familiarity can breed contempt, and because of this, readers may be unable to feel astonishment when they look at the stars. But when people look at their actual families, and in particular at their children to whom they sing lullabies, they may feel contentment, safety, and peace, but they do not lose that capacity to be astonished at their children's existence. *Amazing Stories* seeks to bring the whole of nature, as well as the sciences by which we know nature, under that same familiar gaze.

Chapter 3
"Criminals are so damned unscientific"
Black Mask and the Epistemology of the Gut

Like *Amazing Stories*, *Black Mask* introduced readers to a new type of story. In his introduction to *The Black Lizard Big Book of* Black Mask *Stories* (2010), publisher Keith Alan Deutsch calls it "The new urban mythology of the hard-boiled American hero" (xii). This new hardboiled hero emerges in conversation with its literary sibling, the scientific detective. It also emerges in response to developments in real-world law enforcement. With its emphasis on the uncertainty of scientific knowledge, *Black Mask* stands in dialectical opposition to *Amazing Stories*' vision of science as a means by which to improve everyday life. The hardboiled detective critiques the expert authority of scientific detectives in both fiction and reality by pointing to the ways in which science mediates knowledge through technologies (like microscopes and evidence catalogues) and by presenting the hardboiled detective's relatively unmediated ways of knowing—like operating on gut instinct—as alternatives.

- **The image of the detective** presented on the cover of *Black Mask* illustrates its difference from the formula developed with the great detective, especially when those magazine covers are contrasted with the first illustration of Sherlock Holmes.
- Joseph Shaw emphasized difference in 1946, calling *Black Mask* "**A new type of detective story**," but that conflicts with statements that he made in his early years as an editor. Shaw originally emphasized continuity with scientific detectives, while Dashiell Hammett explicitly criticized scientific detection.

- In the nineteenth and early twentieth centuries, police brought **crime under a microscope**, constructing objective facts through technological mediation.
- Nineteenth century fiction also featured scientific detection, but early writers in the genre characterized **the great detective as a Renaissance man** with a variety of talents.
- In the twentieth century, the exclusively scientific detective emerged, with **Philo Vance** as its most popular example.
- As the hardboiled detective emerged, his contrast with the scientific detective was evident in how the character prioritized **independence from authority**.
- **The detective's body** becomes a metonym for his expertise, an expertise linked to practical experience. Hammett's Continental Op is the prime example of this trope.
- Images of the body permeate Hammett's novel ***Red Harvest***, mostly as metaphors for the body politic, which the Op "dissects" by exploiting the characters' relationships.
- Later in the genre's development, these body images would appear to center on **the gut as the locus for intuition.**
- ***The Maltese Falcon*** gave the genre mainstream respectability while constructing a world marked by epistemological uncertainty that renders scientific detection moot.

The image of the detective

If you were in Manhattan in October of 1926 and you visited 230 Fifth Avenue, just around the corner from the Flatiron Building, you might have seen Hugo Gernsback in his office at Experimenter Publishing putting the finishing touches on the November issue of *Amazing Stories*. And if you were to walk about a mile and a half up the street, past what would in a few years become the site of the Empire State building, past Times Square, almost to Central Park,

you could stop by 578 Madison Avenue. There you might have seen a different editor setting up his new office at Pro-Distributors Publishing. Following the departure of Philip C. Cody, Joseph Shaw had just taken over as editor of *Black Mask*, a magazine that holds an esteemed place in the history of detective fiction comparable to the place held by *Amazing Stories* in the history of science fiction.

Black Mask had begun in 1920 as a general pulp magazine akin to *Argosy*, publishing Westerns, tales of the South Seas, and occasional stories of science fiction, fantasy, or horror. But it had always been best known for its detective stories. By the time Joseph Shaw came on, the magazine was beginning to specialize in a particular kind of crime story, usually but not always containing a detective, that had originated in its pages. The *Black Mask* style of crime story featured a terse, paratactic narrative voice, "tough guy" protagonists, realistic and explicit depictions of violence, and dialogue rendered in lower-class city dialects. This "hardboiled" style also took on certain visual characteristics that came to be represented on some of the magazine's covers (Figure 4). The uniform of a hardboiled detective, a suit and tie and a fedora, is the same as countless office dwellers of the time, giving him an anonymity that allows him to represent the everyman. But significantly, his wardrobe is also that of his gangster antagonists, signaling that, though his actions may ultimately be for the good, he is at home in the criminal underworld. His gun is drawn and ready to fire if necessary, and his body is leaning forward, ready for action.

This is how *Black Mask* introduced its readers to the hardboiled detective. Compare that to how Sherlock Holmes was introduced to readers three decades earlier (Figure 5). Early in *A Study in Scarlet*, Watson meets his future roommate in his home laboratory, where Holmes immediately launches into an explanation of his newly discovered method for testing blood stains. In D.H. Friston's accompanying illustration, Holmes walks towards his visitors holding

Figure 4. Covers of *Black Mask*, (clockwise from top left) August 1925, November 1925, February 1926, April 1925. Artist unknown.

Figure 5. Illustration of Sherlock Holmes accompanying *A Study in Scarlet*, originally published in *Beeton's Christmas Annual* in November 1987, by D.H. Friston.

not a gun but a test tube. The table and floor are littered with beakers and flasks. Watson frequently describes their living arrangements as cluttered and untidy, but here Holmes himself appears nicely dressed and well kempt.

The differences in how these two kinds of detective were represented visually indicate what was new about *Black Mask*. Most though not all detective stories are mystery stories, and as John Cawelti observes, "The fundamental principle of the mystery story is the investigation and discovery of hidden secrets" (42). The impetus for a mystery story is an epistemological crisis, and detectives have multiple means at their disposal for discovering the secrets that need to be known. Classically, the great detective carefully examines evidence and logically deduces what happened on the basis of that evidence.[15] This type of detective dominated the literary scene in the nineteenth century and reached an apotheosis with Conan Doyle's creation of Holmes. Modern scientific detectives from Arthur B. Reeve's Craig Kennedy to Kathy Reichs's Dr. Temperance Brennan are the most obvious inheritors of this tradition. The scientific detective places emphasis on utilizing an intellectually sound method, which Edgar Allan Poe called ratiocination. The *hardboiled* detective, however, places emphasis on bodily action. For him, the labor of detection is not intellectual, but physical, and often dangerous. The tools at the scientific detective's disposal appear to be highly specialized and require expert knowledge, while the tool at the hardboiled detective's disposal was available to anyone; indeed, advertisements for handguns regularly appeared in the pages of the magazine (Figure 6).

The spatial orientations of these tools emphasize this point, with the vertical test tube visually symbolizing a hierarchical and stratified social world while the horizontally pointed gun operates on a flattened playing field. The detective is also positioned differently in these two contexts. Friston depicts Holmes facing the reader—he is a singular individual for readers to

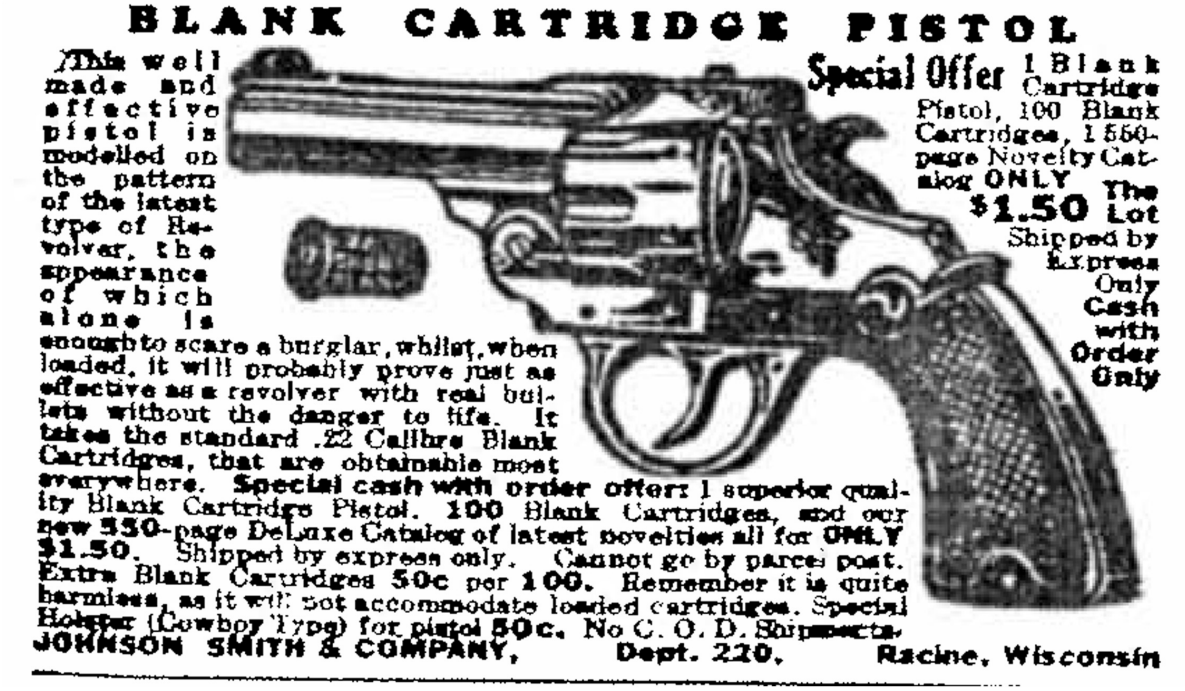


Figure 6. Advertisement for blank cartridge pistol in *Black Mask*, February 1929.

look at and engage with. But *Black Mask* typically presents the reverse angle, showing the detective from behind or in profile. This perspective underscores the hardboiled detective's anonymity and, by extension, his status as an everyman. The fact that this sort of image was used again and again furthers the impression that the hardboiled detective is important as a representative type, not as an individual. The difference in viewpoint also correlates with the narrative voice in which the stories are told: scientific detective stories tend to be told either in the third person or, as in the case of Sherlock Holmes, in the first person from the perspective of the detective's comrade.[16] Hardboiled detectives, however, typically narrate their own stories—the reader is allowed access to his thoughts and views the action from over his shoulder. We as readers are invited to compete with the scientific detective, to see if we can solve the case before

he presents us with the solution. By contrast, we are invited to collaborate with the hardboiled detective, to observe his thought process as he pieces the solution together.

The scientific-hardboiled dichotomy implies a range of epistemological and societal tensions: mind versus body, thought versus action, expert versus layperson, class stratification versus class solidarity, competition versus collaboration, removal from criminality versus immersion in criminality, mediated knowledge versus direct knowledge. At first blush, the hardboiled detective story may appear to simply break with tradition—Shaw himself called it a "new type of detective story"—but in their negotiation of these tensions, scientific and hardboiled detectives are linked. In developing the hardboiled detective, *Black Mask* writers often implicitly and sometimes explicitly critique the scientific authority that had come to characterize both real and fictional detectives of the time.

"A new type of detective story"

Black Mask's critique of science was neither a self-conscious component of the magazine's agenda, nor did it manifest immediately upon Shaw's hiring. Indeed, hardboiled detection had been developing for several years prior to his arrival and continued to develop gradually for several more years.[*] All the while, a diverse and robust discourse on methods of criminal detection and the nature of crime continued to appear in the magazine's pages. Only after the fact did it become clear that *Black Mask* had been developing an unscientific model of detection in contrast to both the emerging realities of criminal investigation and the existing fiction on the subject. After World War II, hardboiled detective fiction was at the height of its popularity, and some of the genre's famous stories were receiving international attention after

[*] For an account of the magazine's slow and uncertain progression towards a focus on detective fiction in its first decade, see Appendix III.

being adapted into the first films noirs. In this context, Shaw attempted to characterize the *Black Mask* model of detection as a self-conscious literary movement. Shaw provided an insight into his agenda as an editor in his introduction to the 1946 anthology, *The Hard-Boiled Omnibus*. As the first anthology of *Black Mask* fiction, *The Hard-Boiled Omnibus* set the tone for how the magazine would be remembered. It excluded all Westerns and other genres, and the magazine's first decade is almost entirely absent. Dashiell Hammett's "Fly Paper," originally published in August 1929, and Ramon Decolta's "Death in the Pasig," originally published in March 1930, are the only two of the collection's 15 stories to come from the first half of Shaw's ten-year stint as editor. This is despite the fact that the book's subtitle was "Early Stories from *Black Mask*."

The greatest instance of historical revisionism, however, comes not in the selection of stories but in Shaw's account of his editorship in his introduction. Shaw writes that he had recently returned to America after "a five-year sojourn abroad during and following the First World War" (v). Initially looking for a job with a sporting magazine, Shaw writes that he was offered the job with *Black Mask*. He claims to have had no prior knowledge of the magazine and limited knowledge about the pulps, but, writing about himself in the editorial "we," Shaw states that he nonetheless saw an opportunity with the magazine:

> We meditated on the possibility of creating a new type of detective story differing from that accredited to the Chaldeans and employed most recently by Gaboriau, Poe, Conan Doyle—in fact, universally by detective story writers; that is, the deductive type, the cross-word puzzle sort, lacking—deliberately—all other human emotional values (v).

In Shaw's version of history, his editorship heralded a conscious break with the genre's Victorian standard bearers: Poe, Conan Doyle, and the French crime writer Emile Gaboriau. Shaw goes on to write, "Obviously, the creation of a new pattern was a writer's rather than an editor's job," and recounts contacting Dashiell Hammett. While he gives Hammett and other writers credit for developing the hardboiled detective, he neglects the nearly four years' worth of

detective fiction that Hammett had already contributed to the magazine, as well as the four years' worth of contributions by Carroll John Daly, the other father of the hardboiled detective. Instead, Shaw credits himself with the idea of forging a new path away from detective fiction's Victorian predecessors.

This canonical account of history contrasts sharply with Shaw's comments in the editorial that he wrote for his first issue, in November 1926:

> [Criminal detection] has engaged the interest if not the occupation of the cleverest minds in history. There is a vast literature on it in every language. The old tales of the masters—Gaboriau, Balzac—still set the pulses beating more rapidly. But how the methods, the type and character of the criminals have changed since the days of which they wrote.
>
> Their [Gaboriau and Balzac] intelligence was low; their ways, simple and crude; the discovery and detection of their crimes of similar character. The Bertillon system was unknown; the possibility of fingerprinting, unsuspected! The automobile, the airplane, telephone and radio broadcasting—all the modern facilities for swift transportation and communication were unavailable.
>
> Still, the theme was and always will be the same.
>
> Today, more clever, intelligent minds have grown lax in conscience and are included in startling numbers in the criminal class.

In 1946, Shaw asserts that he was deliberately breaking with the Victorians, including Gaboriau; but in 1926 he praises Gaboriau, and goes on to assert that modern criminal detection is *more* intelligent, *more* scientific, and *more* technological. It is unclear whether Shaw's account in *The Hard-Boiled Omnibus* represents a conscious attempt to reframe history or whether Shaw had unconsciously adopted a vision of the genre that had emerged in the intervening twenty years. Whatever his reasons, Shaw's description of his editorship as a break with the Victorians does at least three things. First, it allows Shaw to take greater credit for the genre's innovations. Second, it helps Shaw market the genre to a post-World War II audience. Many *Black Mask* writers were veterans, and the initial readership of the magazine in the 1920s consisted of men who were familiar with the horrors of the First World War. In 1946, a generation of veterans were returning

from an even deadlier and more technologized war. By emphasizing hardboiled stories' newness, their emotional depth, and their vision of an empowered everyman, Shaw made these stories appeal to this generation. This might be why Shaw begins by mentioning his "sojourn abroad during and following the First World War."

Third, it aligns the history of the fiction with the history of the films that they inspired. *The Hard-Boiled Omnibus* came out the same year as Nino Frank's article, "Un nouveau genre 'policier:' L'aventure criminelle," in which the French film critic coined the term "film noir." Frank's article points to four films—Billy Wilder's *Double Indemnity* (1944), Otto Preminger's *Laura* (1944), John Huston's *The Maltese Falcon* (1941), and Edward Dmytryk's *Murder, My Sweet* (1944)—as praiseworthy examples of a new trend in the detective genre. Noting that films are following the trend established in American fiction, Frank writes:

> Since Poe, since Gaboriau, and since Conan Doyle, we've become familiar with the formula for detective stories: an unsolved crime, some suspects, and in the end the discovery of the guilty party through the diligence of an experienced observer. This formula had long been perfected: the detective novel (and film) have substituted for the Sunday crossword puzzle and become overshadowed by boring repetition (137).

Frank's description of the detective story formula is uncannily similar to Shaw's, down to the comparison to crossword puzzles, but given that the two were published only a few months apart in different languages in different countries, it is highly unlikely that the two writers could have been aware of one another. Instead, both represent a common understanding of what was innovative about these new stories. And the new films are closely tied to *Black Mask*: Shaw serialized Dashiell Hammett's *The Maltese Falcon* from September 1929 through January 1930, while *Murder, My Sweet* was based on *Farewell, My Lovely*, a novel derived from several *Black Mask* stories by Raymond Chandler. Chandler also co-wrote the screenplay for *Double Indemnity*.

Looking at the great detective tradition of Poe, Gaboriau, and Conan Doyle, Frank asserts, "We are witnessing the death of this formula" (138). If, given the rising popularity of film noir, it did appear that the great detective formula was dying, it makes sense that Shaw would want to emphasize that the stories he published were part of the new pattern. But just as it is inappropriate for Brian Aldiss to interpret Hugo Gernsback from a post-Robert Heinlein perspective,[*] it is inappropriate for Joseph Shaw to reinterpret himself from a post-John Huston perspective. Foregrounding Shaw's 1926 editorial, instead of the introduction to *The Hard-Boiled Omnibus*, changes Shaw's and the genre's place in literary history. It provides an opportunity to view *Black Mask*, not as a break from tradition, but as a continuation of tradition, and to view hardboiled writers, not as rejecting scientific detection, but as engaging in a dialogue regarding the place of scientific expertise alongside other methods of criminal investigation.

Though neither man ever explicitly acknowledges the contrast between their respective positions, Shaw and Hammett initially represent different sides of this dialogue, with markedly different opinions on the place of science in modern criminal investigation. Rarely did Hammett comment on scientific detection; his clearest statement on the topic came in a letter that the magazine published in June 1925. Hammett wrote the letter in response to an article in the April issue, in which an author extolled the virtues of fingerprinting as a method of identifying criminals and establishing guilt.[17] Alluding to Arthur B. Reeve, creator of the scientific detective Craig Kennedy, Hammett begins with a disclaimer, "I am not an expert, not even one of Mr. Reeves' [sic] 'half-baked (half-boiled?) potatoes'" (127). The parenthetical "half-boiled," possibly a joking reference to hard-boiled, marks Hammett's participation in the genre; while

[*] For Aldiss's interpretation of Gernsback, see Appendix I.

hardboiled detectives were still new, the phrase "hardboiled" as a descriptor of tough, callous individuals had been in use since the nineteenth century. Hammett's disavowal of expert status is significant, as expertise is Hammett's central concern.

Hammett quotes the original article: "'The infallibility of finger-prints as an *absolute means* of identification is based on the three following iron-clad facts: First, they never change. Second, they cannot be counterfeited. Third, no two are alike'" (127). Hammett spends the majority of the letter addressing these three claims. He concedes that scientific experiments have indicated the first and third claims to be true, but he asserts that these experiments have not been definitive. Hammett finds fault with the inductive reasoning underlying these claims: "I do not believe that there is, or that there ever can be, demonstrable grounds for saying, *no two are alike*. How could it possibly be proved?" (128). Two identical fingerprints have yet to be discovered, and a means of permanently altering fingerprints has yet to be discovered, but that does not mean that they do not exist.

The claim that fingerprints cannot be counterfeited, Hammett writes, is incorrect. He asserts that an engraver could, "with Mr. Reeves' [sic] microscope and a few simple tools," forge a print—a method that Hammett used in his short story "Slippery Fingers." He then quotes at length the former president of the international association of Chiefs of Police, who describes a method of transferring fingerprints from one location to another: "Fortunately, however, the method is not known to more than half a dozen men at present, and all efforts will be made to keep it a secret of trusted police officials" (127). The value of modern forensic science is predicated on secrecy, as knowledge of scientists' methods would lead to discovery of means of evading those methods. The exercise of knowledge-power is dependent upon the knowledge

being scarce. That scarcity, however, does more than empower law enforcement; it also allows forensic science to become mystified in the public imagination. Hammett writes:

> We would get a lot more truth out of our experts and police officials if it were not for their fear that confessions of fallibility will discredit the system, this leaving the experts jobless and the police minus an effective weapon. These fears are, I think, groundless. The truth will put finger-print classification where it belongs: it is a valuable adjunct to the detective's and the prosecuting attorney's repertory, but it is not infallible when it stands alone, and it may then be dangerous (128).

Hammett sees experts as turning science into scientism by depicting partial knowledge in need of interpretation as objective truth. He goes on:

> The same thing holds true of all the devices of "scientific" detecting. Many of them are excellent when kept to their places, but when pushed forward as infallible methods, they become forms of quackery, and nothing else. The trouble is that criminals are so damned unscientific, and always will be so long as the most marked criminal trait is the childish desire for a short cut to wealth. The chemist and the photographer and the rest make excellent assistants to our old friend, the flat-footed, low-browed gumshoe, but he's the boy who keeps the jails full of crooks in the long run (128).

Hammett's assertion that criminals are so damned unscientific is the most striking sentence of the letter, mostly because it is the clearest point of disagreement between Hammett and Shaw. As was quoted earlier, Shaw would assert a year later that "more clever, intelligent minds" were becoming criminals now than ever before, but here Hammett maintains that criminals are unintelligent. Hammett also appears to contradict himself; his responses to the article's first two claims imply the possibility of a highly scientifically knowledgeable criminal developing the means to change or counterfeit fingerprints. And the logic of the sentence itself is unclear; it does not follow that detectives ought not to be scientific because criminals are not scientific, just as it does not follow that botanists ought not to be scientific because plants are not scientific.

But Hammett's assertion makes sense in two respects. First, the assertion can be understood in a literary context. Implicitly, Hammett's words push back against the tradition of the great detective, in which criminal detection is often framed as a battle of wits between two

great minds—Dupin and Minister D----, Holmes and Moriarty, Nayland Smith and Dr. Fu Manchu. These narratives supply the cultural climate out of which the article's scientism develops. Second, with regard to the practice of real-world criminal detection, the examination of physical evidence (which I take to be synonymous with "scientific" detecting in this context) points only towards the mechanics of the crime, establishing what happened. Establishing why it happened involves a "humanistic" approach to criminals, one that Hammett describes by way of two bodily metaphors. The unscientific detective is "flat-footed," immersing himself in the case by visiting the scene, interviewing witnesses and suspects, and doing the *leg-work*; and he is "low-browed," not a thinker but a feeler. Investigating the motive behind the crime rather than the mechanics, the why rather than the how, is an easier route to a solution because criminals tend to be so childish and unscientific, making their motives easy to sniff out. Hammett concludes his letter by asserting that he favors "circumstantial evidence," which makes sense, as circumstantial evidence can lead to an understanding of who the criminal is as a person. Furthermore, physical evidence provides an illusory sense of objectivity, a sense produced by the media through which that evidence is viewed, while circumstantial evidence by definition requires interpretive work, and doing that interpretive work makes the evidence more solid.

Crime under a microscope

Hammett's critique comes at an important stage in the development of forensic science as a tool of modern law enforcement. The New York Police Department hired its first medical examiner and its first toxicologist in 1918. The Los Angeles Police Department opened the nation's first crime laboratory in 1923, and New York followed suit in 1926. These developments marked an apotheosis of sorts for a field that had begun almost a century earlier

with the work of Eugène François Vidocq, who, in 1829, predicted that "the day would come when all objects found near the scene of a crime would be subjected to examination under a microscope" (Edwards 71). Vidocq, the world's first self-identified detective, established two of the most common methods at modern detectives' disposal: the matching of trace evidence and the identification of patterns. Both of these occur through the mediation of knowledge, and the media through which that scientific knowledge is constructed—the microscope, the magnifying glass, the mug shot, the criminal database, etc.—became icons of detective work, both in popular culture and in the law enforcement community.

Having spent his early years as a criminal and a prisoner, Vidocq came to work for the police as a spy and informant. In 1811 he formed a plainclothes police unit, the Sûreté, on which both Scotland Yard and the FBI would later be based, and in 1833 he founded "Le Bureau des Renseignements Universels pour le commerce et l'Industrie," the first private detective agency. His autobiography was a bestseller, and Honoré de Balzac, Victor Hugo, Edgar Allan Poe, and Émile Gaboriau all based characters on Vidocq.

Beyond the grandiose and romantic story of his life, Vidocq also made substantive contributions to forensic science, experimenting in the fields of chemistry, graphology, ballistics, and blood type identification. In a famous story from his memoirs, Vidocq took the boots of a thief named Hotot and matched them to prints left in the mud near the scene of a robbery (Vidocq 264-276). Predating fingerprints as a means of criminal identification, which only came into use beginning in the 1880s, the Hotot case of 1810 might be the first instance where trace evidence from a person was used to establish guilt. In 1813, Vidocq instituted a new file system at the Sûreté that identified criminals by their names, known aliases, previous convictions, and methods of operation. As one biographer notes, "Vidocq appears to have been the first police

official ever to realize that individual criminals often give themselves away by the repeated use of identifiable techniques" (Edwards 51).

The criminal database, exemplified by Vidocq's filing system, became the most important tool of criminal detection in the nineteenth century. In the 1880's, French police officer Alphonse Bertillon built on the work that Vidocq had begun. While Vidocq's filing system created a record of criminals' techniques, Bertillon created a record of criminals' bodies. He invented the first effective system of criminal identification, employing detailed anthropometric descriptions as well as a comprehensive, statistically based filing system. Bertillon's pioneering work in anthropometrics served as the precursor to the modern system of fingerprint identification, and the success of his system can be credited to the mathematical certainty lent to his measurements thanks to his use of photography. As historian Alan Sekula observes, "For nineteenth-century positivists, photography doubly fulfilled the Enlightenment dream of a universal language: the universal mimetic language of the camera yielded up to a higher, more cerebral truth, a truth that could be uttered in the universal abstract language of mathematics" (17). Bertillon was among the first to employ the "mug shot," and by 1891 his archive contained over 100,000 photographs. Managing so large a collection of criminal records further necessitated mathematical certainty: "For Bertillon, the mastery of the criminal body necessitated a massive campaign of *inscription*, a transformation of the body's signs into a *text*, a text that pared verbal description down to a denotative shorthand, which was then linked to a numerical series" (33). For several decades, this mathematical inscription of the criminal body was held up as the exemplar of the scientific mastery of crime. Joseph Shaw gives a sense of Bertillon's significance when he alludes to "The Bertillon system" as an example of modern criminal detection in contrast to detection in Gaboriau and Balzac's time, but along with the

excitement around the modernization of criminal detection came a new and robust regime of knowledge-power with troubling racial and ethnic implications. Hammett's preference for circumstantial evidence serves as a way of pushing against this racialized understanding of crime, as it places the focus on the criminal as an individual rather than on a criminal class with a distinct and knowable kind of body.

Between the 1880s and the 1920s, more new methods of forensic science emerged, and beginning in September 1926, the *New York Times* ran a four-part series on the science of criminal detection. That series, written by Edward H. Smith, surveys various scientific methods in modern detective work, with a particular focus on methods for detecting forgery, uses of chemical analysis, and how to identify a gun through close examination of the marks it leaves on a fired bullet. Smith attempts to strike a balanced tone, depicting the value of criminal science while also emphasizing its limitations. Considering handwriting analysis, Smith writes, "As in all arts, there is an uncertain line here that divides the false and the true, the mystical and the scientific" ("Detection"). And on the subject of chemistry, he concludes:

> In this field again there are various false claims and exaggerations. The truth is that the microscope and the chemist's retort have made it possible to glean evidence from minutiae of matter such as were formerly quite neglected. But there are limits, and there is nothing miraculous or baffling about the business—just another insight of sober science ("Chemistry").

Like Hammett in his letter, Smith attempts to eschew the hyperbolic claims of omniscience that characterize scientism, but he is by no means a science detractor. The series characterizes the expansion of scientific detection as an historical inevitability. Smith begins the series by writing, "The valuable detective today, and still more tomorrow, must be a scientist, a technician" ("Detectives"). In a later installment, published when the New York crime lab was only two

months old, Smith writes, "[T]he laboratory has come to play a great part in crime detection. Tomorrow it will play a greater" ("Chemistry"). This repeated emphasis, not only on the role of science but on the growth of that role, creates an association between science and the future, an association similar to that which underlies science fiction. Smith is not alone in this sentiment; criminal science's newfound utility produced a sense that it would continue to improve the practice of law enforcement.

For Smith, the iconic technologies of scientific detection are those that enlarge the detective's view of microscopic trace evidence. Hammett draws on the iconic status of this technology as well, though he does so from an estranged position, when he alludes to "Mr. Reeves' microscope." This was nothing new; Sherlock Holmes had been bringing his magnifying glass to crime scenes since 1887. But the 1920s had seen two innovations unknown to Holmes. The first was the popularization of crime labs in major police departments. The second was the invention of the photomicroscope, giving experts the ability to show their findings and explain to a jury how they determine guilt or innocence by way of examining minute physical evidence. In light of these developments, Smith detects a sea change in how criminal detection is conducted:

> The school headed by Bertillon originated the anthropological measurements system which bears his name and introduced fingerprints, now universally relied on. These last have played a more important role than is generally suspected in the solving of crime cases. And they have, of course, made the hiding of identity impossible.
>
> But a newer school is carrying forward from the point where the identifiers leave off. These moderns rely, to the exclusion of some important branches, mainly upon microscope work and the chemical analysis of dust, of particles found on the clothing, under the nails, on the skin and in the hair ("Detectives").

Vidocq's prediction that the day would come when all objects found near the scene of a crime would be subjected to examination under a microscope appeared to be coming true. In the last article of his series, Smith points to New York City's Bureau of Forensic Ballistics as an

example of this new school. The Bureau was founded in 1925 by Charles Waite, Philip Gravelle, Calvin Goddard, and John Fisher. Gravelle and Goddard invented the comparison microscope, which allowed experts to identify guns by matching the striae left on fired bullets. Goddard was an expert witness in the trial of Nicola Sacco and Bartolomeo Vanzetti and was the key forensic analyst in solving the St. Valentine's Day Massacre.

The move that Smith identifies, away from cameras and measurements towards microscopes and chemical analysis, represents a turn to evidence-oriented detection over identification-oriented detection, the orientation Vidocq displayed when he matched Hotot's boot print. The fact that different schools of thought exist indicates that science remained a contested term, and part of what is at stake in this distinction is the distance between the analysis of a crime and its palpable reality. In the investigation of a crime, confessions and eyewitness testimonies seem to provide direct information about what happened. Photographs, like Bertillon's mug shots, and audio recordings are less direct, but make a clear appeal to vraisemblance. Bertillon's measurements were also aggregated into a statistical database that operated at further remove from the lived experience of crime. Fingerprint analysis, chemical analysis, and ballistic analysis all take place at a distance. If Bertillon transformed the body into a text—a kind of data—then Goddard transformed marks left by the body into information about that text—a kind of metadata.

The unscientific Hammett would likely challenge the claim that any of these methods ever really "made the hiding of identity impossible," because they all generate mediated forms of knowledge, and those layers of mediation created failure points. Much to his frustration, the truth-value of his "circumstantial" approach appeared to be diminishing.[18] But Hammett's approach is arguably the most direct in that it involves knowing firsthand who the players are

and what motivates them. Though they represent different visions of scientific detection, Goddard's microscope and Bertillon's database are alike in how they contrast with Hammett's methods: they are both media through which the criminal is made visible. In a general sense, the science of detection is about seeing things that cannot be gleaned with the naked eye with the presumption that seeing these things will lead to the guilty party. The move that Smith identifies towards an emphasis on looking for evidence meant that real-world detection was beginning to look more and more like the version presented in fiction, a version in which clues play a significant part.

Calculation, observation, ingenuity: The great detective as Renaissance man

Like Gernsback, Joseph Shaw developed a magazine around a genre with a century of development behind it. In the first issue of *Amazing Stories*, Gernsback describes scientifiction as "The Jules Verne, H.G. Wells, and Edgar Allan Poe Type of Story," and with this comment he establishes a holy trinity of Victorian science fiction. Detective fiction had its own holy trinity, and as with science fiction, the genre begins with Poe in America in the 1840's, continues to develop with a French writer in the 1860's, and reaches an apotheosis with a British writer in the 1890's-1920's. Each writer provided readers with a detective who was more scientific than his predecessors, but also more everything else. Classically, the great detective was neither a scientist nor an everyman, but rather a brilliant outsider who evinced multiple intelligences and a broad base of knowledge. The great detective is a scientist, but also an artist, an athlete, an actor, and a grifter—an all-around Renaissance man.

While he had antecedents, Poe established many of the most recognizable conventions of detective fiction with a trilogy of stories which Poe called "tales of ratiocination" featuring C.

Auguste Dupin. Although not a professional detective, the Parisian man solves crimes in his free time and sometimes acts as a consultant for the Prefect of Police. The Dupin stories place heavy emphasis on the method of detection; in the first of the stories, "The Murders in the Rue Morgue" (1841), the narrator spends several pages discoursing on the human mind's faculty for analysis, looking at chess and card games for examples of what analysis is and isn't. Poe writes:

> The faculty of re-solution is possibly much invigorated by mathematical study, and especially by that highest branch of it which, unjustly, and merely on account of its retrograde operations, has been called, as if par excellence, analysis. Yet to calculate is not in itself to analyze. A chess-player, for example, does the one without effort at the other (141).

Imagining a card-player, he states:

> He makes, in silence, a host of observations and inferences. So, perhaps, do his companions; and the difference in the extent of the information obtained, lies not so much in the validity of the inference as in the quality of the observation. The necessary knowledge is that of what to observe (142).

These analogies to games might be the features of the great detective with which Joseph Shaw and Nino Frank take issue when they compare this formula to crossword puzzles. But to focus only on calculation and observation would be to overlook the third term in Poe's definition of analysis: ingenuity. Poe asserts, "The analytical power should not be confounded with simple ingenuity; for while the analyst is necessarily ingenious, the ingenious man is often remarkably incapable of analysis" (143). By emphasizing the role that ingenuity plays in the analytical process, Poe belies Shaw's criticism that the puzzle-solving great detective lacks emotional values. On the contrary; as the genre was originally conceived, creative insights rather than cold rationality were crucial to solving puzzles.

Dupin's superior faculty for analysis manifests itself differently in each of his three stories. In "The Murders in the Rue Morgue," he deduces that the murder had been committed by an Orang-Outang, a conclusion reached after witness testimonies described the strangeness of the

assailant's voice and after he concludes that the hair in the victim's hand was not human. In "The Mystery of Marie Roget" (1842) Dupin does not catch the killer, but rather examines details presented in newspaper reports and disputes the conventional interpretation of the crime. For example, many suspect that the murder had been committed by a gang, but a handkerchief had been left behind at the primary crime scene after the body had been moved, and Dupin interprets this as a mistake more likely to have been committed by an individual than a group. In both of these cases, Dupin's solution depends on his ability to observe relevant details, but even more so on his capacity to construct logically sound interpretations of those details. Constructing these interpretations require a large portion of knowledge, both about the physical evidence itself, and also about human nature. In the final and most famous Dupin story, "The Purloined Letter" (1844), the detective relies entirely on what he knows of the antagonist to determine that the stolen letter is hidden in plain sight. As Ronald R. Thomas puts it, "Dupin's framework for solving the case is distinguished from the overly empirical approach of the police by virtue of its *tour de force* of imaginative construction" (47). The Prefect of Police is skilled at calculation and observation, but in his search for the letter he comes up empty, because his analytical method lacks that all-important third ingredient: ingenuity.

Over the next two decades, numerous writers in Europe and America would continue to develop crime as a theme, using the solution to a mystery as a narrative telos and using detectives as central characters. Inspector Bucket in Charles Dickens's novel *Bleak House* and Seargent Cuff in Wilkie Collins's *The Moonstone* serve as two noteworthy examples of British literary detectives during this period. But the next great tales of ratiocination came from the French writer Émile Gaboriau. From 1866 to 1868, Gaboriau published five novels featuring Monsieur Lecoq, a character more explicitly based on Vidocq. Like Dupin, Lecoq emphasizes

the importance of developing an intellectually sound methodology in the pursuit of crime. In *Monsieur Lecoq*, the last of the Lecoq novels, the detective is planning to surveil a prisoner, when the inspector, Gevrol, tells him, "You will look just like one of those silly naturalists who put all sorts of little insects under a magnifying glass, and spend their lives watching them" (259). To this remark, Lecoq replies:

> You couldn't have found a better comparison…. I owe my idea to those very naturalists you speak about so slightingly. By dint of studying those little creatures—as you say—under a microscope, these patient, gifted men discover the habits and instincts of the insect world. Very well, then. What they can do with an insect, I will do with a man! (260).

Whereas Poe describes his protagonist's methods by way of an analogy with strategy games, Gaboriau explains it by way of an analogy to the emerging natural sciences. This is a crucial distinction. Developments in the natural sciences between 1841 and 1868, including but not limited to Charles Darwin's publication of *On the Origin of Species*, challenged the notion of human exceptionalism and legitimized the scientific study of the human as an animal. Lecoq's name, which translates to "the rooster," serves to underscore this point. The application of this idea to criminals was integral to the development of modern criminology. But Gevrol's initial comment indicates that there was still something strange about this notion. In this manner, Gaboriau depicts Lecoq not only as brilliant but also as somewhat radical in his thinking, and this produces some skepticism from Lecoq's colleagues. But Lecoq—who, like Dupin, was inspired by Vidocq—is not purely scientific in his methods; he is also a master of disguise who uses spy craft and tricks in addition to the observational skills of the naturalists.

Between 1868 and 1887, "naturalists" became "scientists" in the popular imagination, and with that transition came increased cultural authority. Poe described the analytical faculty as "mathematical," but for Arthur Conan Doyle, that same ability was decidedly "scientific."

Sherlock Holmes describes himself as a "scientific student of the higher criminal world" ("The Adventure of the Norwood Builder" 354); he asserts that "Deduction is, or ought to be, an exact science" (*The Sign of the Four* 714); and Watson praises him, "You have brought detection as near an exact science as it ever will be brought in this world" (*A Study in Scarlet* 654). In addition to these lines, Holmes frequently alludes to his chemical experiments, describes himself as a scientist or scientific thinker, and admonishes Watson and others that they ought to think more scientifically.[19] Of course, what actually counts as scientific thinking in Conan Doyle's universe seems to be a somewhat fluid concept; in one story the scientific solution may involve the chemical analysis of physical evidence, while in another story it may mean building a psychological profile of a suspect. Being a Renaissance man with a nontraditional educational background, Holmes seems to care less about what it means for something to be scientific than he does about the rhetorical authority conferred on him by calling his methods scientific.[20]

It is important to note, however, that Holmes's scientific methods do not preclude getting physical. Holmes is unfazed by having to beat a poisonous snake to death in "The Speckled Band," and Watson describes him as "an expert single-stick player, boxer, and swordsman" (*A Study in Scarlet* 642). His boxing ability comes up in several stories, and when a prizefighter compliments him in *The Sign of the Four*, Holmes says, "You see Watson, if all else fails me I have still one of the scientific professions open to me" (727). This line can be interpreted as being tongue-in-cheek, with Holmes ironically conflating his deductive abilities with his prowess in the ring, but it is more in keeping with Holmes's personality as a Renaissance man that he should genuinely value his physical skills alongside his mental ones. In referring to boxing as a scientific profession, Holmes underscores the intelligence that that sport requires, just as sports

writer Pierce Egan did in the first half of the nineteenth century, when he dubbed boxing "the sweet science."

The great detective as Renaissance man implicitly critiqued the real institutions of law enforcement that were, at the time, widely regarded as cruel, corrupt, or incompetent. In France after the restoration, "The police were widely perceived as representing and enforcing the interests of those in power" (Merriman 9). This suspicion carried over when London's Metropolitan Police introduced plainclothes detectives in 1829: "In the eyes of the freeborn Englishman such investigation smacked of spying and of the political intrusiveness ascribed to police institutions on continental Europe" (Emsley 7). And in America, the formal institutions of law enforcement were in their infancy, the New York City Police Department having been first established in 1844, the same year that Poe published "The Purloined Letter." Both Vidocq's public persona and his literary descendants, Dupin, Lecoq, and Holmes, caught the public's imagination because they provided a fantastic alternative to the plodding brutes who often solved crimes in the world of readers. Vidocq frequently plays with public perceptions of police in his memoirs. For example, he recounts being assigned to capture a fugitive named Watrin: "The inspectors of the police had already arrested Watrin, but, according to custom, had allowed him to escape" (350). This reputation for incompetence is why Holmes and Dupin are both private citizens, and why Lecoq, though employed by the Sûreté, is characterized as an outsider.[21] It is also why the police officials with whom these detectives work—Monsieur G------, Poe's Prefect of Police; Inspector Gevrol, Gaboriau's French detective; and Inspector Lestrade, Conan Doyle's representative of Scotland Yard—are so often the most foolish characters in the story.

The line of development that led from Dupin to Lecoq to Holmes resulted in a distinct genre with an established set of conventions. Conan Doyle was deeply indebted to both Poe and Gaboriau; even the name "Sherlock" echoes "Lecoq." Conan Doyle acknowledges this early in *A Study in Scarlet*, when Holmes comments, "Dupin was a very inferior fellow" and "Lecoq was a miserable bungler" (645). Holmes represents himself as the apotheosis of the trend begun in Vidocq's memoirs of situating the fantastic great detective in contrast to inferior bunglers; indeed, Holmes is so great that even other great detectives are bunglers by comparison. By placing his character above those of his forebears, Conan Doyle also tacitly admits to their influence on his work. In this passage, detective fiction expresses self-consciousness as a genre that the scientific romances of the same period lacked. That genre was defined largely by the detective's outsider status—the detective had to be separate from and superior to his colleagues, including prior great detectives.[22]

In reinventing the detective genre, *Black Mask* retained the detective's outsider status but not his superior mental faculties, in part because scientific thinking could no longer play a central role in how an "outsider" detective was characterized. By the 1920s, with most large cities' police forces boasting their own crime labs and with *The New York Times* declaring that a detective "must be a scientist," forensic science had come to be associated with the establishment. Traditional Renaissance men continued to occupy the role of great detective in the works of writers like Agatha Christie,[23] but two very different versions of this character type branched off in response to the burgeoning field of forensic science: the hardboiled detective, defined by his independence from authority, and the scientific detective, defined by his subservience to authority.

The scientific detective: Philo Vance

Conan Doyle wrote his last Sherlock Holmes story, "The Adventure of Shoscombe Old Place," in 1927, just as the golden age of detective fiction was beginning. In addition to other detective magazines, the book market was flooded with different spins on the great detective. In 1925, Earl Derr Biggers wrote *The House Without a Key*, the first Charlie Chan mystery, presenting a Chinese great detective working in Hawaii. In 1926, Agatha Christie wrote one of her best-known novels, *The Murder of Roger Ackroyd*, the third to feature Hercule Poirot. And in 1927, the publisher Edward Stratemeyer opened up the detective story to children by releasing the first three Hardy Boys novels, written by Leslie McFarlane under the pseudonym Franklin W. Dixon. Stratemeyer had been inspired to create a children's detective series by the success of the genre in the adult book market, particularly the works of S.S. Van Dine.

Van Dine introduced readers to Philo Vance in *The Benson Murder Case* in 1926. Van Dine describes Vance as an eccentric outsider similar to Holmes. Like Holmes, Vance displays "rare talents of deductive reasoning," but is criticized for "his adherence to cold, logical exactness in his mental processes" (11, 17). Even more than Holmes, Vance leans on the authority of science. He asserts that "the one infallible method of detecting crime" is "the science of individual character and the psychology of human nature" (83). Vance solidifies his authority by discoursing at length on psychology and by parsing scientific and unscientific methods of criminology. When asked whether he believes criminality is a defect of the brain, for example, Vance says, "It was Lombroso, that darling of the yellow journals, who invented the idea of the congenital criminal. Real scientists like DuBois, Karl Pearson, and Goring have shot his idiotic theories full of holes" (87). An explanatory footnote accompanies this and many other comments. More characteristic of academic writing than of fiction, the presence of the footnote

gives the novel a scientific feel and makes an appeal to vraisemblance: Van Dine encourages readers to believe that this is how crimes can actually be solved. The fact that the names and footnotes refer to real scientific work further enhances this reality affect: Cesare Lombroso was a nineteenth century Italian criminologist who, like Bertillon, employed anthropometrics to identify criminals, but Lombroso held that criminality was innate, and that "born criminals" could be identified by atavistic physical features like a sloped forehead or long arms. His pseudoscientific ideas, popular in some circles, were refuted by most mainstream criminal scientists, including the three Vance names. Paul Charles Dubois was a prominent turn-of-the-century neuropathologist, Karl Pearson was a statistician, and Charles Buckman Goring was a criminologist who collaborated with Pearson. And while Vance privileges psychology, it is not the only science in his arsenal; the solution to *The Benson Murder Case* hinges on calculating the height of the perpetrator based on the angle of the bullet wound.

Besides his scientific methods, the most significant aspect of Vance's character is his effete manner. Vance is the antithesis of *Black Mask*'s hypermasculine he-men. Van Dine drives this point home early in the novel when the District Attorney, Markham, asks Vance to come with him to see the crime scene. Vance rings his valet for a change of clothes:

> "I want something rather spiffy. Is it warm enough for a silk suit? … And a lavender tie, by all means."
> "I trust you won't also wear your green carnation," grumbled Markham.
> "Tut! Tut!" Vance chided him. "You've been reading Mr. Hichens! Such heresy in a district attorney!" (21).

Robert Hichens's 1894 novel, *The Green Carnation*, provides a fictionalized account of the relationship between Oscar Wilde and his lover, Lord Alfred Douglas. By alluding to wearing a green carnation, Markham unambiguously implies that Vance is homosexual. Vance's effeminacy and the implications about his sexuality underscore his lack of physical prowess; he

is all brains and no brawn. *Black Mask* writers had a lasting disdain for Philo Vance; Raymond Chandler once called him "probably the most asinine character in detective fiction" (985).

It is revealing to consider the fact that the end of Sherlock Holmes coincides with the beginnings of both Shaw's and Van Dine's careers. Around 1926, detective fiction underwent a kind of Cartesian split—you could have detectives of the mind like Philo Vance or detectives of the body like Dashiell Hammett's Continental Op, but no longer could a detective comfortably occupy both roles as Sherlock Holmes did. Rex Stout made this bifurcation an integral part of his fiction eight years later by featuring a pair of detectives: Nero Wolfe, the fat effeminate agoraphobic who performs the mental labor of detection out of his New York brownstone, and Archie Goodwin, Wolfe's tough, hardboiled assistant.

Shaw commented on this bifurcation in an October 1929 editorial statement, though he couched it somewhat differently:

> DURING the past few years the most interesting and significant development in American literature has been the great growth of the number of stories dealing with crime, criminals, and detective work.
>
> OF equal interest has been the change in the character of such stories. The day of the Sherlock Holmes type of story is practically ended. Despite the fact that the Fu Manchu and Philo Vance stories have been quite popular, the trend is all toward the serious and realistic presentation in fiction of crime, criminals, the underworld, and police and detective methods as they actually are in real life.
>
> THAT this makes for vastly more interesting reading cannot be disputed. Ugly, vicious, sordid, cruel, and completely evil as crime may be to us, we cannot deny that much of it, as perpetrated, is intensely dramatic and thrilling and that the combating of crime and criminal intentions—the battling of right and justice against the wrong-doer—runs the gamut of all tense, human emotion.
>
> AS all *Black Mask* readers know, this magazine has not only specialized in this character of fiction, but has also been the pioneer in the development of the new type of detective story.
>
> MORE than this, its stories are based upon authenticity. Its authors write from first hand [sic] knowledge and from experience with criminals and their ways and detectives and

> their methods. In few stories are the characters fantastic creations of the writer's imagination. Nearly always they are figures drawn from real life, thinking and speaking and acting as real men think and speak and act. And that is the reason why *Black Mask* stories are so gripping, so convincing in their sense of realism.

By asserting that the day of the Sherlock Holmes type of story is practically ended, Shaw indicates the extent to which his perspective in the genre has evolved away from the position he held in November 1926, when he praised Gaboriau, towards the position he would hold in *The Hard-Boiled Omnibus*, when he dismissed both Gaboriau and Conan Doyle. Shaw makes an unusual choice by grouping Philo Vance and Fu Manchu together as descendants of the Sherlock Holmes tradition. Sax Rohmer's Fu Manchu stories feature colonial police commissioner Denis Nayland Smith and his companion Dr. John Petrie squaring off in an ongoing battle of wits against the evil genius Dr. Fu Manchu. Rohmer's stories are less scientific than the other two; indeed, given that the main antagonist is a mad scientist, the Fu Manchu stories may be read as strongly anti-science. But they are decidedly fantastic, featuring exotic locales and unusual plots, and by grouping these stories with those of Van Dine and Conan Doyle, Shaw suggests that the primary tension in detective fiction is not between scientific and hardboiled detective fiction, but rather between unrealistic and realistic detective fiction. Scientific detectives like Philo Vance are just as unrealistic, in Shaw's view, because they impose a sense of order onto reality that obscures the "ugly, vicious, sordid, cruel, and completely evil" aspects of the criminal underworld. By explicitly asserting that his stories are more real, Shaw makes a different appeal to vraisemblance. But as Van Dine demonstrated—and as *Black Mask* expressed elsewhere—scientific understandings of crime were very real in the 1920's. Shaw may have seen it as advantageous to boast about the realism of *Black Mask* fiction, but the bifurcation of detective fiction into "scientific" and "hardboiled" modes was not a contest between realistic and unrealistic stories; rather, it was a debate over how reality ought to be understood.

That question as to how reality ought to be understood hinges on the issue of mediation. As was already observed, both microscopes and evidence catalogues are media through which the criminal can be made visible. To these two heuristic technologies, we may add the psychological profiles that Vance frequently invokes, as well as the trigonometry with which he establishes the height of the killer. All of these technologies provide representations of reality, on the basis of which one can infer what happened. By contrast, a confession or an eyewitness testimony—common forms of evidence in hardboiled crime stories—seems more empirical. Of course, testimony is in its own way mediated, but it nonetheless *feels* like a more direct representation of what happened. And intuition, another common feature of the genre, feels more direct still. The distinction that Shaw draws between the methods depicted by Conan Doyle, Rohmer, and Vance and the "real life" methods depicted in *Black Mask* is essentially the distinction that Whitman draws between the learned astronomer's method of seeing the stars via charts and diagrams and his speaker's method of looking up in perfect silence. This prioritization of direct knowledge over mediated knowledge inflects all of the conventions that characterize a hardboiled detective story, from the first person narration to the paratactic narrative voice to the detective's tendency to beat a confession out of a suspect.

"Play the game alone": Independence from authority

Carroll John Daly became the first to develop these conventions in *Black Mask* in 1922. In "The False Burton Combs," Daly's unnamed narrator describes himself:

> I ain't a crook; just a gentleman adventurer and make my living working against the law breakers. Not that I work with the police—no, not me. I'm no knight errant, either. It just came to me that the simplest people in the world are crooks. They are so set on their own plans to fleece others that they never imagine that they are the simplest sort to do…. I'm a kind of fellow in the center—not a crook and not a policeman (3-4).

This liminal status between cop and criminal would remain a characteristic attribute of the hardboiled private detective. But the narrator isn't a private detective. In fact, he expresses a dislike for the type: "They want to know all about your business and then you're worse off than you were before" (7). Instead, he describes himself as a "soldier of fortune." "Fortune," "chance," and "luck" all figure prominently in his narration—the world of this story is random and uncertain, and the narrator succeeds by being able to deftly navigate this dangerous terrain. He is willing to take chances when necessary and capitalizes on fortuitous opportunities when they are presented. It is fortuitous that, at the beginning of the story, Burton Combs approaches him while he is playing cards on a riverboat. Combs, the son of a wealthy hotel owner, hires the narrator to impersonate him for the summer. The narrator takes the job and discovers that Combs testified against a criminal who then died in prison, and that criminal's brother is out for revenge. The narrator kills the brother out of self-defense, but is arrested and narrowly beats a murder rap. The story ends, somewhat disappointingly, with the narrator taking a legitimate job at Combs's hotel and falling in love.

A world governed by luck, a protagonist who blurs the line between legality and illegality, a plot that hinges on keeping secrets and perpetuating falsehood rather than discovering hidden secrets—Daly's world is very different from Philo Vance's. Its happy ending aside, "The False Burton Combs" takes on themes of random chance and deception, themes present in the genre since Poe, and develops them in decidedly darker and more violent ways. Daly's story, "Three Gun Terry," the first real hardboiled detective story, published in the May 15, 1923 issue, extends this logic into a critique of science.[24] Terry Mack introduces himself in a manner similar to the narrator of "The False Burton Combs," the crucial difference being that Mack doesn't spurn the private detective moniker:

> I have a little office which says 'Terry Mack, Private Investigator,' on the door; which means whatever you wish to think it. I ain't a crook, and I ain't a dick; I play the game on the level, in my own way. I'm in the center of a triangle; between the crook and the police and the victim (43).

Again, the protagonist is a liminal figure between licit and illicit worlds. He has an office, but the story doesn't begin with a client visiting him. As with "The False Burton Combs," Mack becomes embroiled in the case by happenstance; he runs into a woman being chased by two men as he is heading to his car after a night at the bar. In the world of the hardboiled detective, these things just happen. Mack helps her escape them, and it turns out that the woman, Nita, is the daughter of the late Michel Gretna, "who, if he had lived, would have been recognized as the world's greatest scientist" (51). Daly provides readers with a scientific McGuffin: Gretna's last formula, a formula that had been stolen after his death and that Nita had been trying to retrieve.[*] Nita and her uncle hire Mack to recover it. Mack beats and bribes informants on his way to finding the formula which, he is told, would "startle the world" (51). He ultimately recovers it and delivers it to Nita, who immediately burns it. She explains that it is "a chemical for making a poison gas—a gas far more deadly than anything used in the last war, or ever invented" (71). For Vance, science made the world more readable and less chaotic, but for Daly science is the exact opposite—impossible to understand and highly dangerous.

Unlike the kid-friendly *Amazing Stories*, the much more explicit *Black Mask* was decidedly pitched to a narrow audience of adult men. As a result, the horrors of technologized warfare to which Nita alludes remained current for *Black Mask* readers, and that horror at the implications of technological advancement often became associated with a working class mistrust of intellectualism. Daly explains in another story that Terry Mack is illiterate, as were

[*] For a discussion of the scientific McGuffin and its place in the history of *Black Mask*, see Appendix IV.

several other Daly characters. As William F. Nolan observes, "Daly invariably associated toughness with illiteracy" (36). This might be because Mack and his then-34-year-old author were among the last generation for whom a high school education was unusual. In 1910, when Daly was 21, less than 10% of young men had a high school diploma; by 1940 over half did (Goldin and Katz 685). This 30-year period is often referred to as "the high school movement," during which many schools were built and curricula were revised to focus more on practical skills than on the classics. The inability to read was rare—only 2% of nonimmigrant whites were illiterate in 1920—but beyond that, for Mack and his peers, even a basic education would have signified substantial social and economic privilege, as most of Daly's generation went to work instead of high school (NAAL). The younger generation—the generation reading *Amazing Stories*—did not share these associations.

As *Black Mask* slowly developed this new kind of crime fiction, the June 1, 1923 issue, a special edition focused on the Ku Klux Klan, was a landmark. Daly's development of the hardboiled detective reached an apotheosis of sorts with his contribution, "Knights of the Open Palm." The story features the first appearance of Race Williams. Williams appeared in 45 *Black Mask* stories and 8 novels, including 1927's *The Snarl of the Beast*, the first hardboiled detective novel. "Knights of the Open Palm" has Williams hired to infiltrate the Klan and rescue a kidnapped boy who witnessed three Klan members killing a women. Williams's affinity with Daly's previous protagonists is apparent from the outset. As he explains near the beginning of his narration, "I'm what you might call the middleman—just a halfway house between the dicks and the crooks" (429). For Williams, however, maintaining this marginal status is not simply a strategic career choice; it is part of a broader philosophical stance. Commenting on why he doesn't belong to the Klan or any other order, Williams notes:

> Of course I'm like all Americans—a born joiner. It just comes to us like children playing; we want to be in on everything that's secret and full of fancy names and trick grips. But it wouldn't work with me; it would be mighty bad in my line. I'd have to take an oath never to harm my brother—not that I wouldn't keep my oath, but think of the catch in it. I might just be drawing a bead on a lad when I'd spot his button [identifying him as a brother]; then I'd have to drop my gun. Of course that ain't so bad, but that same lad mightn't be wise that I was one of the crowd and—blooey—he'd blow my roof off. No, I like to play the game alone. And that's why I ain't never fallen for the lure of being a joiner (430).

Williams acknowledges the appeal of membership in a group like the Klan, recognizing that such a desire for conformity is common and "American," but these bonds create social ties and obligations that can turn into vulnerabilities. Perhaps most surprisingly, Williams recognizes the desire "to be in on everything that's secret," but the detective rejects easy access to this secret knowledge. Later, he elaborates:

> The real fellows who just enter the Klan because they are born joiners don't know half the time why they are beating up some helpless old man or weak woman. They just do it. Why—God alone knows. They forget their manhood and listen to all the wind about cleaning up the world and making it safe for the white race (436).

In addition to the socially imposed vulnerabilities, being a "joiner" produces a mental weakness by forcing a thoughtless commitment to ideological dogmas. The example of the Klan demonstrates the stakes in ceding one's epistemological authority to a group. Williams implicitly links social independence to intellectual independence, and ties both to masculinity by suggesting that Klan members "forget their manhood." Being a man means knowing why you believe what you believe and being able to distinguish between good ideas and "wind." Like his literary cousin, the Western hero, the hardboiled detective lives for himself, but he also thinks for himself, and hardboiled detective fiction is unique in the emphasis that it places on this trait. Daly's writing is anti-intellectual, but he does not explicitly suggest that science is "wind" as well. Nothing about Race Williams's philosophy is anti-science, but it is anti-scientism, in that it resists an uncritical acceptance of authority. In this regard, Daly's sentiment in this story

anticipates Dashiell Hammett's comments on fingerprints and other "devices of 'scientific' detecting": "Many of them are excellent when kept to their places, but when pushed forward as infallible methods, they become forms of quackery, and nothing else" (128).

Hammett started writing for the magazine at the same time as Daly, though it took him longer to create a detective character.[25] But in his second story for the magazine, he already expresses the antiestablishment attitude that characterizes his most famous work, including a satire of forensic science. "The Vicious Circle" appeared in the June 15, 1923 issue, credited to Hammett's pseudonym, Peter Collinson. In that story, an unnamed United States senator, on track for a presidential run, contacts Gene Inch. Inch owes the senator a favor; the senator pardoned Inch's son when he was governor. The senator reveals to Inch that he is a convicted murderer who escaped from San Quentin twenty years ago, changed his name, and entered politics. Several years ago, another former inmate recognized the senator and has been blackmailing him ever since. The senator asks Inch for his help in silencing the blackmailer. Inch kills the blackmailer, but then blackmails the senator himself. Most obviously, the story satirizes political corruption. Hammett imagines a prominent politician who isn't simply unethical; he's a cold-blooded murderer and fugitive. But the story also reads like a parody of anthropometrics. Gene Inch's physical description caricatures the Lombrosian criminal type: "His forehead was low, narrow, and of an almost reptilian flatness" (120). And the reason why the senator must eliminate his blackmailer is that his fingerprints are still on file, meaning that any accusation lodged against him could easily be verified. Ironically, the bureaucratization of knowledge, designed to catch criminals, only incentivizes more crime, and the identities that fingerprints are

supposed to fix in place instead become more slippery; not only the senator, but also his blackmailer changed their names after prison.

By October 1923, Hammett's stories were carrying his own name on the byline, and by the time Joseph Shaw took over as editor, Hammett had published 29 stories in *Black Mask*. When Shaw took over, he saw Hammett as the magazine's most promising figure, and over the next three years he published 18 more of his short stories. Fourteen of those short stories became the novels *Red Harvest*, *The Dain Curse*, *The Glass Key*, and *Blood Money*. Hammett dedicated *Red Harvest* to Shaw when it was published in book form. In addition to those stories, Shaw published *The Maltese Falcon* serially from September 1929 through January 1930. Shaw also deliberately encouraged other writers to pick up Hammett's style, so much so that another regular contributor to the magazine, Erle Stanley Gardner, complained that Shaw was trying to "Hammettize" the magazine (Nolan 75).

Hammett's significance can be measured by the appreciation given to him by his most prominent successor, Raymond Chandler. Though he was actually older than Hammett, Chandler came late to *Black Mask*, publishing his first story in 1933. Chandler secured his reputation as a leader in the genre on the basis of seven novels and numerous short stories, only 11 of which were actually published in Shaw's magazine. Hammett's influence on Chandler is palpable both stylistically and thematically; reading their novels, it is unsurprising that both Hammett's and Chandler's most famous characters would be played by the same actor in their film adaptations—Chandler's Philip Marlowe is heavily indebted to Hammett's Sam Spade. In his essay, "The Simple Art of Murder" (1944), Chandler writes:

> How original a writer Hammett really was, it isn't easy to decide now, even if it mattered. He was one of a group, the only one who achieved critical recognition, but not the only one who wrote or tried to write realistic mystery fiction. All literary movements are like

> this; some one individual is picked out to represent the whole movement; he is usually the culmination of the movement.

Here Chandler invokes realism in a way that has a slightly different meaning from Shaw, but with much the same connotation. Whereas Shaw is concerned with authenticity, Chandler focuses on "both the language and material of fiction" and asserts the importance of literary realism in both form and content. Chandler points to literary writers like Whitman, Dreiser, and Hemingway as exemplars of literary realism and asserts that Hammett's contribution was in bringing this sensibility to detective stories more successfully than anyone else. Because Hammett was "the culmination of the movement," appreciating his contributions and his relationship with Shaw is crucial to understanding the history of the magazine in these years. Hammett became the culmination of a movement by taking the character type that Daly had invented and developing it with more sophistication and complexity than Daly ever could. Hammett's detectives—the Continental Op, Sam Spade, Nick Charles—all express that same independence from authority that characterized the false Burton Combs, Terry Mack, or Race Williams. And they express that independence in a way that, among other things, shows a greater consciousness of the role that science plays as an authority in modern criminal detection.

"That little fat guy": The detective's body

Edgar Allan Poe perhaps best expresses the spirit of what Shaw and Hammett were doing when they developed the hardboiled school of detective fiction. In the final paragraph of "The Murders in the Rue Morgue," Dupin criticizes the Prefect of Police, telling the narrator, "In his wisdom is no stamen. It is all head and no body, like the pictures of the Goddess Laverna" (168). In this odd observation, Poe may be punning on multiple meanings of the word "stamen." Referring to the pollen-producing organ of a plant, Dupin's use of "stamen" appears to be a

euphemism for male sexuality, perhaps impugning the Prefect's masculinity. But "stamen" also can refer to the fundamental or essential element of a thing, in which case Dupin is commenting on the Prefect's inability to discern what really mattered about the case. In an older sense of the term, "stamen" refers to the thread spun by the Fates; Dupin's criticism may be that the Prefect fails to account for the role that fate can play in our lives, a fitting point given the seemingly random nature of the mystery's solution. The line is made stranger still by the allusion to Laverna, the goddess of thieves and the underworld, not a figure typically associated with the head rather than the body. Dupin's point appears to be that, in order to solve crimes effectively, one must embrace the physical, which means both asserting a masculine sexuality and accepting the role that fate plays in life and death. The opposite of this bodily wisdom is a criminal, and implicitly feminine, focus on the head.

The rationative Dupin thinks with both his head and his body, but in the dualist world of 1920's detective fiction, *Black Mask* appears to be all stamen. Nowhere is this clearer than in one of the magazine's recurring advertisements. Inside of the back cover on virtually every issue of the magazine is a full-page ad for a book titled "Muscular Development" by the body builder Earle Liederman. The ad always features a picture of a shirtless Liederman staring at the reader with an intimidating scowl. The picture is accompanied by text that changed from issue to issue. The February 1929 ad (Figure 7), for example, featured the headline, "The Man I Pity Most," and read:

> POOR OLD JONES. No one had any use for him. No one respected him. Across his face I read one harsh word—FAILURE. He just lived on. A poor worn out imitation of a man, doing his sorry best to get on in the world. If he had realized just one thing he could have made good. He might have been a brilliant success.
>
> There are thousands and thousands of men like Jones. They, too, could be happy, successful, respected and loved. But they can't seem to realize the one big fact—that practically everything worth while living for depends upon STRENGTH—upon live, red-blooded he-man muscle.

The Man I Pity Most

POOR OLD JONES. No one had any use for him. No one respected him. Across his face I read one harsh word—FAILURE. He just lived on. A poor worn out imitation of a man, doing his sorry best to get on in the world. If he had realized just one thing he could have made good. He might have been a brilliant success.

There are thousands and thousands of men like Jones. They, too, could be happy, successful, respected and loved. But they can't seem to realize the one big fact—that practically everything worth while living for depends upon STRENGTH—upon live, red-blooded, he-man muscle.

Everything you do depends upon strength. No matter what your occupation, you need the health, vitality and clear thinking only big, strong, virile muscles can give you. When you are ill the strength in those big muscles pulls you through. At the office, in the farm fields, or on the tennis courts, you'll find your success generally depends upon your muscular development.

Here's a Short Cut to Strength and Success

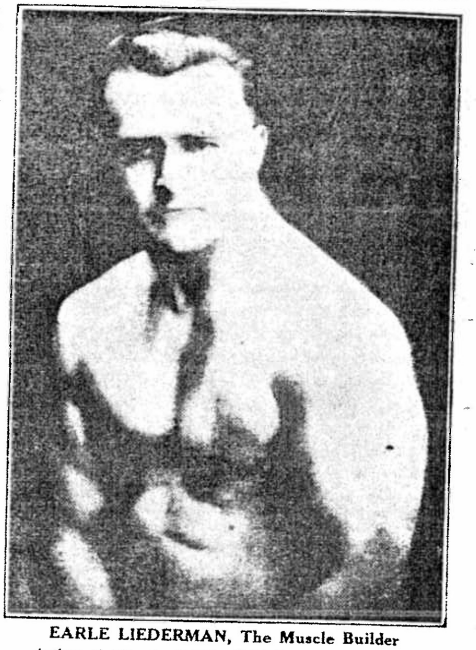
"But," you say, "it takes years to build my body up to the point where it will equal those of athletic champions." It does if you go about it without any system, but there is a scientific short cut. And that's where I come in.

30 Days is All I Need

In just 30 days I can do things with your body you never thought possible. With just a few minutes work every morning, I will add one full inch of real, live muscle to each of your arms, and two whole inches across your chest. Many of my pupils have gained more than that, but I GUARANTEE to do at least that much for you in one short month. Your neck will grow shapely, your shoulders begin to broaden. Before you know it, you'll find people turning around when you pass. Women will want to know you. Your boss will treat you with a new respect. You'll look ten years younger, and you'll feel like it, too. Work will be easy. As for play, why, you realize then that you don't know what play really means.

I Strengthen Those Inner Organs, Too

But I'm not through with you. I want ninety days in all to do the job right, and then all I ask is that you stand in front of your mirror and look yourself over. What a marvelous change! Those great square shoulders! That pair of huge, lithe arms! Those firm, shapely legs! Yes, sir. They are yours, and they are there to stay. You'll be just as fit inside as you are out, too, because I work on your heart, your liver—all of your inner organs, strengthening and exercising them. Yes indeed, life can give you a greater thrill than you ever dreamed. But, remember, the only sure road to health, strength and happiness always demand action.



EARLE LIEDERMAN, The Muscle Builder

Author of "Muscle Building," "Science of Wrestling," "Secrets of Strength," "Here's Health," "Endurance," Etc.

Send for my Big New Book "Muscular Development"

EARLE LIEDERMAN,
Dept. 1702, 305 Broadway,
New York City.

Dear Sir: Please send me, absolutely FREE and without any obligation on my part whatever, a copy of your latest book, "Muscular Development."

Name .....AGE .....

Street .....

City .....State .....

Please write or print plainly.

64 pages and .... IT IS FREE

It contains forty-eight full-page photographs of myself and some of the many prize-winning pupils I have trained. Some of these came to me as pitiful weaklings, imploring me to help them. Look them over now and you will marvel at their present physiques. This will not obligate you at all, but for the sake of your future health and happiness do not put it off. Send today—right now before you turn this page.

EARLE LIEDERMAN
DEPT. 1702
305 Broadway, New York City

Figure 7. Advertisement for Earle Liederman's "Muscular Development" in *Black Mask*, February 1929.

Black Mask's fixation on being a "he-man" shows up in editorial statements as well, and became more pronounced under Shaw's editorship. As one critic observes, "Around 1926, the advertisements for makeup, lessons in dressmaking, and bust enhancers disappeared, along with fiction aimed at women. He-man rhetoric replaced editorial lip-service to family" (Smith 54). The December 1927 cover even declared *Black Mask* "THE HE-MAN'S MAGAZINE." The goal of shaping the perfect male body served as a means of working through anxieties about the status of modern working-class masculinity. The headlines to other versions of Liederman's ad express the same theme: "*A Slap in the Face with a Cream Puff* is not a man's way of fighting"; "*Rip off Your Shirt* and get a job." Three themes recur most frequently in these ads: getting women, getting a job, and winning fights. In this regard, Earl Leiderman's muscles represent a dream of control and self-improvement not unlike the advertisements for T. O'Conor Sloane's correspondence courses in *Amazing Stories*.

Indeed, while Sloane maintained an exclusive relationship with Experimenter Publishing, correspondence courses promising training in radio and electrical engineering frequented both magazines. While *Amazing Stories* ads were aimed at both hobbyists and the career-minded, *Black Mask*'s ads tended to focus more exclusively on vocational training and couched the benefits in much more pragmatic terms. While these ads always tout the potential to earn a high salary, none compare that salary to buried treasure or liken that potential for new employment to a romantic adventure. Instead, many take the approach exemplified by Coyne Electrical School when it tells readers that it can make them electrical experts in 90 days "without books." The ad asserts, "Lack of experience—age, or advanced education bars no one." And the school promises, "No dull books, no baffling charts, no classes, you get individual training…all real actual work" (Figure 8). Juxtaposing this ad with the Leiderman ads generates a fairly specific

Amazingly Easy Way to get into ELECTRICITY

Don't spend your life waiting for $5 raises in a dull, hopeless job. Now...and forever...say good-bye to 25 and 35 dollars a week. *Let me teach you how to prepare for positions that lead to $50, $60 and on up to $200 a week in Electricity*—NOT by correspondence, but by an amazing way to teach that makes you an electrical expert in 90 days! Getting into electricity is far easier than you imagine!

Learn Without Books in 90 DAYS

Lack of experience—age, or advanced education bars no one. I don't care if you don't know an armature from an air brake—I don't expect you to! It makes no difference! Don't let lack of money stop you. Most of the men at Coyne have no more money than you have. That's why I have worked out my astonishing offers.

Earn While Learning

If you need part-time work to help pay your living expenses I'll help you get it. Then, in 12 brief weeks, in the great roaring shops of Coyne, I train you as you never dreamed you could be trained...on one of the greatest outlays of electrical apparatus ever assembled...real dynamos, engines, power plants, autos, switchboards, transmitting stations...everything from doorbells to farm power and lighting...full-sized...in full operation every day!

Prepare for Jobs Like These

Here are a few of hundreds of positions open to Coyne-trained men. Our free employment bureau gives you lifetime employment service.

Armature Expert	$100 a Week
Substation Operator	$90 a Week
Auto Electrician	$110 a Week
Inventor	Unlimited
Maintenance Engineer	$100 a wk.
Service Station Owner	$200 a wk.
Radio Expert	$100 a Week

etc. That's a glimpse of how we help to make you a master electrician, and fit you to hold big jobs after graduation.

Jobs, Pay, Future

Our employment department gives you lifetime service. Two weeks after graduation Clyde F. Hart got a position as electrician with the Great Western Railroad at over $100 a week. That's not unusual. We can point to many Coyne men making up to $600 a month. $60 a week is only the beginning of your opportunity.

AVIATION ELECTRICITY

I am including my new Aviation Electrical Course to all who enroll now.

Get the Facts

Coyne is your one great chance to get into electricity. Every obstacle is removed. This school is 30 years old—Coyne training is tested—proven beyond all doubt—endorsed by many large electrical concerns. You can find out everything absolutely free. Simply mail the coupon and let me send you the big, free Coyne book of 150 photographs...facts ...jobs...salaries...opportunities. Tells you how many earn expenses while training and how we assist our graduates in the field. This does not obligate you. So act at once. Just mail coupon.

Get this FREE Book

NO BOOKS No Classes

No dull books, no baffling charts, no classes, you get individual training...all real actual work ...building real batteries ... winding real armatures, operating real motors, dynamos and generators, wiring houses, etc.,

Students wiring and checking ignition on one of the late type Radial Aircraft Engines in our aviation department

COYNE ELECTRICAL SCHOOL
500 S. PAULINA ST. Founded 1899 H. C. LEWIS, Pres., Dept. 29-66 CHICAGO, ILL.

H. C. LEWIS, Pres.
COYNE ELECTRICAL SCHOOL, Dept. 29-66
500 S. Paulina Street, Chicago, Illinois

Dear Mr. Lewis:
Without obligation send me your big free catalog and all details of Free Employment Service, Aviation Electricity, Radio and Automotive Courses without extra cost, and how I can "earn while learning." I understand I will not be bothered by any salesman.

Name.....

Address.....

City..... *State*.....

Figure 8. Advertisement for Coyne Electrical School in *Black Mask*, February 1929.

profile of *Black Mask*'s target reader as an adult who is unsatisfied, especially but not exclusively with his employment status, but whose professional frustrations are compounded by a lack of education. This lack of education in turn generates ambivalence. The reader sees higher learning as a necessary instrument for self-improvement, but he also sees its constituent elements—books, charts, classes, etc.—as either alienating ("dull" and "baffling") or out of reach (due to age or lack of experience). Coyne promises an avenue to expertise that circumvents these elements. In this regard, both the Coyne and Leiderman ad appeal to a readership consisting of men who identify as doers, not thinkers. Another Leiderman ad, asserting, "Pills never made muscles," builds on the notion that self-improvement requires action while also implicitly countering other pulp magazine ads that promise scientific cures for baldness, enlarged prostates, excess weight, and other ailments. In the picture that *Black Mask* paints, the body is no more a passive recipient of scientific alteration than the mind is the passive recipient knowledge from dull books. Changes to both require lived experience.

Such lived experiences are written onto characters' bodies in the fiction as well, but whereas the ads presented aspirations, the fiction presented harsh truths. With his most famous character, the Continental Op, Hammett presents a detective whose body constitutes an integral part of how he works. Hammett describes the Op as five-foot-six, 190 pounds, and balding. While much about the character's biography is opaque, these details, particularly the fact that the Op is overweight, recur in story after story. They serve to underscore the hardboiled detective's fallibility, conferring on him status as an underdog, while also reminding the reader that the Op is world-weary and middle-aged. As he narrates in "The Big Knock-Over," "I was no fire-haired young rowdy. I was pushing forty, and I was twenty pounds overweight. I had the liking for ease

that goes with age and weight. Little ease I got" (569). In this quotation, the Op manages to engender both sympathy and admiration in his readers. By creating an association between the Op's overweight body and his age, Hammett uses fat as a metonym for the private detective's experience.[26]

Hammett does not mention the Op's weight in "Arson Plus," the story in which the character debuted. But fat nonetheless plays an important role in the story, which Hammett originally published as Peter Collinson on October 1, 1923. An insurance company has hired the Op to investigate a possible case of arson in which the homeowner, Thornburgh, was killed. In the opening scene the Op smokes cigars with the head of the local police department as the two share details about the case. The Op explains, "I'd been doing business with this fat sheriff of Sacramento County for four or five years" (33). His offhanded description of the sheriff as fat indicates a certain degree of derision while also creating a sense of familiarity, implicitly confirming the Op's claim that the two have worked together for several years. The sense of benign cronyism evoked in the Op's interaction with the sheriff contrasts with how he describes his first witness, the servant at the Thornburgh house. The Op writes, "Mr. Coons was a small-boned, plump man with the smooth, meaningless face and the suavity of the typical male house servant" (34). Always economical in his language, Hammett manages in a few words to create diametrically opposed resonances in his descriptions of two overweight characters. Coons's plump physique becomes significant to the plot; when describing the suspected arsonist, another witness calls him "a big man," but when the Op presses the witness for a more detailed physical description, the witness replies, "I didn't put him under a magnifying glass" (37-38). The arsonist's weight is the only direct knowledge the Op has, but it is enough to lead him to suspect Coons.

Ultimately, the Op pieces together that the fire was in fact arson, but was not a plot to murder Thornburgh; indeed, Thornburgh was in on the insurance scam and faked his own death with the help of Coons and his niece. Thornburgh's niece attempts to misdirect the Op with hints at a possible motive for murder. Her uncle, she explains, was a world traveler until he bought his house. She explains, "[H]e came here and he told me that he was through with wandering; that he was going to take a house in some quiet place where he could work undisturbed on an invention in which he was interested" (38). This crucial detail, about which the niece is able to provide no further information, raises a red flag for the Op. In the end he explains, "All that stuff we were told about Thornburgh had a fishy sound. Whiskers and an unknown profession, immaculate and working on a mysterious invention, very secretive and born in San Francisco—where the fire wiped out all the old records—just the sort of fake that could be cooked up easily" (43). The Op senses the inherent absurdity of the "mysterious invention" detail, and by including it as a red herring in this story, Hammett parodies the trope of the scientific McGuffin employed in "Three Gun Terry."

Hammett's second Op story, and the last story that he published as Peter Collinson, appeared only two weeks later, and it similarly contains an element of parody directed at the scientific community. In "Slippery Fingers," which Hammett would later reference in his June 1925 letter, Frederick Grover hires the Op to solve his father Henry's murder. Looking into the dead man's financial records, the Op determines that he was being blackmailed, and suspects Henry's friend, Joseph Clane. Clane's fingerprints, however, do not match the bloody prints left at the murder scene. The Op asks Clane to return to the police station to be printed again, and the Op notices that Clane's fingers feel "too slick" (31). It turns out that, after the murder, Clane had hired a man to "dope" his fingers by applying a gelatin mold of prints from a man with no

criminal record (33). The scientific data prove easily falsifiable, while the Op's tracing of motive—plus his sense of touch—ferret out the truth. The Op describes Clane in terms similar to Coons in "Arson Plus": "He was a big man, beefy, and all dressed up in a tight-fitting checkered suit…. He had a harsh voice and was as empty of expression as his hard red face and he held his body stiffly, as if he was afraid the buttons on his too-tight suit were about to pop off" (25). The derisive tone predisposes the reader to believe in Clane's guilt just as stubbornly as the Op does, but that tone takes on another meaning at the end of the story. After Clane has confessed, the Op quotes him as saying, "'Then that little fat guy'—meaning me—'came around the hotel last night and as good as told me that he thought I had done for Henny'" (34). This is the first description we get of the Op as a "little fat guy," and knowing that the Op is fat imbues his descriptions of characters like Clane with a sense of self-loathing. Fatness is a point of commonality between the Op and the criminals he pursues, and Hammett gives us reason to believe that the Op does not like that similarity.

The story does not end with Clane's confession, but with Phels, the police department's fingerprint expert, talking to Farr, the forger whom Clane had hired. The Op observes:

> These scientific birds are funny. Here was Farr looking a nice, long stretch in the face as "accessory after the fact," and yet he brightened up under the admiration in Phel's [sic] tone and answered with a voice that was chock-full of pride…. When I left the bureau ten minutes later Farr and Phels were still sitting knee to knee, jabbering away at each other as only a couple of birds who are cuckoo on the same subject can (34).

The comedy of this scene is self-evident, as is the contrast between the world of fat tough guys and the world of scientific "birds." The Op's repeated use of diminutive bird metaphors suggests both physical slightness and a kind of insanity. The name "Farr" appears to be allegorical; that he should be capable of feeling pride at a moment like this marks the scientific bird's removal from the real world. Phels's enthusiasm is also comical in light of his failure to discern Farr's

deception. It suggests that Phels is somewhat immature, if not amoral, and that he is only in the police business for love of the science, with little actual investment in the solving of cases. In "Slippery Fingers," Hammett explicitly contrasts the experience and wisdom of the fat, middle-aged Op with the less serious, less reliable expertise of the forensic scientist.

Phels would go on to make cameo appearances in two later Op stories. In "Bodies Piled Up," originally published December 1, 1923, the Op writes:

> Phels, the Police Department Bertillon man, found a number of fingerprints in Devetyn's room, but we couldn't tell whether they would be of any value or not until he had worked them up. Though Develyn and Ansley had apparently been strangled by hands, Phels was unable to get prints from either their necks or their collars (82).

Hammett would reiterate the difficulty of taking fingerprints from skin in a column for *The New York Evening Post* in 1930 (Panek 87). Later in the story, the Op writes, "The fingerprints Phels had secured had all turned out to belong to Stacey, the maid, the police detectives, or myself. In short, we had found nothing!" (84). Then, in "The Main Death," published in June 1927, the Op visits a murder scene and talks to the police officers on the case:

> "Any fingerprints or the like?" I asked.
> "No. Phels went over the apartment, the window, the roof, the wallet, and the gun. Not a smear" (638).

Phels, a homophone for *fails*, appears in these three stories only to show the fallibility or insufficiency of forensic science. In some of the other Op stories, forensic science succeeds in confirming the detective's insights, but not once does Hammett show science leading to a valuable clue.

The contrast between Phels and the Op can be understood in terms of the mind-body split. For Poe, the symbolically significant body part is the phallus/stamen; for Hammett in his letter, the symbolically significant body parts are the flat feet and the low brow, and for the Op, the symbolically significant body part is his gut. Hammet was not the first to associate fatness

with experiential wisdom, but in the Continental Op he created the most famous example of this association. Numerous other fat characters appeared alongside the Op in the pages of *Black Mask*. Some of these characters' weight connotes age and world-weariness, as with the Op. Some instances of fatness serve to signal that the characters are lazy or disgusting. And for some characters, fatness implies corruption or criminality, as in the stereotypical "fat cat." As a character trait, fatness could carry any number of connotations and could be a feature of protagonists, antagonists, or secondary characters. The world of the hardboiled detective is one in which bodily actions and bodily feelings are highly consequential, and the preponderance of big bodies serves to underscore this focus.

As if to drive this point home by way of contrast, Hammett's only main character to be a scientist is the thin man from Hammett's novel of the same name, first published in 1934. Of course, the eponymous Claude Miller Wynant is not really a character at all, as he turns out to have been dead the whole time, but for most of the novel the missing Wynant is the chief suspect in the murder of his secretary, Julia Wolf. Wynant was a former client of the retired private detective Nick Charles, and over the Christmas holiday, he and his wife Nora find themselves embroiled in the case. Hammett's most comedic novel by far, Nick and Nora's investigation is characterized by their witty banter (their rapport was inspired by Hammett's relationship with Lillian Hellman) and by intrusions from Wynant's eccentric family. As with "Arson Plus," the novel reads like a parody of the scientific McGuffin—Wynant was a "well-known inventor" who is believed to be working on "some invention or other that he wants to keep quiet" (9, 54). But of course, this fact ultimately turns out to be inconsequential; Julia and Wynant's attorney were stealing from him, and the attorney murdered them both when Wynant confronted them about it.

Wynant's scientific work proves to be a red herring, but so do all attempts at scientific detection. Hammet first suggests this theme when Gilbert, one of Wynant's relatives, attempts to help with the case by spying on other suspected family members. He notes, "I don't suppose birds and animals like having naturalists spying on them either" (102). By mentioning naturalists, Hammett appears to satirize the kinds of scientific surveillance that Lecoq employed. Surveillance became more prominent in the late 1920's after the constitutionality of wiretapping was established in the 1928 Supreme Court case Olmstead v. United States, in which the court upheld the conviction of bootlegger Roy Olmstead on the basis of evidence obtained through wiretaps. In contrast to Gaboriau's use of the same analogy 68 years earlier, Hammett's description of "spying" implicitly ties the work of "naturalists" to a highly controversial police method at a time when J. Edgar Hoover's FBI was instituting new regimes of knowledge-power.

Of course, Gilbert's efforts are ultimately useless, as is any forensic evidence, and this is where the novel's title comes into play. Nick describes Wynant as "one of the thinnest men I've ever seen" (11). Towards the end of the novel, the police discover the skeletal remains of a body under the floor of Wynant's shop, and based on his clothes and the fact that he had a cane, they surmise, "He'd be a pretty large man, big bones, big belly, and maybe lame" (189). Nick infers that this is in fact Claude Wynant, and that the attorney used lime or another substance to eat away at his features, then redressed the remains in a fat man's clothes so as to impede identification. This inference is based on nothing but what makes sense to Nick narratively. He says, "Once I heard there was a corpse under the floor, I wouldn't have cared if doctors swore it was a woman's, I'd have insisted it was Wynant's. It had to be. It was the right thing" (198). When Nick sums up the case for Nora in the novel's last chapter, she feels frustrated with the circumstantial evidence with which her husband arrives at the solution:

> "Then you don't know positively that he was robbing Wynant?"
> "Sure we know. It doesn't click any other way."
> …
> "Then you're not sure he—"
> "Stop saying that. Of course we're sure. That's the only way it clicks."
> …
> "But this is just a theory, isn't it?"
> "Call it any name you like. It's good enough for me."
> …
> "But that seems so loose."
> "When murders are committed by mathematicians," I said, "you can solve them with mathematics. Most of them aren't and this one wasn't" (194-195).

This repetitive exchange, interspersed with Nick's explanation of what happened, exemplifies the novel's witty tone and the chemistry between the husband and wife. It also plays out the gender dynamics implicit in how hardboiled fiction distinguishes itself from scientific detective fiction, with the wife holding onto a need for scientific positivity and the husband taking the pragmatic position that, as long as the solution makes sense, it is good enough. Nick's comment about mathematicians echoes Hammett's words a decade earlier about criminals being so damned unscientific: his "loose" method fits the nature of crime. In a brilliantly comedic moment of self-reflexivity, the novel's final line expresses the sentiment that readers might feel about Hammett's work if they approach it expecting the formal tightness that characterizes the great detective; after hearing the full explanation, Nora simply says, "It's all pretty unsatisfactory" (201).

To be satisfied is to have enough of something—in this case, enough information—and it is a short leap from the symbolic importance of gustatory satiation to the literal importance of intellectual satisfaction in the context of solving a mystery. To be thin is to be hungry—for more food, for more knowledge, and for more evidence. But Nick Charles, the Continental Op, Sam Spade and others don't want more evidence; they just want the evidence to click—they want to know and understand things *in their guts*. The Op's stomach and those of his fellow *Black Mask*

characters take on multiple symbolic valences, and over the course of the genre's development, the gut would come to be a structuring metaphor, one for which early *Black Mask* stories laid the groundwork. The gut can refer most literally to a part of the body and especially to a part of fat bodies, but it can also refer to knowledge (as in, "spill your guts"), violence ("blood and guts"), courage ("he's got guts"), and instinct or intuition ("gut feeling"). Hardboiled fiction develops an epistemology of the gut around these connotations, all of which favor direct knowledge over scientifically mediated knowledge. In developing the tropes of gut detection, the other "*Black Mask* boys" do implicitly what Hammett, Shaw, and Daly do more explicitly; they critique the scientific authority and expertise that characterized real and fictional detectives of the time.

"From Adam's apple to ankles": Knowledge and relationships in *Red Harvest*

For all the times that Hammett used him to critique science, there was at least one instance in which Hammett had a character refer to the Op as a scientific detective. In *Red Harvest*, the novel that Joseph Shaw serialized from November 1927 through February 1928, the Op pits four rival gangs against one another in an attempt to clean up the town of Personville, a small town so overrun with organized crime that most people refer to it by the nickname, Poisonville. In one of his early attempts to destabilize the city's criminal underworld, the Op spreads misinformation about a boxing match being fixed. When the fighter who the Op claimed would take a dive ends up winning by knockout, someone in the crowd kills him by throwing a knife in his neck. Later, the Op explains his actions to Dinah Brand, the novel's femme fatale. The Op says, "That was only an experiment—just to see what would happen." Dinah replies, "So that's the way you scientific detectives work. My God! for a fat, middle-aged, hard-boiled, pig-headed guy, you've got the vaguest way of doing things I've ever heard of" (84-85). The Op

self-identifies as an experimentalist in the most colloquial sense of the term, and he had no goal in mind when he spread the misinformation. Dinah's reply is clearly sarcastic, but it is unclear what her sarcasm is meant to convey. On the one hand, she might be mocking the arrogance of his project—claiming to "experiment" with people as if he were a scientist, when in fact he has nothing approaching a scientific method, no plan of action. This seems to be how the Op interprets her sarcasm when he replies, "Plans are all right sometimes…. And sometimes just stirring things up is all right" (85).

But on the other hand, Dinah might genuinely see the Op as a kind of scientific detective. After all, Dinah doesn't say that the Op is disorganized or lacks a plan; she says that he is vague, a criticism that might easily be lodged against many scientists, especially when they attempt to communicate their ideas to nonexperts. The Op's appearance, age, and affect—fat, middle-aged, hard-boiled—make this vagueness surprising because in Hammett's world one would only ever expect such vagueness from thin characters like Wynant and young (or at least young-acting) characters like Phels. If Dinah genuinely sees the Op as a scientific detective, or as a detective who is unironic in his scientific posturing, it would not be entirely surprising. The boxing scene is far from the only time when the Op plays at being an experimentalist in the novel.

Red Harvest is an unusual text. The plot begins as a rather conventional murder mystery: Elihu Willson, a wealthy industrialist, hires the Op to investigate the murder of his son Donald. In the course of investigating the murder, the Op convinces Willson to pay him a ten thousand dollar retainer to clean up the town's crime and corruption. The Op catches the murderer a quarter of the way into the novel, and indicates the ease with which he solved the case by the casual manner in which he hands it over to the scientists. Speaking to the killer, a bank cashier, the Op says, "Maybe the gun you used wasn't a bank gun, but I think it was…. I'm going to have

a gun expert put his microscopes and micrometers on the bullets that killed Willson and bullets fired from all the bank guns" (59). The Op's glibness suggests a remarkable degree of confidence, as the forensic ballistics to which he refers is only two-year-old technology. After the Op has solved the case, Elihu Willson attempts to call off the larger project of cleaning up the town, but at this point, the case is personal. The Op tells him:

> Your fat chief of police tried to assassinate me last night. I don't like that. I'm just mean enough to want to ruin him for it. Now I'm going to have my fun. I've got ten thousand dollars of your money to play with. I'm going to use it opening Poisonville up from Adam's apple to ankles (64).

Even though the Op calls the town Poisonville, his figurative language calls to mind the allegorical significance of the town's real name. While most detective stories are concerned with the individual persons involved in the case, *Red Harvest* focuses more broadly on Personville as a whole, and bodily metaphors serve as the novel's means by which to maintain this focus. Ronald R. Thomas asserts that in the novel, "Hammett's concern is directed at understanding how societal and historical forces permeate and become registered in the language that speaks through our bodies" (95-96) This is true of the aging body of Elihu Willson, the dead body of Donald Willson, and the sexualized body of Dinah Brand, an object of desire for many of the town's power brokers, but the cleansing of Poisonville begins with the counterpoised fat bodies of the police chief and the Op. It is out of the conflict between these two bodies that the Op resolves to open the town from Adam's apple to ankles. The Op's language here may be interpreted as a revenge fantasy, but he has not resolved to butcher or destroy Personville. Rather, he wants to get at its insides so as to understand their workings; in other words, he wants to perform a forensic autopsy.

The stakes of this autopsy are particularly high for Elihu Willson, who, for forty years, "had owned Personville, heart, soul, skin and guts" (8). Willson is responsible for the original sin

that led to the city's descent into criminality, having employed thugs to bust up the miners' union during a strike. By establishing the town's backstory in this way, Hammett treats the body politic like a literal human body, and then subjects that body to the Op's metaphorically medico-scientific gaze. Thomas connects this innovation to *Black Mask*'s break with the great detective:

> The novel runs against the nineteenth century tradition of detection by representing crime not as individual but structural, not as biological but sociological. It would make no sense for the detective to seek to identify a single criminal or to prove someone's true identity, therefore. These objectives are irrelevant in a context where everyone is a double agent, where the law and the criminal are equally implicated in a general societal breakdown. Rather than converting the unreadable crime into a legible text, here the detective makes manifest the fact that the crime has already written itself in the lying language of the body politic (103-104).

Thomas's analysis points to the irony inherent in how the Op utilizes the language of experimentation and autopsy: by analogizing his work with that of the criminal scientist, Hammett highlights just how different his project actually is. Personville's guts are not a person's guts. The town's guts are the people and their relationships with one another. The Op teases out Poisonville's complex network of corruption by coming to an understanding of these relationships, not by placing them under a microscope but by acting as a participant-observer.

"Knots in my stomach": Intuition

Beginning in 1934 with Rex Stout's first Nero Wolfe novel, *Fer-de-Lance*, detective fiction's Cartesian split began to mend, and collaborations between hardboiled and scientific detectives became increasingly common, not only in literature. On television, police procedurals are frequently premised on unusual teams of the Nero Wolfe/Archie Goodwin variety. The popular television show *NCIS*, for example, features a six-person investigative team led by a former marine sniper whose other members include a former police detective, a former Mossad assassin, a computer expert, a forensic scientist, and a medical examiner. The show is evenly

divided between those who come from the hardboiled school and those who come from the scientific school. The contrast in methods and worldviews between these characters serves as a frequent source of comic relief, even as the team's success is credited to its intellectual diversity. One such instance of comic relief comes in the following exchange from the 2005 episode "Mind Games," in which the computer expert McGee and forensic scientist Abby talk about having to sift through evidence, comparing themselves to their team leader Gibbs:

> McGee: Now all we have to do is scan 800,000 miles of satellite imagery and pray we get lucky.
> Abby: I am a scientist, McGee. Luck has nothing to do with it and/or us.
> McGee: Okay, then how do you explain something like Gibbs's gut?
> Abby: Well, that's easy. Gibbs is lucky.
> McGee: But…but you just said that…
> Abby: He's not a scientist.

In the world of the show, the scientific method and the epistemology of the gut coexist peacefully, albeit somewhat absurdly. Gibbs frequently invokes his gut as the source of his insight into the case, and this invocation of a gut feeling signifies that which is, by definition, scientifically unexplainable.

Early *Black Mask* featured its share of intuitive detectives. In 1934, Paul Cain wrote a story titled "Hunch," in which the detective, Brennan, is repeatedly praised for his intuition: "Those old Brennan hunches, Johnnie—they never miss" (33). Like "gut feeling," "hunch" is also a bodily metaphor, implicitly comparing intuition to a bodily protuberance (as in a hunchback). Well before "Hunch," in August 1926, Lee Shippley wrote a story titled "Instinct." That story is a western murder mystery, in which the perpetrator, the town doctor, is found out because the heroine's horse instinctively bucks when he approaches, just like she does with a rattlesnake. Addressing her horse at the conclusion of the story, the heroine says, "You taught me something I'd never seen. For we girls are a good deal like judges—we don't always use horse-

sense" (128). Though strictly speaking it is not a hardboiled story, Shippley's piece conveys a similar understanding of the value of instinct in criminal detection. By asserting that women don't always use horse-sense, Shippley also genders this faculty for instinct as masculine.[27]

The hardboiled detective's use of gut instinct is what the anthropologist Gregory Bateson calls an explanatory principle. He writes, "An explanatory principle—like 'gravity' or 'instinct'—really explains nothing. It's a sort of conventional agreement between scientists to stop trying to explain things at a certain point" (39). An explanatory principle marks the point when scientists cut off the potentially infinite regress brought on by scientific inquiry. It is the moment when the explanation is satisfactory, and as Nick and Nora Charles exemplify, that moment is different for different investigators. That moment tends to come earlier for the hardboiled detective; specifically, it comes when his gut tells him the answer.

This is the sense of the word "gut" that is most closely associated with hardboiled detectives today. And the brain-body relationship suggested by the phrase "gut feeling" appears to have an actual basis in nature. The neurobiologist Michael Gershon has described the enteric nervous system (the nerves controlling the gastrointestinal system) as "the second brain," and has shown that the nerves of the gut contribute in profound ways to our thoughts and feelings. But the word *gut* did not become associated with instinct or intuition until the 1960's. The first well-known example of a true gut feeling comes in Billy Wilder's *Double Indemnity*, in which the insurance investigator Barton Keyes claims to have an almost supernatural ability to ferret out phony insurance claims. He credits this ability to a "little man" in his stomach: "Every time one of those phonies comes along he ties knots in my stomach." This line does not appear in James Cain's novel, but interestingly, Cain does associate Keyes's skills as an investigator with fatness. Describing the tediousness of Keyes's job, the narrator writes, "That amount of useless work

you'd think would keep down his weight, but it don't. He gets fatter every year…. But he's a wolf on a phony claim" (31).

If Wilder's 1944 film was the first hardboiled crime story to locate instinct in the stomach, Vera Caspary's 1942 novel *Laura* is the first to identify instinct as the defining difference between the scientific and hardboiled detective. In one of that novel's self-reflexive moments, the title character asks the detective what kind of investigator he is, observing, "In detective stories there are two kinds, the hardboiled ones who are always drunk and talk out of the corners of their mouths and do it all by instinct; and the cold, dry, scientific ones who split hairs under a microscope" (76). Coming 20 years after Daly and Hammett published their first stories, Caspary's novel provides an accurate analysis of the genre's bifurcation, and Caspary's detective, Mark McPherson, consciously eschews both sides of the hardboiled-scientific binary. Otto Preminger's film adaptation of *Laura* came out less than a month after *Double Indemnity* and is the only of Nino Frank's original films noirs not to trace its origins to *Black Mask*.

"These are facts": *The Maltese Falcon*

Microscopes (and mug shots, evidence catalogues, and the other technologies of scientific detection) produce facts, but hardboiled detective fiction posits a world in which facts are not to be trusted, where men have to rely on their instincts because nothing is certain. *The Maltese Falcon*, serialized in *Black Mask* from September 1929 to January 1930, develops this sense of uncertainty and, from a literary standpoint, it is the most successful work that *Black Mask* ever published. Raymond Chandler considered it a game-changer. In "The Simple Art of Murder," Chandler writes, "*The Maltese Falcon* may or may not be a work of genius, but an art which is capable of it is not 'by hypothesis' incapable of anything. Once a detective story can be

as good as this, only the pedants will deny that it could be even better" (990). Chandler holds up *The Maltese Falcon* in response to Dorothy Sayers's assertion that the detective story "does not, and by hypothesis never can, attain the loftiest level of literary achievement" (986). Chandler repeats Sayers's scientistic phrase so as to mock its underlying presumptions. The majority of pulp fiction—this applies to both science fiction and detective fiction—may be formulaic and aesthetically conservative, but *The Maltese Falcon*, like Lovecraft's "The Colour Out of Space," showed that these genres were capable of a complexity and sophistication that warranted significant and lasting attention from the mainstream literary establishment.

In many ways, *The Maltese Falcon* breaks the mold of the hardboiled detective. While Sam Spade is just as much of a he-man as other *Black Mask* protagonists, and while forensic science plays no role, many of the conventions with which the genre is associated are absent here. Hammett tells the story in the third person, rendering Spade's thoughts and motivations highly uncertain throughout the story. And the detective looks nothing like the Op; the novel's first words tell us, "Samuel Spade's jaw was long and bony" (106). Hammett goes on to introduce us to Effie, "a lanky, sunburned girl," and Brigid, a "pliantly slender" woman (106, 107). Compared to the Op stories, this conspicuous preponderance of thin people in the novel's first two pages creates a tone that is not as tough as it is sinister. Of Spade, Hammett writes, "He looked rather pleasantly like a blond Satan" (106). This satanic aspect fits with the character's ambiguity, but it also seems to help him as he navigates the novel's complex plot and successfully plays one side against the other in classic hardboiled form.

In the novel, Spade's partner, Miles Archer, is murdered after having been hired to follow a man named Floyd Thursby. Soon after, Thursby turns up dead as well. Spade wades through a series of deceptions and dangerous situations to discover that Thursby and the woman who had

hired Archer, Brigid O'Shaunessy, had previously worked together along with a third man, Joel Cairo. The three had been hired by Casper Gutman to steal a statue of a falcon from a Russian General in Constantinople. After stealing the falcon, Brigid and Thursby betrayed Cairo and planned to keep the falcon for themselves, and Brigid gave it to a ship captain named Jacobi for safekeeping. Brigid had hired Miles to scare Thursby away so that she could keep the falcon for herself, and she killed Miles in an attempt to frame him. When she discovered that Gutman and Cairo were in town looking for her, she returned to Spade for protection. Gutman's assistant, Wilmer Cook, killed Thursby and later Jacobi, but Jacobi's dying act was to deliver the falcon to Spade. Spade agrees to deliver the falcon to Gutman if Gutman sets up Wilmer to take the fall for the murders of Archer, Thursby, and Jacobi. Gutman agrees, but upon inspection discovers that the falcon is a fake. Wilmer kills Gutman for setting him up, and Spade betrays Brigid, turning her in to the police for Archer's murder. This final decision is the most poignant in a series of actions that Spade takes, the motivations for which remain ambiguous; Spade is still the chief suspect in Archer's murder, and the reader can never be certain if Spade is acting out of self-preservation or a desire for justice.

Spade is not the only unknown quantity; in various contexts, the femme fatale identifies herself as Wonderly, Leblanc, and O'Shaunessy. And the falcon is the ultimate deception: it is allegedly made of jewel-encrusted gold, but is covered with black enamel so as to mask its worth. When Gutman discovers that it is a fake, he initially screams and cries, but then says, "'Shall we stand here and call each other names? Or shall we'—he paused, and his smile was a cherub's—'go to Constantinople?'" (210). Gutman infers that the Russian general knew that the falcon was valuable and had a duplicate made. On deciding to continue the pursuit, both Gutman and Cairo begin to laugh with glee, and Gutman's cherubic smile contrasts with Spade's Satanic

affect. Ultimately, it is uncertain whether a real falcon even exists. The truth is an ever-elusive concept in this novel, and the reality of the falcon does not matter in the face of the value that the characters—Gutman in particular—place on it. Talking about the falcon, Gutman asserts, "[I]t well may be a fact that…nobody in all this whole wide sweet world knows what it is, saving and excepting only your humble servant, Casper Gutman, Esquire" (160-161). Gutman delays in explaining what the falcon is, but Hammett eventually devotes a chapter to the statue's history, and that history, involving Emperor Charles V and the Templars, is comically irrelevant to the rest of the story.

Furthermore, Hammett gives the reader clear reasons to doubt Gutman's account. Gutman says, "These are facts, historical facts; not school-book history, not Mr. Well's [sic] history, but history nonetheless" (167). Gutman's words have an air of conspiracy: part of the romance that he creates surrounding the falcon stems from the fact that he promises access to secret information. But his words also cast doubt on his entire story; without a verifiable historical record, Gutman might just be delusional. Particularly revealing here is Gutman's allusion to H.G. Wells's popular textbook, *The Outline of History*, first published in 1919. This may be the only time that Wells's name appears in *Black Mask*, and fittingly, Hammett alludes to him so as to mark a contrast between the criminal's worldview and the scientist's. *The Outline of History* was a bestseller, so it works as a cultural touchstone, but it is also explicitly steeped in the natural sciences. By stating that his history is not Wells's history, Gutman asserts that he has a decidedly unscientific faith in the falcon's value. Professing to be the bearer of unscientific knowledge, Gutman is, appropriately, the only fat character in the story, and his name underscores his fatness, as does that of his assistant, Cook.

Hammett's particular blend of factual uncertainty, moral ambiguity, unexpected violence, and exotic characters all would influence the generation of writers that would come to prominence in the 1930's, most notably Raymond Chandler, whose first detective story would come in December 1933 and who would come to replace Hammett as *Black Mask*'s marquee writer. In an advertisement in the August 1929 issue, Joseph Shaw called *The Maltese Falcon* "The finest story Dashiell Hammett has ever written." Shaw wrote, "This story is a marvelous piece of writing—the finest detective story it has ever been our privilege to read in book form, in a magazine of any kind, or in manuscript" (iv). This was not empty praise. *Black Mask* rarely advertised individual stories to be featured in upcoming issues; Shaw preferred instead to use his editorial statements to highlight multiple authors or the ethos of the magazine more generally. The story was a hit—the novel's serialization ended in January 1930, and both the February and March issues featured cover stories by Hammett. Both times he is billed as "Author of The Maltese Falcon." This was, essentially, the end of Hammett's career as a pulp fiction writer; his last story for the magazine would appear in the November 1930 issue.

The novel's significance is also visible in the cover, where Spade appeared in the September 1929 issue (Figure 9). While in earlier years, the magazine featured illustrated backgrounds, beginning in 1929 the norm was to draw an individual against a white background, and the cover for *The Maltese Falcon* holds up this tradition. But unlike characters on past covers, Spade looks right at the reader. Prior to this issue, even when the cover provided a frontal view, the individual was looking off to the side, situating the reader as a spectator who viewed the action from a position of safety. Spade not only looks at the reader, he shoots at him, and it appears from the hole in his newspaper and the broken martini glass that the reader shot first. By breaking the fourth wall in this way, the cover draws the reader into the action, but positions the

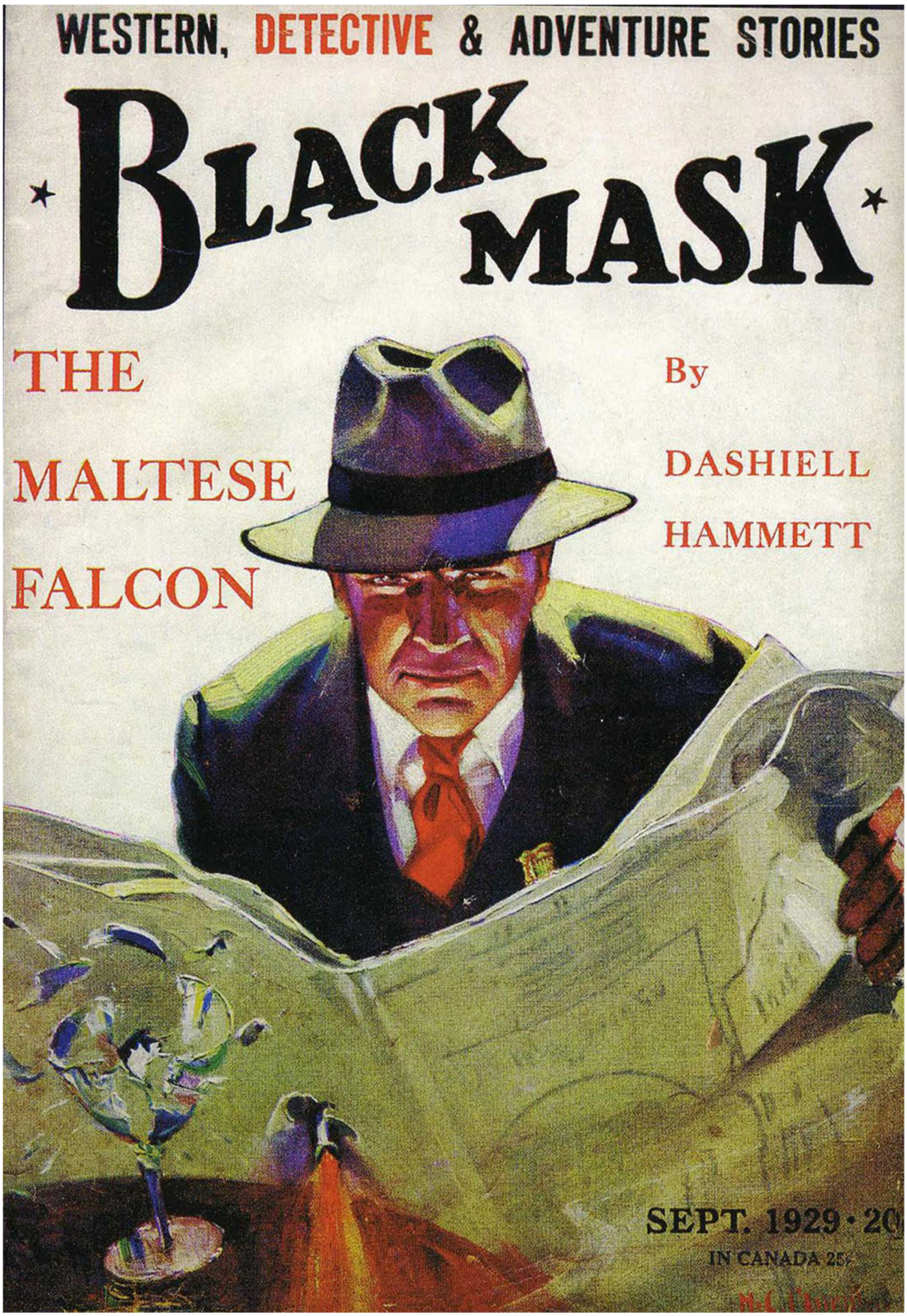


Figure 9. Cover of *Black Mask*, September 1929. Artist unknown.

reader as Spade's antagonist. The cover predisposes us to see him, not as a hero, but as a threat. Like prior *Black Mask* covers, this one has the detective holding the gun near his abdomen rather than extended. The scene being depicted doesn't appear in the novel, but the staging of the action contributes to the self-reflexive way in which the image produces a sense of danger—Spade literally shoots through a newspaper while looking like he could shoot through the magazine that contains him. The newspaper also takes on symbolic value, as most of the news that Spade gets throughout the course of the story is either bad or untrustworthy.

Hardboiled detective fiction asserts that nothing can be trusted to provide an unvarnished picture of reality, not even science. Indeed, the power and authority that comes with scientific expertise makes it particularly important to take a skeptical position towards scientists. *Amazing Stories* sought to bring science into the family so as to demonstrate its utility in everyday life and its accessibility to those without traditional forms of scientific expertise. *Black Mask*, on the other hand, questions that utility and pushes against traditional forms of scientific expertise. Faced with such epistemological uncertainty, it is difficult if not impossible for the detective to know the truth, and with no other options, he must shoot from his gut.

Chapter 4
"Where's your control?"
The Individual vs. Institutional Authority in Sinclair Lewis's *Arrowsmith*

In her 2008 introduction to Sinclair Lewis's *Arrowsmith*, Sally E. Parry describes the plot of the novel: "Like Christian in *Pilgrim's Progress* maneuvering through various obstacles in order to reach the Promised Land, Arrowsmith takes on various medical jobs in hopes that he can eventually devote himself to pure research" (vii). The place of pure research—whether it actually is the promised land that Martin Arrowsmith believes it to be—constitutes the central problem in interpreting this novel. Harold Bloom believes that Lewis genuinely treats pure research as a promised land, writing, "Idealization of science, and of the pure scientist…is what most dates the novel" (2). But as Parry puts it, "Although on one level Lewis may have admired Arrowsmith's decision [devote himself to pure research], it is not one that he would have personally been comfortable with" (xii). The construction of purity is the means by which research scientists divorce themselves from everyday reality, and it is a concept about which Lewis shows tremendous ambivalence. In this regard, Lewis's novel encompasses both sides of the dialectic represented by *Amazing Stories* and *Black Mask*, venerating the possibility of advancement through scientific discovery while also emphasizing the importance of placing critical pressure on expert authority.

- The figure of the coldhearted scientist serves as an instrument with which Lewis articulates his critique of institutional authority, a critique that he also articulates when he **refuses the Pulitzer Prize.**

- **Nonconformity** and independence are central concerns throughout Lewis's body of work, and he shares these concerns with his collaborator, Paul De Kruif.
- *Arrowsmith* expresses this theme of independence through the motif of scientific **control.**
- Control, in turn, is tied to Martin's conception of **expertise,** which the climax of the novel calls into question.
- The novel shows **institutional authority** to be problematic, but also suggests that De Kruif's romantic individualism is insufficient.
- Lewis's **Nobel Prize acceptance speech** revisits his critique of institutional authority, tying that critique to the representation of reality.

"All prizes, like all titles, are dangerous": Lewis refuses the Pulitzer Prize

In April 1926, while many readers were enjoying the first issue of *Amazing Stories*, two books about medical doctors were announced as winners of the Pulitzer Prize. Harvey Williams Cushing's *The Life of Sir William Osler* won the prize for Biography or Autobiography and Sinclair Lewis's *Arrowsmith* won the prize for the Novel. The Pulitzer Prize had been established less than a decade earlier, and the Novel prize, first awarded in 1918, represented an attempt to solidify and institutionalize the culture of letters around the realist novel at a time when the realist novel was in a significant state of transformation. As a high culture genre, the realist novel functions somewhat differently than science fiction or detective fiction. While popular genres of fiction tend to be aesthetically conservative, relying on established formulas and only occasionally producing complex and innovative works like "The Colour Out of Space" or *The Maltese Falcon*, the realist novel lends itself to more challenging and multifaceted

explorations of its subjects. Consequently, both the formal features of the genre and the culture of letters that surround it tend to be more loosely defined.

The realist novel was the dominant high brow genre of the Victorian age on both sides of the Atlantic, two of its leading figures being George Eliot in England in the 1860s and 1870s and William Dean Howells in America in the 1880s and 1890s. But by the time *Arrowsmith* was published, Victorian realism had begun to wane. Gordon Hutner writes, "When William Dean Howells died in 1920, his passing symbolized the transition between the end of one era, American Victorianism, and the beginning of another, American modernism" (37). For a younger generation of writers, Howells, once thought of as "The Dean of American Letters," became a straw-man against whom they could define themselves. Hutner writes, "His doctrines, which once seemed bristling, were now taken as intellectual pieties compared to, say, the pronouncements of Frank Norris, who has maligned the realism of Henry James and Howells…as the 'drama of the broken tea-cup' and the 'tragedy of the walk down the lane'" (38). Lewis makes much the same criticism, stating in his Nobel Prize acceptance speech:

> In his fantastic vision of life, which he innocently conceived to be realistic, farmers, and seamen and factory hands might exist, but the farmer must never be covered with muck, the seaman must never roll out bawdy chanteys, the factory hand must be thankful to his good kind employer, and all of them must long for the opportunity to visit Florence and smile gently at the quaintness of the beggars (Hutchisson 244).

This critique of Howells is not exactly a fair or accurate depiction, but it constitutes an appeal to vraisemblance very similar to Joseph Shaw's criticism of Philo Vance. Like Shaw, Lewis attempts to establish the realism of his own writing by pointing to (or, arguably, constructing) the unreality of another author.

Lewis's disdain for Howellsian gentility helps explain why, in May of 1926, Lewis published a letter turning down the Pulitzer Prize. In his letter, Lewis explains, "All prizes, like

all titles, are dangerous" (Hutchisson 232). If writers and readers too easily accept prizes like the Pulitzer as signifiers of merit, Lewis argues, then writers will begin to pursue the prize as an end unto itself and adjust their own writing to meet the standards and tastes of the institution that awards the prize. He cites the terms of the prize:

> The prize shall be given "for the American novel published during the year which shall best present the wholesome atmosphere of American life, and the highest standard of American manners and manhood." This phrase, if it means anything whatever, would appear to mean that the appraisal of the novels shall be made not according to their actual literary merit but in obedience to whatever code of Good Form may chance to be popular at the moment (Hutchisson 232).

He groups the Pulitzer committee in with "the American Academy of Arts and Letters and its training-school, the National Institute of Arts and Letters, amateur boards of censorship, and the inquisition of earnest literary ladies" as examples of other institutions that exert pressure on writers "to become safe, polite, obedient, and sterile" (Hutchisson 233). With these words, Lewis suggests that the purpose of literary institutions is to reify the culture of letters around the realist novel and to preserve the genre in its Victorian/Howellsian form. He concludes his letter, "I invite other writers to consider the fact that by accepting the prizes and approval of these vague institutions we are admitting their authority, publicly confirming them as the final judges of literary excellence, and I inquire whether any prize is worth that subservience" (Hutchisson 233-234). The letter advocates maintaining a skeptical position with regard to institutionally inscribed expert authority, and as such, Lewis's position within the culture of letters around the realist novel directly connects to his views on expertise.

But *Arrowsmith* is not simply critical of traditional expertise; as medical doctors, Martin Arrowsmith and his colleagues are scientific experts, and Lewis shows them to be multifaceted and sympathetic characters. Though Lewis never cites the novel directly, *Middlemarch* (1874)

looms large over his depiction of the medical profession. George Eliot's doctor character, Tertius Lydgate, experiences the same struggle as Martin Arrowsmith, to balance his scientific ambitions against everyday concerns. The novel, a milestone in the history of the realist novel, was venerated by the medical community as well. Harvey Cushing quotes William Osler as saying, "Ask the opinion of a dozen medical men upon the novel in which the doctor is best described, and the majority will say *Middlemarch*" (463). Osler also said, "'Writers of our times, like George Eliot, have told for future generations in a character such as Lydgate, the little everyday details of the struggles and aspirations of the profession of the nineteenth century'" (371). For Eliot, and Osler and Cushing, those aspirations—to make medicine more of a science—are tragically foolhardy. Osler describes Lydgate as "'at once an example and a warning,'" but Lewis is more sympathetic to the purely scientific side of medical practice (463). Ironically, Lewis's novel went on to supplant *Middlemarch* as the medical community's go-to literary depiction of a doctor, and many aspiring doctors still read the book in medical school.

For example, Howard Markel, the University of Michigan's Director of the Center for the History of Medicine, regularly holds a book club for medical students reading the novel, in which the tension that Martin experiences in striving to become a research scientist serves as a touchstone for students considering their career paths. In one such meeting, Markel observed how Cushing's biography and Lewis's novel together present both sides of the medical profession: "Cushing…wanted to portray not the cold-hearted scientist but the frock-coated avuncular healer. That was the two paradigms, or two opposite ends of the spectrum, and ironically, the Pulitzer committee rewarded both sides." Max Gottlieb, Martin Arrowsmith's mentor in the novel, provides the best defense of cold-hearted scientists—and the best critique of avuncular healers—in a monologue on who the scientist must be:

> "He must be heartless. He lives in a cold, clear light. Yet dis is a funny t'ing: really, in private, he is not cold nor heartless—so much less cold than the Professional Optimists. The world has always been ruled by the Philanthropists: by the doctors that want to use therapeutic methods they do not understand, by the soldiers that want something to defend their country against, by the preachers that yearn to make everybody listen to them, by the kind manufacturers that love their workers, by the eloquent statesmen and soft-hearted authors—and see once what a fine mess of hell they haf made of the world! Maybe now it is time for the scientist, who works and searches and never goes around howling how he loves everybody!" (268).

Howling about how much you love everyone is, in Gottlieb's estimation, an insidious rhetorical gesture that has caused demonstrable harm in the past, as exemplified by jingoistic soldiers and exploitative capitalists, among others. By juxtaposing these examples with doctors who are ignorant of the science behind their therapies, Gottlieb makes a compelling case in favor of taking a skeptical view of all "philanthropists." In fact, Gottlieb's examples of "philanthropists" read like a list of figures whom Lewis satirizes in later novels: the preacher in *Elmer Gantry* (1927); the manufacturer in *Dodsworth* (1929); the politicians in *It Can't Happen Here* (1935). But Gottlieb's defense of the cold-hearted scientist as an alternative is entirely speculative: *maybe* now it is time for the scientist. Lewis does not actually make a strong case in favor of cold-heartedness; rather, he uses the figure of the cold-hearted scientist as an instrument in his satire of superficially avuncular character types. By contrasting these philanthropists with cold-hearted scientists, Lewis throws the former's disingenuousness into sharp relief.

In the novel, the opposite of the cold scientist is the "Man of Measured Merriment," a corporate drone who unthinkingly conforms to institutional norms. Martin criticizes these types when he finds out that another scientist published a paper on his discovery before he did. He says to himself:

> "Damn these old men, damn these Men of Measured Merriment, these Important Men that come and offer you honors. Money. Decorations. Titles. Want to make you windy with authority. Honors! If you get 'em, you become pompous, and then when you're used to 'em, if you lose 'em you feel foolish" (314).[28]

Martin's words anticipate Lewis's reasons for rejecting the Pulitzer Prize. Lewis's novel is, to a large extent, based on the life of his collaborator, Paul De Kruif, but the conflict between the cold scientist and the institutions of science at least partially stands for all conflicts between romantic individuals and institutional authority. In some respects, the novel is as much based on Lewis's relationship with organizations like the American Academy of Arts and Letters as it is based on De Kruif's relationship with organizations like the Rockefeller Institute. However, despite his damning the Men of Measured Merriment, Martin isn't as convinced as Lewis is that institutions are to be spurned. Most of Martin's colleagues lament his lost publishing opportunity, but Gottlieb remains dismissive, believing that, for a true scientist, the work of knowledge production is an end unto itself. Martin is trapped between these two positions, between wanting to advance within the institutions of science and wanting to spurn those institutions altogether. His ambivalence in this regard constitutes the central point of dramatic tension throughout the novel. *Arrowsmith*'s depiction of science is built on a contradiction: the novel constantly critiques the institutions of science—for being too bureaucratic, too commercial, too short-sighted in their focus on practical outcomes—while also suggesting that those institutions are necessary for scientific work to happen. Martin's dissatisfaction with this state of affairs is what motivates his movement through various jobs in the medical field over the course of the novel.

The novel follows Martin Arrowsmith's life and career from his time at college through his early forties. After attending medical school, he works first as a country doctor in North Dakota, then as a public health official in Iowa, before securing a position as a researcher at the prestigious McGurk Institute in New York City. There he discovers a bacteriophage, a virus that kills bacteria, and eventually he gets the opportunity to test its utility as a medical treatment

when a plague ravages an island in the Caribbean. After Martin's wife is infected with the plague and dies, he goes against scientific protocol—which dictates that he have a control group for his study—and he gives his treatment to everyone afflicted with the plague. At the end of the novel, he resigns from the McGurk Institute and sets up an independent research lab in Vermont with a colleague.

The novel paints a complex and provocative picture of contemporary natural science, one built on a number of dichotomies:

Individuals	vs.	Institutions
Coldness	vs.	Sentimentality
Theoretical science	vs.	Applied science
Pure research	vs.	Practical research
Intrinsic value	vs.	Instrumental value
Idealism	vs.	Commercialism

Again and again, the characters in the novel attempt to define these binaries so as to better articulate what science is and what it ought to be. Their underlying assumption is that these binaries map onto one another, with pure, theoretical, non-instrumental science standing in opposition to the private sector's commercialization of knowledge production in the name of practicality. Ultimately, however, Lewis's satire shows that these binaries do not parallel one another, and that commercial interests may not be the best avenue for achieving practical ends, and also that pure, non-instrumental research is not necessarily appealing as an alternative model of scientific work.

"A Standardized Citizen": From *Main Street* to *The Microbe Hunters*

Lewis's criticisms of both literary and scientific institutions stem from a more general nonconformist attitude that Lewis displayed from the very beginnings of his career. His first major novel, *Main Street* (1920), centers on Carol Millford, a woman from Saint Paul, Minnesota who marries a small town doctor named Will Kennicott and moves with him to Gopher Prairie, Minnesota, a small town modeled on Lewis's birthplace, Sauk Centre, Minnesota. Most of the story finds the artistic and socially progressive Carol butting heads with the forces of conservatism and anti-intellectualism that Lewis sees as endemic in the American Midwest, and the novel earned Lewis his reputation as a satirist of that class of American anti-intellectuals that H.L. Mencken called "the booboisie."

He furthered this reputation with his following novel, *Babbitt* (1922). That novel's protagonist, George F. Babbitt, is in many ways Carol Kennicott's opposite—a middle-aged realtor and father whose life revolves largely around his activities with the town's Boosters Club. Babbitt's naïve faith in the American Dream and in the virtues of his small city struck such a chord with readers that it led to the neologism, "Babbitry," meaning "materialistic complacency and unthinking conformity" (OED).[29] For *Babbitt*, Lewis invented a new fictional town, Zenith. Modeled after several Midwestern cities, including Cincinnati and Minneapolis, Zenith exemplifies the average American city, and it is located in the average American state. Lewis's fictional state of Winnemac would provide the locations for at least part of four later Lewis novels: *Arrowsmith* (1925), *Elmer Gantry* (1927), *Dodsworth* (1929), and *Gideon Planish* (1943). Lewis describes the location in *Arrowsmith*:

> The state of Winnemac is bounded by Michigan, Ohio, Illinois, and Indiana, and like them it is half Eastern, half Midwestern. There is a feeling of New England in its brick and sycamore villages, its stable industries, and a tradition which goes back to the Revolutionary War. Zenith, the largest city in the state, was founded in 1792. But

> Winnemac is Midwestern in its fields of corn and wheat, its red barns and silos, and, despite the immense antiquity of Zenith, many counties were not settled till 1860 (10).

This sense of having one foot in the old America of the east coast and one foot in the Western frontier is central to Winnemac's and Zenith's all-important averageness. Malcolm Cowley said that Winnemac "was more typical than any real state in the Union" (145), while Maxwell Geismar called it a "standardized chain-store state" (71). While writing *Babbitt*, Lewis was consciously concerned with what it meant to live in an "average" community, as well as with the effects that standardization had on the individual—his initial subtitle for *Babbitt* was "The Story of a Standardized Citizen" (Lingeman 178).

Lewis's creation of Zenith would later be compared to the work of husband-and-wife sociologists Robert Staughton Lynd and Helen Merrell Lynd (Igo 73). In 1929, the Lynds published an in-depth anthropological study of Muncie, Indiana, titled *Middletown*. The Lynds referred to Muncie as Middletown throughout their book, a pseudonym meant to suggest the city's averageness. The Lynds write:

> Two main considerations guided the selection of a location for the study: (1) that the city be as representative as possible of contemporary American life, and (2) that it be at the same time compact and homogeneous enough to be manageable in such a total-situation study (7).

That the Lynds simultaneously aspired to study a representative *and* homogenous city already suggests the contradictions inherent in the *Middletown* project. In *Middletown*, we see an early example of the average American not only being subjected to a scholarly gaze, but being actively constructed by that gaze, a process of social construction given weight and authority by explicitly scientistic language. H.L. Mencken, for example, wrote, "It reveals, in cold-blooded, scientific terms, the sort of lives millions of Americans are leading" (Igo 23). The popularity of

the Lynds' project reflects a general cultural interest in constructing a "middle America," an interest that Lewis both satisfied and satirized in his Zenith novels.

Mencken used the Lynds' study as an occasion to criticize middle America, but historian Sarah Igo notes the "strange slippage between the typical and the good, the average and the ideal" that occurred when *Middletown* gained attention in the popular media (95). Lewis's Winnemac novels consciously wrestle with this kind of slippage. Indeed, it is suggested by the choice of the city's name. By naming their object of study "Middletown," the Lynds paint an ostensibly neutral picture of the typical city, but "Zenith" suggests that that typical city is or ought to be venerated as the highest possible aspiration. Science serves as an instrument in the project of standardization—not only is it an everyday thing, it builds and shapes other aspects of everyday life. Serving on the Sunday School Advisory Committee, for example, Babbitt reads education journals and learns "How scientifically the Sunday School could be organized" (172). This is not to say that scientific standardization was a major concern for Lewis as he wrote his "Story of a Standardized Citizen"—the novel's few explicit mentions of science mostly come from anti-intellectual evangelical preachers—but rather that Lewis was acutely aware of the authority that science carried among nonexperts well before he began work on *Arrowsmith*.

Like *Main Street*, *Babbitt* was a massive success, but after writing two satires featuring very flawed characters, Lewis wanted to write about a "heroic" character, and began to do research for a novel about the labor movement. It would be titled *Neighbor* and its protagonist would be modeled after Eugene Debs. After several meetings with Debs and other union leaders, he became disillusioned with the project, writing to his wife that most union men were "plain boobs" or "Babbitts in overalls" (Lingeman 205). He would eventually shelve the project, though

for the rest of his life he would occasionally attempt to return to it without making much progress. While working on *Neighbor* in 1922, however, Lewis met Dr. Morris Fishbein of the *Journal of the American Medical Association*, and through Fishbein he met the biologist Paul De Kruif. In De Kruif, Lewis would find a kindred spirit, a fellow nonconformist who wanted to do for the scientific establishment what Lewis had done for middle America

De Kruif had graduated from the University of Michigan with a Ph.D. in biology in 1916. His mentor at Michigan was Frederick Novy, a pioneer in bacteriology, virology, and immunology who had studied in Europe under Louis Pasteur and Robert Koch. De Kruif had served in the Army Sanitary Corps in France during World War I, after which he briefly returned to Michigan as an Assistant Professor. Jacques Loeb recruited him to join the Rockefeller Institute, a leading private institution for scientific research. Loeb was the head of the Institute's Division of Experimental Biology and was the premier exponent of the mechanist doctrine in science, which held that living things were essentially machines. Loeb was a hero to the 1920's intelligentsia, counting H.L. Mencken and Theodore Dreiser among his admirers. De Kruif had looked up to Loeb, but became dissatisfied while working under him at the Rockefeller Institute due to the prevalence of commercialism in modern medicine (Hutchisson 95). In 1922 he voiced this dissatisfaction by anonymously publishing a series of articles under the title "Our Medicine-Men" in *The Century Magazine*. He expresses numerous criticisms of the scientific establishment, many of which return to the overarching problem of corporatization. He writes, "Of late there has been a tendency to introduce efficiency, a necessity to industry, into science, which until now has been a field for intellectual romantics" (950). He writes that this development is "antithetical to the spirit of all creative endeavor" and that "a genuine piece of scientific investigation is always a highly individualized affair" (951-952). After he was

discovered to have been the author of the articles, he was forced to resign from the Rockefeller Institute.

When Fishbein introduced Lewis to De Kruif, the biologist was in the process of transforming himself into an author of popular science texts, the best known of which is *The Microbe Hunters*, published the same year as *Arrowsmith*. The book is structured as a "great men" history of microbiology examining those "intellectual romantics" to which he alluded, from Antonie van Leeuwenhoek to Paul Ehrlich. The book has been described as a "Jazz Age history of science," and De Kruif generates an almost childlike enthusiasm for this history (Markel). Exclamation points appear in almost every paragraph, and he conveys suspense through the liberal use of ellipses. Describing Pasteur's experiments with bottles of urine and milk, he exclaims, "At last he opened them, to show that the urine and the milk were perfectly preserved, that the air above the fluid in the bottles still had almost all of its oxygen; no microbes, no destruction of the milk!" (74). Describing experiments into rabies, he writes, "Their only knowledge that there was such a thing as the microbe of rabies was the convulsive death of the rabbits they injected, and the fearful cries of their trephined dogs…" (168). These stylistic choices are common among popular science writers still today, and they may be seen as a way of generating excitement for a subject that is popularly perceived as cold and inaccessible. For De Kruif, however, his mission is not simply to teach the science of microbiology but rather to convey his appreciation of these men as everyday individuals. Towards the very end of his last chapter, on Ehrlich, De Kruif writes:

> I love these microbe hunters, from old Antony Leeuwenoek to Paul Ehrlich. Not especially for the discoveries they have made nor for the boons they have brought to mankind. No. I love them for the men they are. I say they *are*, for in my memory every man jack of them lives and will survive until this brain must stop remembering (349).

This humanization of the scientist—this removal of the "great men" from the ivory tower—is as far as a literary depiction of scientists can get from Byron's Newton or Whitman's Learn'd Astronomer. De Kruif presents instead a populist image of the lunch-pail scientist. Immediately after the above quotation he returns to Ehrlich specifically, and in the last lines of the book he recounts Ehrlich's reply to a "worshiper" who praised him for discovering the cure for syphilis: "You say a great work of the mind, a wonderful scientific achievement? …My dear colleague…for seven years of misfortune I had one moment of good luck!" (350).[30] Ehrlich's words, like all of the quotations in the book, are likely apocryphal—De Kruif provides no sources and often appears to be embellishing—but they nicely echo another apocryphal science quotation, Thomas Edison's assertion, "Genius is one percent inspiration and ninety-nine per cent perspiration." De Kruif augments this image of the workaday scientist with minutiae that render his microbe hunters more accessible. He writes, "The only language [Leeuwenhoek] knew was Dutch…educated men talked Latin in those days" (3)[31]; he includes the details that Ehrlich "smoked twenty-five cigars a day; he was fond of drinking a seidel of beer" (326); and he calls Koch a "country doctor" (327).

In De Kruif, Lewis found both a subject for his next novel and a collaborator. The novelist wanted to write about working people who weren't boobs and Babbitts, and the biologist's vision of scientists as romanticized workers made for the ideal subject matter. After several nights drinking together and discussing science with Fishbein, the two men decided to collaborate on a novel about a scientist. Initially they were to be listed as coauthors, and though eventually Lewis was credited as the sole author, De Kruif was involved in the writing process from start to finish and received twenty-five percent of the royalties. The two men traveled

together to Washington, the Caribbean, and England conducting research. And many details of Arrowsmith's biography are drawn directly from De Kruif's life. The McGurk institute is based on the Rockefeller Institute, while Arrowsmith's mentor, Max Gottlieb, is an amalgam of De Kruif's two mentors, Frederick Novy and Jacques Loeb.

And Winnemac University, where Arrowsmith develops his conceptions about what science ought to be, is modeled on De Kruif's alma mater, the University of Michigan. Early in the novel, after describing the state of Winnemac, Lewis describes the university:

> It is not a snobbish rich-man's college, devoted to leisurely nonsense. It is the property of the people of the state, and what they want—or what they are told they want—is a mill to turn out men and women who will lead moral lives, play bridge, drive good cars, be enterprising in business, and occasionally mention books, though they are not expected to have time to read them. It is a Ford Motor Factory, and if its products rattle a little, they are beautifully standardized, with perfectly interchangeable parts (10).

Howard Markel calls this passage "a precise pen-portrait of the University of Michigan during the first decade of the 20th century" (372). Here again, Lewis invokes standardization, producing an image of students being commodified in the service of an ideological project with both moral and economic components. Lewis suggests not only that the university produces good workers, but that being a good worker runs contrary to being a good thinker, hence alumni not being expected to have the time to read books. The passage calls into question whether it is the job of the university to produce good workers or good thinkers. By indicating the disjuncture between what the people want and what they are told they want, Lewis casts doubt on the assertion that Winnemac University is "the property of the people of the state." The metaphorical equation of the university with the Ford Motor Factory invokes the industry and culture of the great lakes region specifically and implies that industrial capitalists are the ones telling the people what they want.

This passage, like many, is illuminated by both De Kruif's history with the Rockefeller Institute and Lewis's prior work on *Neighbor*. These details about the novel's background underscore the ways in which *Arrowsmith* works as an anti-capitalist or at least anti-pecuniary novel. Both Lewis and De Kruif were concerned with the influence of money and corporate interests on intellectual labor in general and especially on scientific research. This interest stems from the ways in which industry operates as a force for standardization in opposition to the romantic individual who endeavors to maintain control over his or her life.

"Control, control, control": The ideology of pure science

Most interpretations of the novel contrast it with Lewis's two earlier works, *Babbit* and *Main Street*, the satirical tones of which are characterized by a far greater degree of cynicism. James M. Hutchisson writes, "This novel answered Lewis's critics, for it presented a hero of whom Lewis approved—an idealistic truth-seeker who transcended the environments that defeated the chief characters in *Main Street* and *Babbit*. *Arrowsmith* has remained among the most praised of Lewis's novels, in large part because its satiric components…are outweighed by its sobering, pervasive idealism" (97). And Brooke Allen observes, "It was a new type of book for Lewis, and many readers, expecting more satire, were pleasantly surprised by this serious, mature work" (197). Not all critics interpret Lewis's newfound seriousness and idealism in such a positive light. Identifying the same qualities in the novel, Harold Bloom characterizes it somewhat differently: "Idealization of science, and of the pure scientist…is what most dates the novel" (2). Describing the experience of reading it for the first time among a group of budding scientists, Bloom writes, "*Arrowsmith*, with its naïve exaltation of science as a pure quest for

truth, had a kind of biblical status" (3). Whether they regard this feature as a virtue or a flaw, most critics agree that Lewis is earnest in his praise of pure research science.[32]

Two aspects of the novel typically establish *Arrowsmith* as less biting of a satire than Lewis's other major works: the persistent idealism of the novel's protagonist and the sentimental tone expressed in the conclusion. These two features are closely linked; unlike the protagonists of Lewis's other major works, Arrowsmith earns his happy ending through his commitment to a vision of scientific discovery. It is certainly true that both *Main Street*'s Carol Kennicott and *Babbitt*'s George Babbitt ultimately conform to the cultural pressures around them, while Martin resolutely spurns the culture of applied science that characterizes the McGurk Institute. But this is not so much a commitment to idealism as it is conformity to a different set of cultural practices. Martin does not arrive at an understanding of the virtues of pure research; his mentor, Max Gottlieb, indoctrinates him with those values. During Martin's time in medical school, he becomes Gottlieb's disciple, even going so far as to imitate his mentor's motions and speech patterns. To a large extent, Martin's behavior constitutes a kind of celebrity-worship: Gottlieb, who is largely based on Jacques Loeb, is the most famous member of the medical school's faculty, and his bombastic persona contributes to his mystique. Gottlieb even declares at one point, "I'm the chief glory, the only glory, in this shopkeeper's school" (126). Gottlieb's teachings also confer onto Martin a kind of cultural capital, particularly when he teaches Martin the importance of having a control group—a concept that has both literal and symbolic importance throughout the novel, but which, when introduced, serves primarily as a tool that Martin uses to assert his intellectual superiority over his peers: "Now Martin began to mouth it—control, control, control, where's your control? where's your control?—till most of his fellows and a few of his instructors desired to lynch him" (42). In the wording of this line, Lewis

suggests that even when he appears to be asserting his independence from his fellows and his instructors, he is conforming to someone else's ideals. Martin never speaks his own word; all he does is "mouth" Gottlieb's word.

It is undeniable that Lewis felt genuine admiration for the aspirations of pure science. Lewis even once asserted that he enjoyed writing more than anything "except pure research in a laboratory" (Hutchisson 112). But his enjoyment of laboratory work should not be taken to mean that he idealized pure research or venerated it uncritically. When it is not attached to scientific research, the novel holds the idea of purity up for derision, most notably during Martin's time as a public health official in Iowa. Martin's superior at the Department of Public Health, Doctor Almus Pickerbaugh, is, in his way, as devoted to purity as Gottlieb—not scientific purity but, literally, cleanliness. Pickerbaugh devotes his time to comical awareness-raising campaigns about good hygiene. These take the form of "Weeks"—"Better Babies Week," "Banish the Booze Week," "Tougher Teeth Week," "Stop the Spitter Week," "Three Cigars a Day Week," "Can the Cat and Doctor the Dog Week," etc.—and in the form of poems that Pickerbaugh writes himself (214-215). For example:

> Germs come by stealth
> And ruin health,
> So listen, pard,
> Just drop a card
> To some man who'll clean up your yard
> And that will hit the old germs hard (215).

Lewis associates Pickerbaugh and his wife with the older generation to which they belong: "the late eighties and the early nineties, the naive and idyllic age of Howells, when young men were pure" (197). The allusion to Howells makes it clear that to be "pure" is not a simple, unironically good thing. Purity is associated with cleanliness and health, but it is also the opposite of the authentic and the real.

Lewis gives reason to believe that "pure" science might be similarly problematic. Discussing other professors' perceptions of Gottlieb, Lewis writes, "They said, not without reason, that he was so devoted to Pure Science, to art for art's sake, that he would rather have people die by the right therapy than be cured by the wrong one" (120). Pure research constitutes an escape from earthly, everyday concerns. Gottlieb frequently compares his devotion to religion, asserting, "'The scientist is intensely religious—he is so religious that he will not accept quarter-truths, because they are an insult to his faith'" (267). He ends his speech by telling Martin, "'May Koch bless you'" (268). There is a complex irony to Gottlieb's invocation of Koch: Gottlieb, a scientist who is named after God, is replacing God with the name of a scientist. The fact that "Gottlieb" is German for "God's love" reinforces the sense of the scientist's religiosity conveyed in this passage. It also contrasts with Arrowsmith's name, which evokes neither faith nor "art for art's sake," but rather craftsmanship.

The fact that the "atheist" Gottlieb should rely so heavily on the rhetoric of faith rather than reason—on deference to authority rather than critical thinking—is a problem about which Gottlieb never demonstrates any self-reflection (120). Doctor T.J.H. Silva, a competitor for the role of Martin's mentor, provides a point of comparison in this respect. Silva is dean of the medical faculty at Winnemac University and is known by the nickname "Dad" Silva because of his reputation as a compassionate healer and mentor. Lewis introduces him by writing, "Silva's god was Sir William Osler, his religion was the art of sympathetic healing, and his patriotism was accurate physical diagnosis" (82). Silva is more thoughtful that Gottlieb about the role of "gods"—models on whom scientists base their approach to their work—and about how they form the basis of the difference between Martin's two mentors:

> "Gottlieb's gods are the cynics, the destroyers—crapehangers the vulgar call 'em: Diderot and Voltaire and Elser; great men, wonder-workers, yet men that had more fun

> destroying other people's theories than creating their own. But my gods now, they're the men who took the discoveries of Gottlieb's gods and turned them to the use of human beings—made them come alive!" (117).

Gottlieb and Silva differ on the relative value of theoretical and applied science, but their arguments are not symmetrical. Gottlieb's privileging of pure research stems from a highly abstract commitment to the truth, and while Silva's philosophy would likely accept "quarter-truths," it is grounded in concrete moral sense. Discussing Gottlieb's philosophy, he tells Martin and his wife:

> "It's all very fine, this business of pure research: seeking the truth, unhampered by commercialism or fame-chasing. Getting to the bottom. Ignoring consequences and practical uses. But do you realize if you carry that idea far enough, a man could justify himself for doing nothing but count the cobblestones on Warehouse Avenue—yes and justify himself for torturing people just to see how they screamed" (117).

In Silva's eyes, Gottlieb's ideology of pure research can lead to projects even more asinine and ridiculous than Pickerbaugh's awareness campaigns. Or worse, the amorality of Gottlieb's religion can justify unnecessary cruelty.

The novel never offers Gottlieb an opportunity to respond to these criticisms; on the contrary, shortly after Silva offers this perspective, Gottlieb calls on him to treat his wife for a bleeding ulcer because, Lewis writes, "The Gottlieb who scoffed at medical credos, at 'carpenters' and 'pill mongers,' had forgotten what he knew of diagnosis, and when he was ill, or his family, he called for the doctor as desperately as any backwoods layman to whom illness was the black malignity of unknown devils" (127). For someone as prideful about his expertise as Gottlieb is, the comparison to a backwoods layman is a pointed criticism. Around the same time that Silva treats Mrs. Gottlieb, Martin, upon finishing medical school, accepts a position as a country doctor in North Dakota.

The contest between Gottlieb and Silva for Martin's professional ambitions plays out like a love triangle, and Martin's admiration for Gottlieb takes on decidedly erotic overtones. In the next scene after Silva explains his criticisms of Gottlieb's gods, Martin and his wife Leora run into Gottlieb, and after the encounter, Martin explains to Leora, "'Dr. Silva is a darling, but that was a *great* man! I wish—I wish we were going to see him again. There's the first man I ever laid eyes on that I'd leave you for, if he wanted me'" (118). Ironically, it soon becomes clear that Gottlieb does want him, but he never says so. In the next chapter, Lewis depicts the same encounter from Gottlieb's point of view. Gottlieb runs into the couple almost immediately after Silva has treated Mrs. Gottlieb for her ulcer. This is the first time that Gottlieb has met Leora, and he thinks to himself, "'That girl, maybe it was she that stole Martin from me—from science!'" (129). Having heard about Martin's job in North Dakota, and having just seen his own wife saved by his professional rival, Gottlieb perceives Leora as another rival. But whether she is a professional or romantic rival appears momentarily to be blurry. Martin's and Gottlieb's wives represent the inescapability of the everyday concerns that pure science attempts to expurgate. By blurring the lines between the professional and the erotic the same way that he blurs the lines between the scientific and the religious, Lewis suggests that both Martin's and Gottlieb's commitment to pure science is grounded more in emotion than in reason.

Pure science is attractive because the intellectual labor involved is exciting, not because it is inherently good. Martin's mastery of "control" as a scientific concept functions as an icon of that excitement. Clif Clawson, Martin's medical school classmate, makes the connection between the scientific and colloquial meanings of control explicit and highlights the erotic subtext of Martin's relationship with pure science early in the novel when he criticizes Martin's girlfriend, Madeline: "'How you can fall for that four-flushing dame—*Where's your control?*'"

(47).[33] Reflecting his own words back at him, Clif shows Martin that he is out of control in his relationship with Madeline, and only a few pages later, he finds himself in a love triangle with her and his future wife, Leora (55).

The depth of Martin's commitment to Gottlieb and to his religion of pure science exceeds any romantic relationship that he has in the novel, but he puts that commitment to the test when he goes to the Caribbean to test his phage therapy. This climactic episode focuses on the question as to whether or not Martin will, when faced with the reality of human suffering, observe proper experimental conditions and keep a control group, or whether doing so would constitute, in Silva's words, "torturing people just to see how they screamed." Immediately prior to leaving for the Caribbean, Lewis writes, "Martin swore by Jacques Loeb that he would observe test conditions; he would determine forever the value of phage by the contrast between patients treated and untreated and so, perhaps, end all plague forever; he would harden his heart and keep clear his eyes" (333). By showing that Martin's goal is to end all plague forever, Lewis hints that his protagonist is arriving at a synthesis of Silva's and Gottlieb's positions. Unlike Gottlieb, who never articulates concrete goals, Martin has a practical, altruistic end in sight. But he is still willing to harden his heart in order to achieve that end, and the fact that he swears by Jacques Loeb shows that he is still, at this point, a follower of Gottlieb's religion.

"How much I don't know!": Expertise in the colonial laboratory

The climactic section of the novel, in which Martin tests his phage therapy on an outbreak of the plague, takes place on the fictional Caribbean island of St. Hubert. Saint Hubert was the patron saint of hunters and was said to be able to cure rabies, and as late as the early twentieth century, St. Hubert's keys were a traditional treatment for rabies in Europe. The key

took the form of a small metal bar, nail, or cross that was heated and placed on the body where the bite had occurred. If it was placed there immediately, the heated key could cauterize and sterilize the wound, killing the rabies virus. By naming the island St. Hubert, Lewis not only alludes to the curing of deadly infections, but also to the persistence and the value of folk wisdom. St. Hubert's keys are not perfect, but they did sometimes work, and people knew that they worked long before they could explain the mechanism by which they worked.

The immediate need for a treatment that works, and the way in which that need supersedes the need of pure scientists to understand how a treatment works, poses a serious ethical dilemma for medical science. The sociologist Steven Epstein has written on this ethical dilemma in the context of debates over the human subject testing of new AIDS treatments like AZT in the 1980's and 90's. Epstein examines how, initially, "Principal investigators insisted on the virtues of 'clean data,'" and how this led to many patients being excluded from potentially life-extending treatments (253). AIDS patients and advocates worked with researchers and challenged this mentality so as to give more people access to potentially life-saving treatments during the testing stage. As Epstein writes, "Did 'clean' data come only from 'pure' subjects? Was 'messy,' 'impure' science necessarily bad science?" (256). The Caribbean scenes in *Arrowsmith* lead readers to ask the same questions.

Epstein examines how the construction of credibility—the believability of claims and claim-makers and the trustworthiness of someone's expert authority—was crucial to activists' work with scientists, noting that traditional credentials such as a medical degree or Ph.D. were "the simplest and easiest route to establishing and maintaining credibility" but that "in a politicized or public controversy, credentials are a less sturdy indicator of credibility than they may at first appear" (334-335). Lewis demonstrates this when Martin first arrives on St. Hubert

and embarks on what Lewis describes as a political campaign "to persuade the shopkeeping lords of St. Hubert to endure a test in which half of them might die" (358). None of the local leaders trust him, and their mistrust reaches a crescendo when one missionary asks the local government, "'Has anybody but Arrowsmith himself told you he's a qualified scientist?'" (362). This resistance is so strong that Arrowsmith only receives permission to conduct his experiment after the surgeon general commits suicide.

Of course, this mistrust runs both ways; Martin is not persuaded by arguments to give his treatment to everyone, boasting, "'I'm not a sentimentalist; I'm a scientist!'" (365).[34] Martin's steadfastness in policing the line between scientists and nonscientists stems largely from Gottlieb's training. Gottlieb tells Martin when he starts working at the McGurk Institute, "'Not all the men who work at science are scientists. So few! The rest—secretaries, press-agents, camp-followers! To be a scientist is like being a Goethe: it is born in you'" (268). Gottlieb works to prevent science from being perceived as an everyday thing, and again he resorts to mystification rather than reason in his defense of pure science, depicting it as a divinely bestowed gift rather than a teachable method of inquiry. Minimizing the contributions that nonscientists make to the work of science is one of the means by which Gottlieb keeps science pure, and prior to the St. Hubert episode, this exclusion of laypeople appears to be a virtue. Martin believes that he can only hope to eradicate the plague forever by purging himself of the pernicious influence of nonexperts.

Lewis establishes this attitude towards laypeople when Martin is in medical school and dismisses people's fear of the laboratory. He thinks, "how foolish were the lay visitors to the laboratory, who believed that sanguinary microbes would leap upon them from the mysterious centrifuge, from the benches, from the air itself" (34-35). In this scene, laypeople's fears are

depicted as irrational and anathema to scientific research, but the novel ultimately shows these concerns to be legitimate. Leora dies of the plague after she smokes a contaminated cigarette that she finds in Martin's laboratory (379).[35] Her death exposes the laboratory, the iconic site of pure research, as a dangerous and hostile environment, the purity of which can be contaminated at any moment by simple human error. Only after Leora's death does Martin relent in his commitment to maintaining a control group.[36]

Martin's change of heart happens quickly. Only one page earlier, moments before Martin discovers Leora's body, he says, "'I'm getting to be good and stern, with all you people after me. Regular Gottlieb. Nothing can make me do it, not if they tried to lynch me'" (375). The allusion to lynching demonstrates Martin's egotism at this moment; people are dying all around him and he is denying half of them a potentially lifesaving treatment, but from his point of view, he is the persecuted party. This line is one of four times that the novel alludes to lynching. Earlier, Lewis makes an offhanded reference to a story about lynching in the newspaper (173). He also provides an anecdote about Martin treating a typhoid epidemic in Minnesota and convincing villagers not to lynch some squatters they believe to be responsible (179-180). But the novel's first reference to lynching comes when Martin is in medical school and repeats "where's your control?" until "most of his fellows and a few of his instructors desired to lynch him" (42). This is the line that Martin alludes to when he makes his boast just prior to discovering that Leora has died. By twice connecting experimental controls to lynching, Lewis underscores Martin's obliviousness to his own privileged position as the scientific expert.

Offhanded references to lynching are a recurrent trope in Lewis's novels.[37] In *Main Street*, when Carol Kennicott discusses her idea to build a new town hall and tells a friend that

the townsfolk could build it cooperatively, her friend replies, "'You mention the word 'co-operative' to the merchants and they'll lynch you!" (122). And in *Elmer Gantry*, Lewis writes that the protagonist's friend, the minister Frank Shallard, "asserted that evolutionists were literally murderers, because they killed orthodox faith, and ought therefore to be lynched" (376). These lines reveal a glibness about lynching at a time when these extrajudicial killings occurred in the United States on a weekly basis.[38] Unlike *Main Street* and *Elmer Gantry*, in *Arrowsmith*, Lewis indicates the ugliness of his protagonist's persecution complex by making it clear that the novel takes place in a world where lynchings are not simply hypothetical; Martin reads an announcement about a scientific lecture that is in the newspaper "between a half column on the marriage of the light middleweight champion and three lines devoted to the lynching of an I.W.W. agitator" (173). The detail about the lynching receiving only three lines of coverage suggests a cultural desensitization of which Martin and others are guilty. This desensitization is bound up with racial insensitivity; in over ninety percent of lynchings at the time, the victim was black, but the characters in Lewis's novels fixate on white victims. For *Main Street* and *Elmer Gantry*, this obliviousness can be attributed to the fact that the novels take place in a racially homogenous setting where African Americans were not visible. But in *Arrowsmith*, an awareness of race is unavoidable. The "they" whom Martin imagined trying to lynch him are the black Caribbean people dying of the plague.

Lewis and DeKruif sketched out the novel while traveling the Caribbean together, and St. Hubert is modeled on Trinidad and Barbados (Lingeman 223). Lewis was more interested in finding models for characters than he was in accurately capturing the history and culture of the region, but still, it was on this trip that Lewis became conscious of race. Lewis biographer Richard Lingeman writes, "he was beginning to see racist stereotypes as targets for anger and

satire" (224). In the novel, Lewis writes, "Like most white Americans, Martin had talked a great deal about the inferiority of Negroes and had learned nothing whatever about them" (354). Martin does not, like Carol Kennicott in *Main Street*, serve as a sympathetic counterpoint to other characters' small-mindedness; he is the small-minded one. Martin is the object of Lewis's satire. To disabuse Martin of his prejudice, Lewis introduces the character of Oliver Marchand, a black doctor working on St. Hubert. Sally Parry writes, "For a black character to be a professional in a novel by a white author was highly unusual in Lewis's day. What is even more striking is that Marchand is quietly competent" (xi). Marchand is one of Martin's only allies on St. Hubert, and Martin and Leora both think of him as "the doctor on whom they depended" (373). After they spend an evening together discussing science, Martin says to himself, "I never thought a Negro doctor—I wish people wouldn't keep showing me how much I don't know!" (354).[39] Again and again, the St. Hubert episode shows Martin how much he does not know. The fifty pages that Martin spends in the Caribbean break down the explicit and implicit assumptions about science that Martin has made in the previous three hundred pages: scientists are not necessarily white, laboratories are not necessarily clean, and the best science is not necessarily pure.

Mis'able monasteries and men of measured merriment: Institutional authority

Prior to his time on St. Hubert, it was easy for Martin to take a binary view of scientific institutions whereby practical concerns are always associated with conformity and commercialism in opposition to the romantic individuals who work on a purely theoretical level. After St. Hubert, it becomes much more difficult to associate practicality solely with selling out. This does not mean, however, that the novel does not contain a serious critique of institutions

that is in keeping with the view that De Kruif expressed when he wrote "Our Medicine-Men." Both Lewis and De Kruif were genuinely resistant to the prospect of scientific research becoming another form of alienated labor. The institutions that sponsor scientific research pose an existential threat to working scientists by exerting pressure on their career path that turns them into a Standardized Citizen like Babbitt. Leora calls these sorts of scientists and doctors "Men of Measured Merriment," and she and Martin turn this phrase into a song:

> "Men of measured merriment! Men of measured merriment! Damn the great executives, the men of measured merriment, damn the men with careful smiles, damn the men that run the shops, oh, damn their measured merriment, the men with measured merriment, oh, damn their measured merriment, and DAMN their careful smiles!" (261).

The repeated reference to careful smiles renders these men similar to the "pure" young men from "the naive and idyllic age of Howells" (197). By asserting that they are also the executives and the men that run the shops, Lewis suggests that these men belong to the managerial class.

The novel provides two obvious examples of Men of Measured Merriment: the head of the Department of Public Health, Almus Pickerbaugh, and the McGurk Institute's head of the Department of Physiology, Dr. Rippleton Holabird. Both men are administrators, and both repeatedly show more concern with communicating about their institution to the public than they do with the scientific work that that institution does. When Martin first discovers his bacteriophage, he worries that it will put him on a career path that will make him just like Holabird:

> His work seemed to have been taken from him, his own self had been taken from him; he was no longer to be Martin, and Gottlieb's disciple, but a Man of Measured Merriment, Dr. Arrowsmith, Head of the Department of Microbic Pathology, who would wear severe collars and make addresses and never curse (308).

Martin associates the existential threat of having to join the managerial class—having to dress differently and never curse—with the threat of losing ownership of his intellectual labor. But just

like when he was in medical school, Martin's seeming desire for independence is expressed as a desire to serve a different master. By still wanting to identify as Gottlieb's disciple, Martin reveals that the central concern with regard to these men of measured merriment is not the loss of individuality, but rather the privileging of an institutional model of professional development over an apprenticeship model.

The novel foreshadows this tension early on, when Lewis describes Winnemac University as "the property of the people of the state" and "a Ford Motor Factory" (10). By associating public property with private industry, Lewis suggests that all institutions are suspect, and the novel amplifies this suspicion when Dean Silva repeats the same line to Gottlieb. Gottlieb writes to Silva asking that the medical school be devoted to basic research, and Lewis paraphrases Silva's reply, "The medical school belonged to the people of the state, and its task was to provide them with immediate and practical attention" (125). In his position as dean and in his conflicts with Gottlieb, Silva appears to be yet another man of measured merriment, but unlike Pickerbaugh or Holabird, Lewis does not hold Silva up for scorn and gives him a moment of heroism when he diagnoses Mrs. Gottlieb's ulcer. And after the events on St. Hubert, "healer" characters like Dean Silva and Gustav Sondelius begin to look like intellectual romantics in their own right.

Like "control," "practical" takes on a double meaning in the novel. In many cases, as in Silva's reply to Gottlieb, "practical" refers to applied science and a concern with everyday, "real-world" applications. But in many other cases, being practical means making decisions that affect Martin's everyday life outside of his laboratory work. Martin's decisions to move first to North Dakota, then to Iowa, are motivated partly by practical concerns, such as money and Leora's happiness. In either of these senses, the novel shows Martin or Gottlieb perceiving practicality as

a form of compromise that jeopardizes their idealism. This is especially true when the novel ties being practical to being commercial, as a former medical school acquaintance does when he runs into Martin and says, "'I guess by this time you've gotten over the funny ideas you used to have about being practical—'commercialism' you used to call it. You can see now that you've got to support your wife and family, and if you don't, nobody else is going to'" (204). Once again, the novel positions Martin's scientific ambitions and his wife as rivals, but here, his wife is aligned with commercialism. Due to practical concerns, Martin regularly asks himself whether he should sell out or whether he already has sold out.[40]

Unsurprisingly, Lewis tells us, "No one in the medical world had ever damned more heartily than Gottlieb the commercialism of certain large pharmaceutical firms" (130). He damns the pharmaceutical firms specifically for producing "doubtful" vaccines—profit motivations leading to a reckless behavior where Gottlieb's philosophy of pure science would be more conservative. Gottlieb asserts, "'He is the only real revolutionary, the authentic scientist, because he alone knows how liddle he knows'" (268). Silva dismisses this attitude, and even asserts that this logic could justify torture (117). Silva's dismissiveness towards Gottlieb creates an opportunity, not to compromise the "purity" of research but to break down the binary model that assumes only two options for how to be a scientist. Silva and Sondelius are neither men of measured merriment like Pickerbaugh and Holabird, nor are they pure scientists like Gottlieb. Martin equates applied science with commercialism, set in contrast to a noninstrumental science, which represents revolutionary freedom. But there is no reason that science can't be both practical and noncommercial—can't both serve humanity and maintain the rigorous standards of scientific truth. The tragedy of the novel is that he never perceives that.

The final fifty pages follow Martin after he returns from the Caribbean. During Martin's absence, Gottlieb has succumbed to dementia. Martin has gained some notoriety for his work with the bacteriophage, and the McGurk Institute offers him a job as the assistant director. Holabird, now the director of the McGurk Institute, tries to persuade him by telling him that he will be next in line for the position of director, saying, "We'll need a new Director of McGurk who will work with us and help bring science out of the monastery to serve Mankind" (422). Still fearing that he will become a man of measured merriment, Martin turns Holabird down in order to join a colleague who is starting his own lab in the Vermont woods, where they and several others examine the effects of quinine on the body.

James M. Hutchisson writes of Lewis, "Most of his novels contain a clear pattern: a representative American idealist (in one form or another) pursues a vision, is defeated by the environment, renounces the earlier idealism, then retreats back into reality and thereby metaphorically perishes. Only *Arrowsmith* deviates from this pattern" (123). This is because, in Hutchisson's interpretation, Martin holds on to his ideals. But Martin does retreat, not to reality but from it. The St. Hubert scenes are the only portion of the novel where Martin's idealism comes into direct conflict with reality, and in that moment his ideals lose out. Reflecting on their decision to move to Vermont, Martin's partner Terry observes, "It's kind of a mis'able return to monasteries…except that we're not trying to solve anything for anybody but our own fool selves" (427). By returning to the monastery, it is clear that Gottlieb's religion has won, but for Martin this is not a victory. Terry's description of their retreat as miserable suggests some guilt over their decision; they might not be serving an institution like Winnemac University or the McGurk Institute, but by not serving mankind, this might just be another form of selling out.

Hutchisson is not the only critic to interpret this as an idealistic and happy ending. Mark Schorer writes, "It is a little fantastic, that ending, and quite unpersuasive. It comes out of Lewis's own sentimental notions" (435). But at this point, it is difficult to view this onanistic pursuit of art for art's sake through a sentimental lens. Martin found himself unable to answer the difficult ethical questions, with which he was confronted in the Caribbean, so instead he explores a question with no instrumental value at all: whether "quinine derivatives act by attaching themselves to bacteria or by changing bodily fluids" (402). The fact that quinine works as a treatment for malaria had been known for centuries; precisely how it works is a low-risk intellectual curiosity, akin to investigating how a St. Hubert's key prevents rabies.

The very last lines of the novel see Martin discussing this question with Terry while the two men "lolled in a clumsy boat, an extraordinarily uncomfortable boat, far out in the water" (430). Martin says, "'This new quinine stuff may prove pretty good. We'll plug along on it for two or three years, and maybe we'll get something permanent—and probably we'll fail!'" (430). The scene is reminiscent of the conclusion to another novel released that same year, in which a resigned protagonist withdraws from the modern life that he thought he had wanted. The ending of *The Great Gatsby* finds Nick Caraway, having similarly decided to leave New York in the wake of so much tragedy, looking out at a ferryboat from the shore. In the novel's final lines, he thinks:

> Gatsby believed in the green light, the orgastic future that year by year recedes before us. It eluded us then, but that's no matter—tomorrow we will run faster, stretch our arms farther…and one fine morning—
>
> So we beat on, boats against the current, borne back ceaselessly into the past (189).

Both novels end with an expression of hopefulness combined with an acknowledgement that failure is likely. In both novels, the boat's direction is unclear; it either fights the current or lolls clumsily, and this serves as a symbol of the characters' uncertainty. Both Nick Caraway and

Martin Arrowsmith want to embrace the future, but neither know whether they will be able to push forward or whether they will be borne back ceaselessly into the past.

The similarities between these two works run deeper than their closing lines. Both *Arrowsmith* and *The Great Gatsby* are novels from Minnesotan writers about Midwesterners who move to New York City in hopes of achieving greatness, only to become disillusioned by the version of modernity that they encounter. In both cases, the protagonist witnesses a horrific death, after which they withdraw from the metropolis. Today, *The Great Gatsby* is regarded as the crucial novel to have been published in 1925, but at the time of its publication and for several years after, *Arrowsmith* would have held that distinction (Hutner 59-60). Lewis's status in the American canon fell over the course of the twentieth century, and little critical attention has been paid to his work due in no small part to the perception that his work is, as Bloom and Schorer put it, idealistic and sentimental. But by recognizing these structural and tonal similarities between *Arrowsmith* and *The Great Gatsby*, we can begin to better appreciate the depth and sophistication with which Lewis critiques modernity and, in *Arrowsmith* specifically, the state of science as a part of that modernity.

Across his body of work, there are few moments when it is unclear whether Lewis advocates for the values that he depicts or whether he depicts characters with those values so as to make a broader point. The depiction of pure research in *Arrowsmith* is one such moment. Hutchisson makes it clear that there was a tension between the satirical and idealistic content of the novel in his account of Lewis's editing process, noting, "Nearly all of Lewis's large-scale cuts deleted satiric material that to some degree undercut, digressed from, or obscured the idealistic themes of the novel" (114). In the writing of this novel, Lewis was at war with his own satirical tendencies. By all accounts, he wanted to write an earnest, idealistic novel. That was his

desire when he started writing *Neighbor*, and that was his desire throughout his collaboration with De Kruif, but the words on the page resist so simple an interpretation. Those idealistic themes are present, but at the end of the day, the satirist won out, and pure research is given a more ambivalent treatment than even Lewis himself may have intended.

When Gottlieb says, "perhaps it is time for the scientist," he expresses the dream of living a life free from the pressure to be practical. This pressure, exerted by industry, by universities, and by the culture at large, warps our perception of reality, allowing for quarter-truths, while pure science, by approaching nature without an agenda, searches for the real. This does not mean that every person or even every scientist is obligated to search for the truth in this way, or that that search in inherently better than working as a healer in the mode of William Osler. Pure research is *a* good model for how to be a scientist, not *the* model. But Lewis's attitude towards pure research is not the point. In *Arrowsmith*, pure research science is a rhetorical figure, a point of contrast that Lewis uses in order to advocate against becoming too standardized, too institutionalized, too measured, and too controlled.

"Far from reality": Lewis accepts the Nobel Prize

Unlike the Pulitzer Prize, Lewis accepted the Nobel Prize when the Swedish Academy awarded it to him in 1930.[41] Lewis was the first American awarded the prize, and he used his acceptance speech as an opportunity to comment on the state of American literature. He begins his speech by discussing a member of the American Academy of Arts and Letters who had criticized Lewis's selection for the prize: "This scholar stated, and publicly, that in awarding the Nobel Prize to a person who has scoffed at American institutions as much as I have, the Nobel Committee and the Swedish Academy had insulted America" (Hutchisson 236).[42] Perhaps

unsurprisingly, Lewis uses this anecdote so as to turn his speech towards a critique of American literary institutions, particularly the American Academy of Arts and Letters.

Lewis examines the Academy at length, he says, "because it is so perfect an example of the divorce in America of intellectual life from all authentic standards of importance and reality" (Hutchisson 241). This divorce from reality is evident in the writers whom the Academy venerates, like William Dean Howells. This is not only a problem for the Academy: "Our universities and colleges, or gymnasia, most of them, exhibit the same unfortunate divorce" (Hutchisson 241). He explains:

> Oh, socially our universities are close to the mass of our citizens, and so are they in the matter of athletics…. And in one branch of learning, the sciences, the lords of business who rule us are willing to do homage to the devotees of learning. However bleakly one of our trader aristocrats may frown upon poetry or the visions of a painter, he is graciously pleased to endure a Millikan,[43] a Michelson,[44] a Banting,[45] a Theobald Smith.[46]
>
> But the paradox is that in the arts our universities are as cloistered, as far from reality and living creation, as socially and athletically and scientifically they are close to us (Hutchisson 242).

The perspective on science that Lewis articulates here helps to illuminate *Arrowsmith*. The natural sciences do not stand in opposition to institutions; they are one of the things that the institutions of learning do right. Millikan, Michelson, and Banting were not men of measured merriment because they worked at universities and won prizes, and Smith was not selling out by working for the Rockefeller Institute. None needed to escape to the Vermont woods; on the contrary, their discoveries would have been impossible without institutional support. Universities might support sciences for cynical reasons—because "the lords of business" see value in them—but the work of science is no less legitimate because of this.

Lewis's Nobel speech, like his Pulitzer rejection letter, represents a contest over how to define the real (or the authentic or the actual) within the culture of letters that existed around the

realist novel. In his speech, science serves as a symbol for that which approaches the real. It may operate under the auspices of institutional authority, but it still attempts to strip away filters and get at actuality. Comparing writers who spurn the "tea-table gentility" of William Dean Howells to a physicist who measured the charge of an electron seems like comparing apples to oranges, but that comparison serves as an appeal to vraisemblance.[47]

Coincidentally, one of the passages in *Arrowsmith* where Lewis most clearly articulates this viewpoint compares Gottlieb to Sherlock Holmes: "Gottlieb would have made an excellent Sherlock Holmes—if anybody who would have made an excellent Sherlock Holmes would have been willing to be a detective. His mind burned through appearances to actuality" (133). With this description, the novel evokes a notion that today seems cliché, that science is detective work. The novel, with its resistance to institutional authority, depicts that detective work as hardboiled. But in presenting a hardboiled spirit of independence, Lewis does not sacrifice admiration for the capacity of pure science to improve our everyday lives. I have argued that the ending of the novel is ironic, and that Martin's withdrawal is not an ideal, but Lewis still evinces genuine admiration, and that may be why so many critics interpret the ending as idealistic. Mark Schorer interprets it this way, writing, "In this ending we have moved from science into what we can only call 'science fiction'" ("Afterward" 436). Schorer uses "science fiction" disparagingly to criticize the unreality of the ending, but his description is actually more correct that Schorer lets on. Lewis encompasses both a hardboiled spirit of independence with a science fictional sense of possibility, highlighting both the risks and the rewards implied by science's status as an everyday thing.

Conclusion
"I might have been a great scientist"

Sinclair Lewis's conflicts with the Pultizer Prize committee and the American Academy of Arts and Letters point to the ways in which the realist novel was in a state of transition around 1925. As everyday reality changed, so too did the literary conventions by which everyday reality was represented. Just as scientific romances became scientifiction and then science fiction, and just as the great detective split into the scientific detective and the hardboiled detective, Howellsian realism gave way to modernism as the dominant high culture literary genre. As much as realist novels, modernist novels strive to capture the complexity of everyday reality—both an enthusiasm about progress and a skepticism towards the same—but they do so while evincing more self-consciousness about literary form and about what it means to be modern. Modernist novels ask what it means to live in a world that has gone to war, in a city full of cars, and in a house with a radio. Science permeates modernist literature, often in subtle and offhanded ways, because science permeates modernity.

While Lewis's work participates more in the realist tradition, he was a promoter of the modernist movement. At the end of his Nobel Prize acceptance speech, he lists several young writers who give him hope for the future of American letters, including Earnest Hemingway, Thorton Wilder, and William Faulkner. Jon Dos Passos is the only writer whose work Lewis directly compares to his own, stating, "there is John Dos Passos, with his hatred of the safe and sane standards of Babbitt and his splendor of revolution" (Hutchisson 245). The critique of "safe and sane standards" is, of course, the central theme of *Babbitt*, and of Lewis's speech. In some

respects, it is the central theme of Lewis's entire body of work. Lewis's high praise of Dos Passos dates back to 1925, when Lewis published a review of *Manhattan Transfer* in which he asserts that the novel is more important than the works of Gertrude Stein, Marcel Proust, or James Joyce. He writes, "For one reader there is no question as to whether he prefers the breathless reality of 'Manhattan Transfer' to the laboratory-reports of 'Ulysses'" (4-5). Writing only months after the publication of *Arrowsmith*, it is remarkable that Lewis would strike this contrast between "reality" and "laboratory reports." That he would do so further supports the impression that Lewis takes issue with holding pure research as an ideal. The laboratory is not reality.

In contrasting reality and the laboratory, Lewis might be referencing a disconnect that Dos Passos depicts in his novel. Late in *Manhattan Transfer*, one of the protagonists, the unemployed, recently divorced Jimmy Herf, laments his decline in social status. He says, "'If I'd had a decent education and started soon enough I might have been a great scientist. If I'd been a little more highly sexed I might have been an artist or gone in for religion…. But here I am by Jesus Christ almost thirty years old and very anxious to live" (325).[48] Jimmy's words contrast Tom Buchanan's in *The Great Gatsby*. Both men are non-experts—outsiders to the world of science looking in at an institution that they recognize as tremendously powerful. The relatively arrogant Tom Buchanan sees himself as capable of harnessing that power despite his nonexpert status, to wield his ability to cite scientific stuff as if it were a weapon with which he can gain control over everyday life. For the downtrodden Jimmy Herf, however, science is just outside his grasp and it, along with religion and art, represents missed opportunities. But a missed opportunity is still an opportunity. The laboratory is not reality, but it could have been. By citing it at this moment, Dos Passos affirms the role of science as an everyday thing.

Jimmy Herf's lament is not the only moment where Dos Passos does this; the physical manifestations of a scientifically constructed culture permeate *Manhattan Transfer*'s built environment—the skyscrapers, the hospitals, the trains, and the cars. Two years later, Dos Passos displayed even more consciousness of the role that the automobile played as an icon of the scientific age, writing in *Oriental Express*, "Henry Ford's gospel of multiple production and interchangeable parts will win hearts that stood firm against Thales[49] and Democritus,[50] against Galileo and Faraday. There is no god strong enough to withstand the Universal Suburb" (193). By directly comparing Ford to four of the most influential men in the history of science, Dos Passos suggests that Ford has become this generation's public face of science, and that he is a more successful public face than his predecessors were. This is because, with Ford's assembly line, the role of science in people's lives became material—not a conceptual abstraction but a physical thing. That physical thing begat other physical things—new ways of working and living and socializing.

Advancements in the applied sciences—fields like mechanical engineering, forensic science, and medicine—shaped how people talked about scientific research. In 1921, Marie Curie gave a lecture at Vassar College in which she noted, "We must not forget that when radium was discovered no one knew that it would prove useful in hospitals…. [Research] must be done for itself, for the beauty of science, and then there is always the chance that a scientific discovery may become like the radium a benefit for humanity." This rhetorical gesture, defending basic research as an end unto itself while also pointing to its potential utility, sounds a lot like Martin Arrowsmith's perspective. It also sounds a lot like the perspective adopted by the United States a generation later, when Vanevar Bush wrote *Science, The Endless Frontier*, his 1945 report to President Truman, in which he called for the government to expand its support for

science, writing, "Basic research leads to new knowledge. It provides scientific capital. It creates the fund from which the practical applications of knowledge must be drawn."

In one respect, the three cultures of letters under consideration here—science fiction, detective fiction, and the realist novel—represent different literary relationships with different applied sciences. Science fiction purports to engage with all sciences, but *Amazing Stories* is, at its core, a magazine about invention with a technocratic interest in feats of engineering both large and small. Both Joseph Shaw and Dashiell Hammett show how hardboiled detective fiction emerged out of a largely skeptical response to forensic science and the dominance of the Bertillon system. And *Arrowsmith* shows a novelist exploring the ethical questions that arise when medicine is treated as a science.

In another respect, this is the story of three generations coming to grips with the new scientific age. *Amazing Stories* sold itself as a magazine for everyone, but its target audience was primarily young people, as evinced by Gernsback's repeated praise for "the ambition and really great inventive genius of American boys" (Douglas 199). *Black Mask*, on the other hand, was a magazine directed at *men*, and its skeptical attitude towards science can be interpreted as the older generation's resistance to change. Novels like *Arrowsmith*, *Manhattan Transfer*, and *The Great Gatsby* exist in between these two. It is telling that Jimmy Herf is almost thirty years old when he muses that he might have been a great scientist—young enough to still feel a sense of possibility but old enough to feel that doors have closed behind him. *Arrowsmith* follows Martin from boyhood to manhood, concluding when the protagonist is in his forties, but he is only a few years older than Jimmy Herf when he is at the low point of his professional development, having lost his job at the public health department and not yet finding a place at the McGurk Institute. He says to himself, "I'm licked. I'm a complete failure—at thirty-two!" (257). A similar sense of

despair comes over Nick Caraway when he realizes that it is his thirtieth birthday: "I was thirty. Before me stretched the portentous menacing road of a new decade…. So we drove on toward death through the cooling twilight" (143). To be around the age of thirty in the novels of this time was to feel a profound sense of loss and anxiety.

For the implied readers of *Amazing Stories*, born in the new century, it was easy to become familiar with science. For the older *Black Mask* readers, it was easier to go with their gut. But for those who were around the age of thirty—who were born around the time that H.G. Wells, Arthur Conan Doyle, and William Dean Howells were inventing the tropes that Gernsback, Hammett, and Lewis would later respond to—1926 was a time of tremendous uncertainty, and the desire for control became a dominant theme in this generation's literature.

In the summer of 1925, while she was traveling in France, Gertrude Stein took her car to a garage for repairs. In conversation, the owner of the garage told her that the younger mechanics learned their trade very readily, but that those between the ages of twenty-two and thirty could not be trained. They were, the mechanic said, "une génération perdue"—a lost generation (Mellow 273). This was the anecdote that Stein told Ernest Hemingway which led him to quote her as telling him, "You are all a lost generation," the famous quotation that served as an epigraph to *The Sun Also Rises*.

Being a member of the lost generation did not only mean having come of age during World War I. Being a member of the lost generation meant coming of age during a time when a new set of technical skills became necessary in order to thrive, but when the opportunities to acquire those skills remained limited. Around 1926, both writers who belonged to this generation—like Hammett, Fitzgerald, and Dos Passos—and older writers observing these changes—like Gernsback, Lewis, and Stein—recognized the power of science to positively or

negatively affect people's everyday lives. They all, in one way or another, put forth ideas about how experts and non-experts might engage with science as an everyday thing, and they all lament the failure of those who did not or could not do so.

Appendix I
The Genealogy of Science Fiction and the Problem of Gernsback

I advocate "familiarization" as a different hermeneutic lens through which to read Gernsback in part to get around a very old and intractable debate among critics about the role of the writer/editor. Part of the reason Gernsback appears to be such a troublesome figure for science fiction criticism, and the reason why that troublesomeness matters, is the unique position that Gernsback occupies in the genealogy of science fiction. It is generally agreed that *Amazing Stories* was the first American science fiction magazine. It is also agreed that, by publishing readers' letters (with their addresses, so that readers could contact one another directly) and by starting the Science Fiction League, Gernsback initiated science fiction fandom. For these reasons, early science fiction critics such as Mark Siegel and Sam Moskowitz, who themselves come out of this fan culture, hail Gernsback as the father of science fiction. Later critics have taken issue with this honorific, viewing Gernsback not as a founder but rather as a corrupting influence on a generic tradition that extends much further back in time.

For example, James Gunn's history of science fiction begins with the epic of Gilgamesh. When he comments on Gernsback and the cohort of writers who worked for him, Gunn writes that they "created a pulp ghetto in which the genre was nurtured into maturity, but from which it would have difficulty escaping" (*Inside* 7). This image of a pulp ghetto is remarkably commonplace within science fiction scholarship, and often comes with an unclarity regarding who is to blame for this ghetto. Gunn, for his part, places responsibility on science fiction itself: "When science fiction enclosed itself in what would later be called a ghetto, it dropped out of

critical view. As late as 1914, Sam Moskowitz pointed out, the *New York Times* was reviewing books such as Edgar Rice Burroughs's *Tarzan of the Apes*. By 1926, not only were such reviews unlikely but science fiction was scarcely being published in book form" (*Inside* 12). What Gunn does not address here is the twelve year interlude between 1914 and 1926. The implication that decisions made by members of the science fiction community caused the marginalization that science fiction underwent in this period seems both unnecessary and impossible to substantiate. It may be the case that science fiction stories published in Gernsback's magazines and in general pulps like *All-Story* were all of low quality (though I would contest this assertion). But even in that case, while the pulps' aesthetic shortcomings explain *their* segregation, they do nothing to explain why science fiction developed and flourished *exclusively* in this domain, or why throughout the 1910's and 1920's, when it came to science fiction, Gernsback's magazines and those of his equally low-brow contemporaries so thoroughly dominated the genre's output. Most of H.G. Wells's science fiction novels were published before 1910, the major exception being 1933's *The Shape of Things to Come*. And with the exception of Charlotte Perkins Gilman, few major American writers remained interested in the utopian fiction that had thrived around the turn of the century. Science fiction had already dropped out of critical view in a changing literary landscape long before it was "enclosed" (and arguably, preserved) in a pulp ghetto.

Gernsback's most noteworthy detractor, Brian Aldiss, attributes the genre's ghettoization almost exclusively to the *Amazing Stories* editor. Writing with David Wingrove, he asserts that Gernsback "was one of the worst disasters to hit the science fiction field," explaining: "Gernsback's segregation of what he liked to call 'scientifiction' into magazines designed to contain nothing else, ghetto-fashion, guaranteed the setting up of various narrow orthodoxies inimical to any thriving literature" (202). As if to compensate for the vices of this segregation,

Aldiss begins his history of the genre with Mary Shelley, construing a history of the genre as an offshoot of British romanticism. Within this view of history, Gernsback's prominence in the 1910's and 1920's is little more than an unfortunate aberration: "Gernsback was just a midwife disguised as a Young Pretender" (204). Eric Rabkin and James Mitchell adopt the term "midwife" to describe Gernsback as well, but in their writing the term lacks the pejorative aspect found in Aldiss and instead appears as a middle ground between the extreme interpretations of Gernsback as either paterfamilias or redheaded stepchild.

Still, Gernsback has consistently had advocates who view him as the originator of science fiction. Samuel R. Delany has written, "It's just pedagogic snobbery (or insecurity), construing these preposterous and insensitive genealogies, with Mary Shelley for our grandmother or Lucian of Samosata as our great-great grandfather. There's no reason to run SF too much back before 1926, when Hugo Gernsback coined the ugly and ponderous term, 'scientifiction' (25-26). Delany's reasoning is that the protocols by which contemporary readers read a science fiction text and understand it *as* a science fiction text would have been incomprehensible as little as a few decades prior to Gernsback. Certainly, those reading protocols may be applied to works by More or Kepler or Shelley, or to the epic of Gilgamesh, and such anachronistic readings may provide interesting interpretations of how these works comprise a prehistory of science fiction, but that does not, for Delany, change the fact that those conventions by which a science fiction work is known as a science fiction work were not consciously identifiable as such until the early twentieth century.

The scholar who has spent the most time articulating what those conventions are has been Gary Westfahl. Westfahl is Gernsback's most vociferous supporter, and he has written two books arguing for the centrality of Gernsback's influence. In *The Mechanics of Wonder*, his

study of Gernsback and Campbell, Westfahl argues that Gernsback was "the first true critic" of the genre and that he "offered a complete theory of the genre's nature, purposes and origins" (1). Contrary to Aldiss, Westfahl asserts that orthodoxies and self-segregation are necessary for a genre to prosper. He writes that there are three almost universal features of science fiction—"a devotion to the style and conventions of popular adventure fiction," "a repeated inclination not only to present but to explain new scientific developments," and "repeated assertions that works of science fiction are uniquely valuable not simply in predicting but in creating and shaping the future"—and he contends that Gernsback's emphasis on these features is responsible for their subsequent universality (60-62). His next study, *Hugo Gernsback and the Century of Science Fiction*, follows up on that assertion, focusing less on Gernsback qua Gernsback and more on how subsequent science fiction bears the mark of Gernsback's influence.

In my own view, to imbue Gernsback with as much agency as either Westfahl or Aldiss do—to assert that he is responsible for all that is important or all that is terrible about subsequent science fiction—both gives him too much credit and misses the point of his historical significance. When discussing Gernsback's role in the history of science fiction, it would be more productive not to say that Gernsback did this or that to science fiction, but rather to say that Gernsback was a central figure in a range of historical developments during the period extending from his beginnings as a writer/editor in 1908 to approximately the mid-1930's, when his centrality began to give way to that of John W. Campbell, Robert Heinlein, and others. This reformulation allows us still to appreciate Gernsback's significance, but it repositions him as a member of a larger culture of letters encompassing other writers, editors, illustrators, publishers and readers, rather than as a singular entity. This broader community is collectively responsible for the shape that science fiction took in the 1910's and 1920's. Gernsback himself may be

understood not as a solitary agent of change within this culture of letters, but rather as a central coordinator of various agents in this historical moment.

The other chief representative of science fiction in these decades would be Edgar Rice Burroughs, a writer whose place in the geneology of science fiction is similarly derided. Considered alongside one another, these two figures paint a picture of the predominant trends in American science fiction during these decades. Gernsback's literary career began in 1908, when the immigrant from Luxembourg expanded his business selling electronics into the field of magazine publishing. Gernsback would later recount a tale of a police officer coming to his office, his company having been accused of fraud for advertising a radio transmitter that cost only $7.50. Having been shown the transmitter, the officer remained unconvinced: "Your ad here sez it is a wire*less* set, so what are all dem here wires for?" Gernsback recounted his frustration at his encounter:

> It rankled me that there could be such ignorance in regard to science, and I vowed to change the situation if I could. A few years later, in 1908, I turned publisher and brought out the world's first radio magazine, *Modern Electrics*, to teach the young generation science, radio, and what was ahead of them (Ashley 20).

From the beginning, then, Gernsback's mission was didactic. Significantly, that educational mission included not only explanations of innovations that had come to pass, but also predictions of developments that were just around the corner. It was in this spirit that Gernsback began to serialize his own original work of fiction, *Ralph 124C 41+: A Romance of the Year 2660*, in April 1911. Gernsback's interest in prophecy is suggested by the rebus embedded in the novel's title: One to foresee for one. The eponymous protagonist is introduced as "one of the greatest living scientists and one of only ten men permitted to use the Plus sign after his name" (9). A mistake in the telephot service (Gernsback's version of a video-phone) leads to a chance

conversation with Alice 212B 423, a Swiss woman with whom Ralph feels an immediate connection. After Ralph utilizes some technological wizardry to save her from an avalanche, Alice and her father visit Ralph's home in New York and Ralph takes them on a tour of the city, expounding on his own scientific work as well as on how technological innovations have altered modern American city life. The following passage, in which Ralph and Alice enjoy a meal at a restaurant named *Scienticafé*, exemplifies the novel's tone:

> Meats, vegetables, and other eatables, were all liquefied and were prepared with utmost skill to make them palatable. When changing from one food to another the flexible tube, including the mouthpiece, were rinsed out with hot water, but the water did not flow out of the mouthpiece. The opening of the latter closed automatically during the rinsing and opened as soon as the process was terminated.
>
> While eating they reclined in the comfortably upholstered leather arm-chair. They did not have to use knife and fork, as was the custom in former centuries. Eating had become a pleasure.
>
> "Do you know," said Ralph, "it took people a long time to accept the scientific restaurants.
>
> "At first they did not succeed. Humanity had been masticating for thousands of years and it was hard to overcome the inherited habit.
>
> "However, people soon found out that scientific foods prepared in a palatable manner in liquid form were not only far more digestible and better for the stomach, but they also did away almost entirely with indigestion, dyspepsia, and other ills, and people began to get stronger and more vigorous" (86-87).

A majority of the novel proceeds in this vein, taking on the form and style of Victorian utopian travelogues such as *Looking Backward*, but adopting an even more technocratic and utilitarian perspective than Edward Bellamy ever did. Of particular note in this passage is Gernsback's use of the word "scientific" as a kind of shorthand that may imply a range of positive descriptions—modern, rational, civilized, comfortable, healthy, better. While this utopianism dominates the narrative, the later chapters from *Ralph 124C 41+* turn more towards adventure, as Ralph must rescue Alice from a Martian who has abducted her.

Ralph 124C 41+ ran in *Modern Electrics* for twelve consecutive issues, and as readers were enjoying the final installments of the novel, *All-Story* was introducing a new series that

similarly featured a human man rescuing a damsel in distress from the clutches of Martian aggressors. From February until July of 1912, the magazine published the first novel of Edgar Rice Burroughs, writing under the pseudonym Norman Beam. *Under the Moons of Mars*, published in book form as *A Princess of Mars*, follows Confederate American Civil War veteran John Carter as he finds himself inexplicably transported to Mars. There, he becomes embroiled in the political affairs of the planet's two races, the green Martians and the red Martians, first as prisoner of the green Martians, then as military leader, and finally as husband to Dejah Thoris, the red Martian princess of the novel's title. If Gernsback's literary forebears are the techno-utopias of Bellamy and the like, then Burroughs's forebears are the westerns of Owen Wister and the colonial adventure tales of H. Rider Haggard. Descriptions of the setting and people in *A Princess of Mars* do not, as in *Ralph 124C 41+*, emphasize comfort and ease; rather, they play up the elements of exoticism and danger. When he first arrives, Carter writes, "I opened my eyes to a strange and weird landscape" (10). The Martians themselves are "grotesque," and their laugh is "a thing to make strong men blanche in horror" (11,18). Even the Martian method of childrearing is described as "horrible" (30).

But while the characters' relationships with their setting are very different in *A Princess of Mars* and *Ralph 124C 41+*, one might assume that the protagonists themselves have something in common. They both appear to be tremendously powerful and accomplished characters. Carter is often viewed as a Nietzschean figure; Adam Roberts describes him as "a cartoon-like but charismatic *Übermensch*: the reinvention of the Will-to-Power as action hero" (179). It is true that Carter, as a captain in the Confederate army, is implied to have a capacity for leadership. But before accepting the Nietzschean interpretation of his character, it is important to consider where Carter is at the beginning of the narrative. Before going to Mars, Carter spent a

year “Masterless, penniless, and with my only means of livelihood, fighting, gone” (2). He is a veteran of the losing side of a war who has neither a livelihood nor self-respect. He himself admits, “I do not believe I am made of the stuff which constitutes heroes” (8). He is only able to become a hero on Mars because the planet’s reduced gravity affords him with superior strength. Bearing this in mind makes the contrast between Burroughs and Gernsback more apparent, and may help illustrate the uniqueness of Gernsback’s concern with everyday life. John Carter is a relatively ordinary man who goes on an extraordinary journey. Ralph 124C41+ is an extraordinary man who (at least for most of the novel) goes on a relatively ordinary journey.

While they would, according to Aldiss, eventually achieve a synthesis, Gernsback and Burroughs represent two shapes that science fiction took in this period. Echoing Aldiss’s cynicism, Suvin calls the former “the *popular science* compost heap” and the latter “the adventure-journey heap.” Of the “*popular science* compost heap” he goes on to write, “Unalloyed, or alloyed with the baser metal of subliterary conflict and sentiment, this leads no further than to a primitive technological or at best technocratic extrapolation, as evidenced in Bacon’s *New Atlantis*, then in Gernsback and the “SF reservation” between the two world wars” (22-23). But popular science was immensely popular, and the popularity of the Gernsbackian model would indicate that it struck a chord with readers. For this reason, I contend that its relevance cannot be as easily dismissed as either Aldiss or Suvin would like.

I believe that Aldiss and Suvin are guilty of a kind of backward reading that evaluates Gernsbackian science fiction according to the standards of post-Heinleinian science fiction. Heinlein begins his 1942 novel *Beyond this Horizon* with a famous description of the novel’s protagonist, Hamilton Felix, entering a room: “the door dilated, and a voice inside said, ‘Come in, Felix’” (5). This sentence, coming on the novel’s first page and accompanied by no further

description of the door, suggests a narrator for whom dilating doors are commonplace, and furthermore, suggests an assumption on the part of that narrator that the audience will consider dilating doors to be commonplace. In this sentence, Heinlein evinces an aesthetic principle that has since become central to sociologically mindful science fiction: stories should not only describe scientific innovations and discoveries, but also depict how those advancements affect culture, social mores, and even language. Isaac Asimov explains the value of this principle when he comments, "It is easy to predict an automobile in 1880; it is very hard to predict a traffic problem" (Gunn *Alternate Worlds* 118). By contrast, Gernsback's fiction, and Burroughs's, are not sociological but anthropological. The passage in *Ralph 124C 41+* describing scientific restaurants is clearly directed at twentieth century readers who are more interested in taking a tour of twenty-seventh century life than they are in becoming immersed in twenty-seventh century perspectives.

But, to Gernsback's credit, Ralph's comment about people's difficulty overcoming masticating does represent a partial effort at grasping the connection between science and culture. And after all, one can't predict a traffic problem, or even think of a traffic problem as a kind of thing that one ought to be predicting, until someone has predicted an automobile. Suvin's criticism of Gernsback's "technocratic extrapolation" and Aldiss's complaint that in *Ralph 124C 41+*, "society is unchanged" both seem like highly ahistorical standards to apply to a writer of Gernsback's generation (203). Ahistorical interpretations of this nature are not categorically illegitimate; indeed, this is exactly the kind of interpretation that Gernsback himself provides when he relabels Poe, Verne, and Wells as scientifiction writers. But evaluating Gernsback's *worth* according to such standards seems unfair and not particularly valuable from a scholarly standpoint. From the point of view of a literary historian, it would be a more useful endeavor,

and an endeavor that has up to this point rarely, if ever, been undertaken, to ask neither "what are Gernsback's literary merits?" nor "what was Gernsback's effect on science fiction?" but rather, "what exactly was Gernsback *doing* as a writer and editor during his heyday?" My answer to that question is that Gernsback was familiarizing his readers with science.

Appendix II
Nontraditional Expertise in *Amazing Stories*

In science fiction, a genre heavily focused on knowledge and learning, the student or assistant is a common role. This "master-apprentice" sort of relationship varies slightly from the "best friend" relationship featured in A. Hyatt Verrill's "The Man who Could Vanish" and is integral to promoting the accessibility of science to the reader. Often, this master-apprentice relationship comes in lieu of traditional schooling. In the opening lines of "The Secret of the Invisible Girl," Keene says, "Although I left school at the age of fifteen, I have studied at home and have the equivalent of a college education. I am very anxious to study inventing" (1:377). This detail about Keene's character echoes Charley Hyuck's unconventional education in "The Man Who Saved the Earth." These characters' lack of formal schooling gives their stories a rags-to-riches dimension; the editorial preface at the beginning of "The Man Who Saved the Earth," for example, describes Charley as "the little newsboy grown up to be a great scientist" (1:75). This rags-to-riches quality is significant for how it contrasts with the genius characters like Robold or Hackensaw, about whose backgrounds we know little. In "The Secret of the Invisible Girl," Keene is more like the reader than he is like Hackensaw, but the esteem with which Hackensaw comes to regard Keene carries with it the promise that Keene may someday be as great as Hackensaw. By proxy, then, Keene's job in the narrative is to embody the reader's own potential for intellectual greatness, a democratic ideal that through hard work and determination anyone can "make it."

This dream of social advancement through scientific training permeates the magazine, not only in its fiction. One of the magazine's most conspicuous advertisements is for a correspondence course on chemistry from the Chemical Institute taught by *Amazing Stories*' associate editor, T. O'Connor Sloane. The ad appeared in various forms in almost every issue of the magazine, often across from Gernsback's editorial. One common version of the ad (Figure 10) counterpoises a picture of pirates burying treasure with one of a scientist peering into a microscope, and the headline reads: "BURIED TREASURE can still be found in CHEMISTRY: Good Chemists Command High Salaries and you can make yourself independent for life by unearthing one of chemistry's yet undiscovered secrets." Like the Hackensaw stories, the ad invokes secrets so as to suggest that scientists have access to privileged information, and the allusions to pirates and treasure strongly imply an element of romance. The ad goes on to assert, "Quietly, systematically, the chemist works. His work is difficult, but more adventurous than the blood-curdling deeds of the Spanish Main." Both blood-curdling deeds and quiet, systematic work can involve the thrill of discovery, but the ad's definition of "adventure" presents that thrill as decoupled from danger.

The ad also places a priority on independence and evinces an anti-establishment sentiment; learning from home via the Chemical Institute contrasts with the "elaborate specialized training" required by universities. This anti-establishment sentiment jibes with the youthfulness of *Amazing Stories*' implied audience. In the October 1927 editorial, titled "Amazing Youth," Gernsback writes, "The further progress of our world now lies in the hands of our youngsters…. When it comes to original thinking, the young man, as a rule, has it all over the older one" (2:625). This assertion can be contrasted with Gernsback's depiction of the scientific establishment in July of the same year:

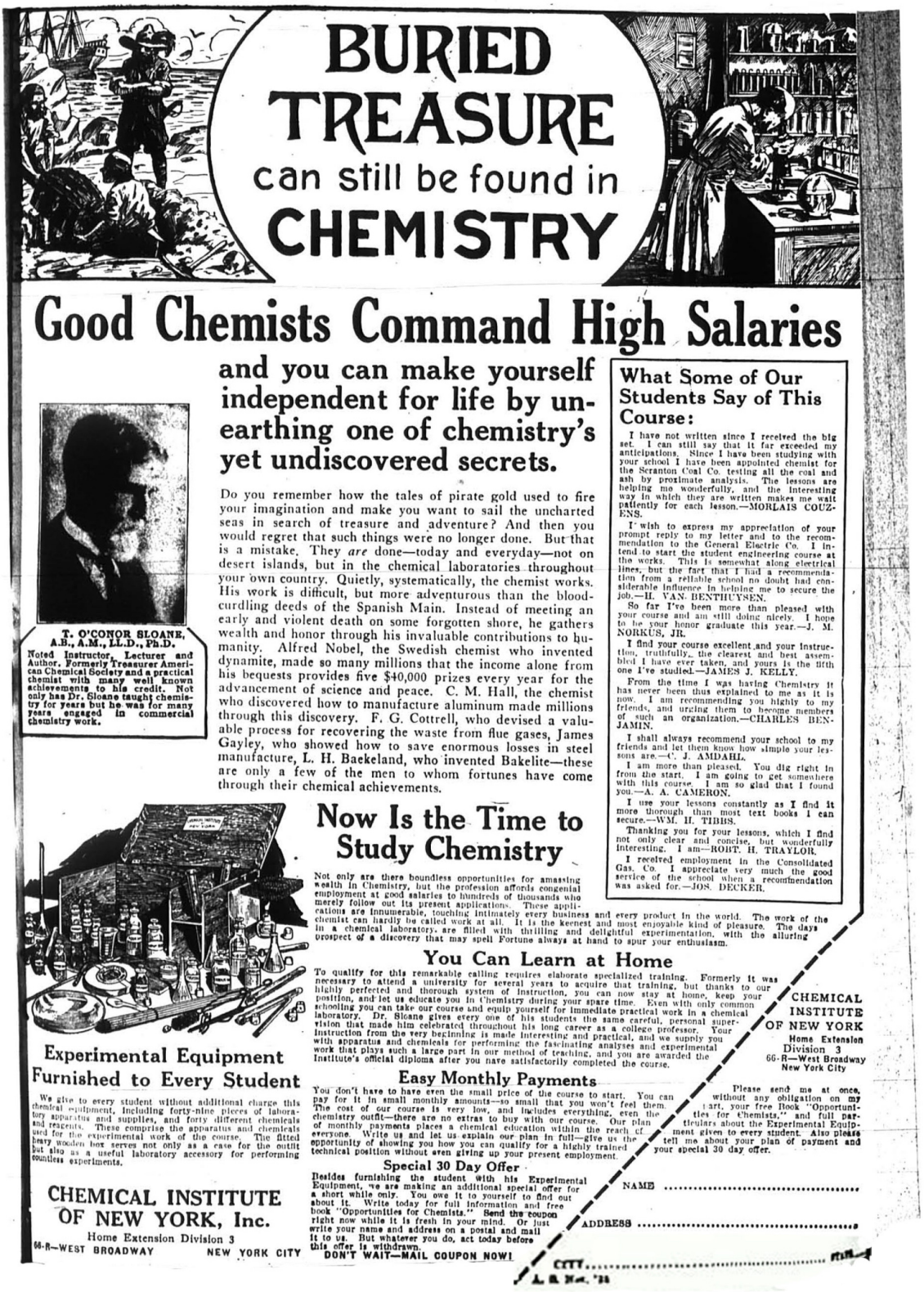


Figure 10. Advertisement for Chemical Institute of New York in *Amazing Stories*, October 1926.

> It is surprising how incredulous people can be, particularly in connection with the prediction of future inventions and progress of the human race. That the man in the street, not versed in things scientific, should doubt scientific strides in the future, can easily be understood. Curiously enough, however, it is the man of science rather than the layman, who, as a rule, is more unbelieving, more arrogant and more intolerant of projected scientific progress (2:317).

The message is clear: our notion of who constitutes a "man of science" ought to be expanded to include not only those arrogant, intolerant (implicitly, old) professionals but also the nontraditional experts, especially original-thinking youths who, presumably, have been self-taught with help from Sloane's course. Of course, *Amazing Stories* still recognized the cultural capital acquired through traditional institutions of higher learning, hence its associate editor's name always carrying his university-bestowed title, "Dr. T. O'Connor Sloane, Ph.D."

Appendix III
Black Mask and the Birth of a Hardboiled Culture of Letters

As was mentioned in Appendix I, some scholars refer to Gernsback as the midwife of science fiction. But a more apt analogy would be to say that Gernsback was the nursemaid who was there for the christening and who was primarily responsible for the genre's care in its earliest years. If the midwife metaphor may appropriately be applied to anyone, it is Joseph Shaw. *Black Mask* published the first hardboiled crime story, Carroll John Daly's "The False Burton Combs," in December 1922, but the identity of both the genre and the magazine remained unstable until around January 1930, with the final issue of Dashiell Hammett's serialized novel, *The Maltese Falcon*. In the last years of this very long birthing process, Shaw was largely responsible for fostering the magazine's style.

Shaw's influence on the development of hardboiled detective fiction, while substantial, is less palpable than Gernsback's influence on the development of science fiction. While every issue of *Amazing Stories* began with a one-page editorial, Shaw rarely wrote editorials for *Black Mask*. The closest thing to an editorial that one might find in most issues of *Black Mask* was a short unsigned statement describing what the magazine was about. These statements provide some insight into the magazine's agenda, but they are closer to advertisements than they are to editorials. One such statement, under the headline "What's in a name?" boasts about the magazine's high editorial standards and asserts that even if a story is submitted by a famous writer or regular contributor, the quality of the story itself is of paramount importance. The statement claims, "We have sent back story after story on occasion, under the belief that an

author, like the magazine, should show a consistent upward tendency in his successive works" (97). The editorial introductions to individual stories are similarly brief, when present at all, and focus on teasing the story. They do not, like Gernsback's introductions, provide an opinion as to the story's literary or educational value. The introduction to Katherine Brockelbank's "Bracelets," for example, simply reads, "A tale of Tia Juana after the closing hour of the Border and all the good folks have gone home" (323).

Prior to Shaw's tenure, the back pages of the magazine featured a letters column titled "Our Readers' Private Corner," printing letters from both readers and writers, but that column had been eliminated by the time Shaw took over. As a result of these editorial decisions, most issues of *Black Mask* lack any of the ancillary material (except for advertisements) that was such an important part of *Amazing Stories*. This was not unusual—indeed, *Black Mask* is more characteristic of pulp magazines of the 1920's than *Amazing Stories* is—but these editorial decisions have the effect of rendering both readers and the editor largely invisible. *Black Mask* was very much an author-centered culture of letters. Those authors increasingly specialized in detective fiction, and together they brought about what Russel Nye has called "the greatest change to the detective story since Poe" (255).

That change was slow and uncertain. A survey of the magazine's taglines and cover art belies a reticence to commit to the detective genre. In 1922 *Black Mask* billed itself as "A MAGAZINE OF MYSTERY AND DETECTIVE FICTION," but by the time Daly published "The False Burton Combs," it had changed its tagline to read "Romantic Adventure, Mystery, and Detective Stories." In 1923 it changed again to "Detective, Adventure, and Mystery Stories" (it dropped the "and" in 1924), and in February 1926 it changed to "Mystery, DETECTIVE, & Adventure," with "DETECTIVE" rendered in red letters. In September 1926 it changed again to

"Western, DETECTIVE, & Adventure," with "DETECTIVE" still in red. It was rendered in all caps beginning in November 1927, and this would remain the magazine's tagline until 1933, when it became "GRIPPING, SMASHING DETECTIVE STORIES." These changes tell the story of a magazine experiencing an identity crisis. Early on, *Black Mask* marketed itself as a traditional detective magazine, one in a market of pulp magazines that already included *Detective Stories* and *Detective Tales* among others. It moved away from that identity during those early years when Hammett and Daly were only beginning to develop the hardboiled style, but began to highlight that identity again a few months before Shaw was brought on. But even as it highlighted its new form of detective fiction, *Black Mask* buttressed that fiction by including it alongside other, more established genres.

The cover art reinforces a sense that, even as Shaw was cultivating the hardboiled detective genre, the magazine was hedging its bets with Westerns and other adventure tales. During Shaw's first three years with the magazine, *Black Mask*'s cover art is remarkably consistent; every issue from January 1927 to December 1929 features a solitary man holding a weapon (almost always a gun). The man's clothes and environment reliably signal the genre in which his story participates: he typically sports either the cowboy hat and spurs of a Western character or the suit and tie of a hardboiled city-dweller. The few exceptions include pirates, pilots, and one Asian man clad in stereotypically oriental attire. Breaking the cover art down by genre, Shaw's first three full years with *Black Mask* look like this:

	Western	Hardboiled	Other
1927	5	3	4
1928	7	2	3
1929	1	9	2

The above numbers indicate that the publishers of *Black Mask* considered it advantageous to present the magazine on newsstands as a magazine with Western stories. In 1927 and 1928,

hardboiled crime fiction was still too new to be a safe bet, but by 1929 the genre was sufficiently established and closely associated with *Black Mask*, and as a result it became the magazine's chief selling point. Western stories and Western-themed cover art would continue to appear in the magazine from time to time for years to come, but they remained rare after 1929.

As early as February 1924, there is evidence to suggest that some readers were irritated by the magazine's generic equivocation. In that month, the magazine published a letter from a reader under the headline, "How about Western Stories?" The reader writes:

> Please oh! please do not publish any more Western stories in BLACK MASK! All my friends who are readers of your magazine agree with me to the extent, that did they care for Western stories, they would buy the magazines that contain them. There are several who publish Western stories exclusively, while others have at least two in every issue. And our reason for liking the BLACK MASK was that it contained no Western stories. Why not keep it as it was started at the beginning, with Detective, Mystery, and Adventure, but the first two preferably.

In 1924, detective stories and westerns both flourished in genre-specific magazines, but the kind of generic purity that this letter-writer prefers was still new. *Weird Tales* was less than a year old, and *Amazing Stories* was still two years away. The editors' uncertainty can be detected in the question posed by the headline, a question implicitly answered by the many Western stories to appear in subsequent years. An equally appropriate question for the editors to ask of their readers at this time would be, "What *kind* of detective story?"

Appendix IV
J.S. Fletcher and the Scientific McGuffin

Before Joseph Shaw took over as editor, the majority of detective stories in *Black Mask*—and all detective stories published elsewhere—followed in the austere, aristocratic tradition made famous by British writers like Agatha Christie. One such writer in this tradition was J.S. Fletcher, a man who enjoyed much popularity on both sides of the Atlantic and who counted Woodrow Wilson among his fans (Barnes 380). His novel, *Exterior to the Evidence*, published in London in 1920, was serialized in *Black Mask* from April to August 1922. *Exterior to the Evidence* follows the investigation into the death of a wealthy Englishman, Sir Cheville Stanbury, who fell off a cliff after making a new will. The writing style is florid and verbose: "Letty went to bed that night in the room that was always kept for her at Foxden Manor, and she slept the sleep which follows on sudden relief from anxiety that has no definite cause" (48-49). This sort of language is characteristic of the genre during this period. The detective on the case, Weathershaw, is "expressionless and unemotional," but he is not a self-identified scientist like Holmes (166). Indeed, as the title suggests, Weathershaw solves the case on the basis of characters' motivations rather than any analysis of physical evidence.

The novel is noteworthy for one innovation. Ever since "The Purloined Letter," a subgenre of mystery stories emerged around the pursuit of a missing object. The importance of that object may or may not be explained, but all the reader needs to know is that one or more characters want it. Alfred Hitchcock famously called this object the McGuffin, explaining, "It is the mechanical element that usually crops up in any story. In crook stories it is always the

necklace and in spy stories it is always the papers" (OED). The titular purloined letter, moonstone, and Maltese falcon are all McGuffins. Fletcher leads the reader to believe that Sir Cheville's will is the McGuffin in his novel, but the will is in fact a red herring. The real McGuffin is the design for a machine invented by Sir Cheville's business partner, Mr. Etherton. Sir Cheville had been carrying the design at the time of his murder, and they were stolen by a petty criminal, Madgwick, who had been hired by a local manufacturer, Sir John Arncliffe. Fletcher never explains what Etherton's machine does, rendering the technology unreadable and, implicitly, suspicious. Fletcher creates an atmosphere of mistrust around technology, and heightens that sense of mistrust by way of characters' frequent use of the world "invent" to mean both "to engineer" and "to lie." The two uses of the word even appear in the same scene; when Madgwick confesses and accuses Arncliffe, another character states, "I don't believe a word of it! That fellow's invented it" (268). Less than a page later, in the same conversation, another character says, "Sir John Arncliffe, as I said, is the biggest manufacturer in these parts, and he's always been known as an inventor, too" (269). Is Arncliffe an inventor or a liar? Has he invented his reputation as an inventor, or is Madwick inventing his claim that Arncliffe is a liar? The juxtaposed uses of the word produce an unmistakable uncertainty around the nature of invention, similar to the anxiety that Wilkie Collins produces around the mysterious oriental moonstone. But the fact that it is an invention places it in a scientific rather than a supernatural context, making it the first scientific McGuffin.

The scientific McGuffin—the formula or technology that motivates the story—thrives as a trope in the twenty-first century. See, for example, the tesseract in the 2012 film, *The Avengers*. And scientific McGuffins appear at least three times in significant early works of hardboiled detective fiction: Gretna's formula in "Three Gun Terry," Thornburgh's invention in "Arson

Plus," and Wynant's invention in *The Thin Man*. All three serve to critique scientific authority. Gretna's formula for poison gas highlights the dangers of technological advancements, while the inventions in "Arson Plus" and *The Thin Man* are both red herrings that satirize science as ineffectual.

Notes

[1] See, for example, Glen Scott Allen's *Master Mechanics & Wicked Wizards* (2009).

[2] Works that present social orders without depicting them as necessarily good or bad may also be understood as utopian, as distinct from "eutopian" works, which endorse the societies they depict. However, from here onward, unless otherwise noted, I will use the more common definition of "utopia" to mean "good place."

[3] Compare this to a quotation typically attributed to Isaac Asimov: "The most exciting phrase to hear in science, the one that heralds new discoveries, is not 'Eureka' but 'That's funny....'" Though the quotation is possibly apocryphal, its popularity suggests a shift in emphasis away from inspiration towards inquiry, thus emphasizing the everyday work of science—work conducted not by a heroic genius but by a "lunch pail" scientist.

[4] Hawthorne does make one reference to Owen's "science," in the sense of his craft, in the story (201). By comparison, the story refers to him as an artist a total of forty times.

[5] For an analysis of denialists' role in shaping public perceptions of science, see *Denialism: How Irrational Thinking Hinders Scientific Progress, Harms the Planet, and Threatens Our Lives* (2009) by Michael Specter.

[6] Fiction—including science fiction—had a role in shaping that reality as well. On June 4, 1926, the pulp writer George Allen England wrote a letter to Hugo Gernsback praising *Amazing Stories*, specifically emphasizing the importance of science education in the wake of the Scopes trial:

> By all means, Mr. Gernsback, publish all the science fiction you can, especially with bearing on evolution. The clergy can dominate educational systems, but they cannot control magazines. If the people cannot be reached through the schools, they can through the magazines. Your work is of the utmost importance (Ashley 157).

Gernsback took Allen's advice, publishing many stories that touched on themes of evolution, though it is, of course, unclear whether those stories' typically fantastic handling of the subject actually imparted useful information to readers or whether it converted anyone who did not believe evolutionary theory. One noteworthy work of evolutionary science fiction that *Amazing Stories* published was "The Tissue-Culture King," published in August 1927. This story was the only work of fiction by the biologist Julian Huxley, brother of Aldous Huxley and grandson of Thomas Henry Huxley. In the fashion of H.G. Wells's *The Island of Doctor Moreau*, the story follows a scientist's experiments in human-directed evolution, using members of a previously unknown African tribe as his subjects.

[7] Culler derives this point from Tzvetan Todorov, who in 1968 wrote, "il y a autant de vraisemblables que de genres, et les deux notions tendent à se confondre," which Culler translates as, "There are as many versions of vraisemblance as there are genres." Culler omits the

second half of the sentence from Todorov, which translates as, "and the two notions tend to be confused with each other."

[8] Meyer-Maier's reaction exemplifies the ethos that Asimov expresses when he says that the most exciting phrase in science is not "Eureka" but "That's funny" (see note 3 above).

[9] Perhaps the most obvious example of defamiliarization in Gernsback's writing can be found in his April 1927 editorial, titled "The Most Amazing Thing (In the Style of Edgar Allan Poe)" (2:5). The piece is not so much an editorial as it is a short story imitating Poe's "The Thousand-and-Second Tale of Scheherazade." In Poe's tale, Scheherazade tells the king of Sinbad's final voyage, in which he discovers marvels all of which are commonplace innovations by Poe's own time, such as the telegraph and the locomotive. The story's epigraph is "Truth is stranger than fiction," but it could just as easily be Gernsback's motto, "Extravagant fiction today.....cold fact tomorrow." In Gernsback's imitation, an unnamed explorer reports on a space expedition to his unnamed king. The explorer tells the king, "On the Third Planet of the Sixth Universe we encountered a race of most amazing creatures." The story ends with the explorer telling the king that the creatures call themselves human beings and their planet Earth, but before that point he offers an extended description of the creatures' physiology and habits. Describing arms, the explorer explains, "Instead of having normal tentacle-like appendages, they have these folding rods." Just before the story's putatively surprise ending, the description turns to political satire:

> Every once in a while, for no reason apparent at all, they fall upon each other and exterminate thousands of themselves with the most astonishing implements, which bore holes through their bodies, or with weird machines which give out gasses as some of our insects do; or they annihilate each other's cubicles by dropping destructive missiles on them. Yet, when it's all over, they appear to be good friends once more.

Its lack of subtlety aside, "The Most Amazing Thing" clearly attempts to alter perspective in a similar manner as Tolstoy's story, "Kholstomer." The difference is that Tolstoy never suggests that a scientifically informed contemporary reader would be able to understand his horse's nature, while such understanding is central to our reading of Gernsback's aliens. While still defamiliarizing figures, the aliens are in some respect normalized.

[10] Parenthetically, it is worth noting that Gernsback announced in the inaugural editorial of *Amazing Stories* that he had made arrangements with the copyright holders of all of Verne's work, and Gernsback began serializing *Voyage au Centre de la Terre* under the title *A Trip to the Center of the Earth* in the magazine's second issue. Unfortunately, Gernsback reprinted the notoriously loose English translation first published by Griffin and Farran in 1871. The shortcomings of this translation are well documented in Arthur B. Evans's article, "A Bibliography of Jules Verne's Translations," but among those shortcomings are the Anglicization of the main characters' names (Harry and Professor Hardwigg in place of Axel and Professor Lidenbrock) and a complete omission of the following passage. This comes on the first page of the novel, in which the narrator, Axel, describes his Uncle, Professor Lidenbrock:

> Il était professeur au Johannæum, et faisait un cours de mineralogy pendant lequel il se mettait régulièrement en colère une fois ou deux. Non point qu'il se préoccupât d'avoir des élèves assidus à ses leçons, ni du degree d'attention qu'ils lui accordaient, ni du success qu'ils pouvaint obtenir par la suite; ces details ne l'inquiétaient guére. Il professait «subjectivement,» suivant une expression de la philosophie allemande, pour lui

> et non pour les autres. C'etait un savant égoïste, un puits de science dont la poulie grinçait quand on en voulait tirer quelque chose: en un mot, un avare (2).

The above passage was translated by Robert Baldick in 1965 as follows:

> He was a professor at the Johannaeum and gave a course of lectures on mineralogy, during every one of which he lost his temper once or twice. Not that he cared whether his pupils attended regularly, listened attentively, or were successful later: these little matters interested him only very slightly. His teachings were what the German philosophers would call 'subjective': that is to say it was intended for himself and not for others. He was a selfish scholar, a well of science whose pulley creaked when you tried to draw anything out of it. In short, he was a miser (2).

The 1871 translation retains a hint of the Professor's misanthropy in Harry's observation that his uncle was, "when in one of his peculiar humors, very far from a pleasant companion" (1:101-102). However, this line certainly lacks the vividness of Verne's original prose. While the omission of this passage from the *Amazing Stories* version is attributable to the exigencies of circumstance rather than intentionality (it was, after all, the only English language translation available to Gernsback), it is nonetheless fitting. The omission makes Hardwigg seem substantially less socially awkward than Lidenbrock, and by comparing the two versions of character, we can further appreciate *Amazing Stories* as a site wherein science fiction moved away from the socially alienated scientist as a stock character type.

[11] *The Lost World* provides a particularly extreme example: Challenger takes Malone and Summerlee on an expedition to South America after the photographs that he took during his first expedition are believed to be fakes. Challenger is abrasive to the point of physical violence; before he is even introduced a character describes him as "a homicidal megalomaniac with a turn for science" (8). On the expedition, Challenger is primarily concerned with proving his discovery to Summerlee, while Malone's reaction is characterized by the sublime, stating at the end of his account, "Our eyes have seen great wonders" (155).

[12] I must concede that the early issues of *Amazing Stories*, consisting mostly if not entirely of reprints, are often of a piece with the Victorian/Edwardian tradition. The scientists, doctors, inventors, and professors populating these issues tend to be callous and egoistical. They rarely evince a strong sense of empathy, and perhaps more importantly, they do not seem to care about the atrophy of this particular sense. The April 1926 issue gives a prime example of this type, Professor Martyn of "The Man from the Atom," written by Green Peyton Wertenbaker and first published in *Science and Invention* in 1923. In that story, the narrator, a man named Kirby, explains, "The Professor was one of those mysterious outcasts, geniuses whom Science would not recognize because they scorned the pettiness of the men who represented Science" (1:62). This sentence could easily have come from one of Arthur Conan Doyle's descriptions of Professor Challenger. Kirby goes on to note, "The Professor had few friends. Ordinary men avoided him because they were unable to understand the greatness of his vision" (1:62). Kirby is one of those few friends, and, ostracized by both the scientific community and by ordinary men, Professor Martyn invites Kirby to test his new invention, a device that allows a person to increase or decrease their size. The majority of the story depicts Kirby's adventure as he grows uncontrollably larger and larger, becoming as large as the universe itself before he figures out how to decrease his size. This story evinces a highly ambivalent attitude towards scientific thinking; on the one hand, it seems as though the scientist must give up on cultivating social sensibilities in order to pursue his discipline to the fullest extent, and in doing so, he may,

ironically, fail to gain the respect of his colleagues. On the other hand, Martyn is so passionate about his work that he does not seem to care about the emotional fulfillment that he has supposedly sacrificed, and his colleagues' disrespect is due to their pettiness rather than his eccentricity.

[13] In *Science Fiction: The Gernsback Years*, Everett F. Bleiler counted the prevalence of 48 important story motifs appearing in early pulp magazines. Featured in 39 stories from 1926-1929, "Inventions" was, by Bleiler's count, the third most prevalent of these motifs, bested only by "Future setting" (appearing in 53 stories) and "Social matters" (41 stories) (xviii-xx).

[14] Eric Rabkin and Carl Simon discuss this in their article, "Age, Sex, and Evolution in the Science Fiction Marketplace."

[15] A note on terminology: I use "great detective" to refer to all detective characters up to and including Sherlock Holmes, as well as some twentieth century detectives, including Hercule Poirot. Great detectives evince a keen intellect and are typically Renaissance men. I use "scientific detective" to refer to a type of detective character that branched off from the great detective in the early twentieth century. Scientific detectives solve crimes almost exclusively by using scientific methods. I use "hardboiled detective" to refer to another type of detective character that branched off from the great detective in the 1920s, originally in *Black Mask*. Hardboiled detectives solve crimes using a combination of violence, personal connections, and intuition; they very rarely employ scientific methods.

[16] Watson's role as narrator is similar to the nonexpert viewpoint characters in many scientific romances such as Axel in *Voyage au Centre de la Terre* or Edward Malone in *The Lost World*. The fact that Watson, a medical doctor, fills that role in Holmes's stories underscores the exceptionality of Holmes's genius.

[17] The April 1925 issue of *Black Mask* is not available in any library, and the original article to which Hammett is responding could not be found.

[18] Shifts in the relative truth-values of circumstantial evidence and forensic science manifest themselves in contemporary culture as well, most apparently with the "*CSI* effect," the tendency of jurors in criminal trials to expect more forensic evidence, effectively raising the standard of proof for prosecutors. This heightened standard of proof is often attributed to the exaggerated portrayal of forensic science in television police procedurals like Anthony E. Zuiker's *CSI: Crime Scene Investigation.*

[19] In having Holmes (who was based in part on Conan Doyle's mentor, the Scottish medical lecturer Joseph Bell) admonish *Doctor* Watson this way Conan Doyle demonstrates that understanding medicine as a science was still relatively new, with Claude Bernard having famously discoursed on the subject in his *Introduction to the Study of Experimental Medicine*, published in 1865.

[20] Clearly, however, Holmesian detection is far more evidence-based than that of either Poe or Gaboriau. Franco Moretti has traced the development of clues as a defining motif of detective fiction in the 1890's. Surveying the work of Doyle and his contemporaries, Moretti found that clues were far more likely to be present, necessary to the narrative, and visible to the reader in Doyle's stories. Moretti speculates that Doyle's use of clues may explain why his work has stood the test of time while his contemporaries are now largely forgotten; Doyle found the formula that

would characterize the genre in the twentieth century. However, Moretti also finds that, even by the end of the 1890's, other writers have yet to take up the Doyle formula, and even Doyle failed to consistently employ clues as a narrative device. Moretti offers two possible explanations for this: one, Doyle's rivals were still exploring alternatives, hoping to find a better detective story formula than one requiring clues to solve the mystery, or two, Doyle's generation of writers were too set in their ways, and the influence of clues would not fully manifest itself until a new generation emerged in the early twentieth century. Both of these explanations are plausible, but both are dependent on a consideration of the detective fiction market as a self-contained environment. If one considers history, another explanation emerges. The 1890's were the height of popularity for the Bertillon system of detection based on criminal identification; evidence-based solutions to mysteries were not yet the norm in fiction because they were not yet the norm in reality; it would take several decades before, as Edward H. Smith put it, "a newer school [carried] forward from the point where the identifiers leave off."

[21] The detectives' names further reinforce this outsider status, associating Dupin and Lecoq with wilderness and pastoral settings respectively, rather than with the urban environments that they police (*Dupin* means "from the pine tree" while *Lecoq* means "the rooster"). *Holmes*, a homophone for "homes," evokes domesticity, a fitting connotation for a man who conducts experiments in his home laboratory. While Holmes's home is in London, his name nonetheless signals his removal from the city's institutions of law enforcement; Holmes works out of his Baker Street apartment, while Inspector Lestrade, a recurring Holmes character who works for Scottland Yard, works on the streets and train platforms with which his name is associated.

[22] The reason why detective fiction coalesced sooner than science fiction has more to do with form than history. By definition, a detective story must include certain things; most importantly, it must include a character occupying the role of the detective. And that detective must have something to detect—a mystery to solve, criminal to apprehend, etc. Science fiction, by comparison, has a more capacious set of defining qualities. Many science fiction stories feature scientists, for example, but the presence of a scientist character is neither necessary nor sufficient for a story to be science fiction. This difference was consequential for the American pulp magazine market; while *Amazing Stories* crystalized a loosely defined genre, *Black Mask* reinvented a well-defined genre.

[23] It is noteworthy that the traditional great detective appears to have thrived more in the U.K. than in the U.S., while American writers first produced the scientific and hardboiled variations on this character. One could easily speculate that this is the result of Arthur Conan Doyle's lasting influence on British writers, of British culture's different construction of class, or of differences in the history of forensic science. It must be conceded, however, that British writers like Agatha Christie and J.S. Fletcher were very popular in America during detective fiction's golden age, even while American writers were providing different takes on the great detective.

[24] For most of its run, *Black Mask* was published once a month, but from February 1923 to April 1924 it was published twice a month, with issues coming out on the first and fifteenth of each month.

[25] Daly gets credit for founding the hardboiled detective genre with "Three Gun Terry," with "The False Burton Combs" as an important precursor, but Hammett arguably deserves that distinction for a four-page story that appeared in the same issue as "The False Burton Combs."

Hammett wrote "The Road Home," his first piece in the magazine, under the pseudonym Peter Collinson. It features a dialogue between two New Yorkers on a riverboat in Burma. Barnes, a fugitive who murdered a man during a robbery, is attempting to bribe Hagedorn, a detective that has been hunting him for the past two years. Unable to persuade him, Barnes jumps off of the boat and attempts to swim ashore with "*muggar*" crocodiles pursuing him. Hagedorn contemplates leaving him to the crocodiles, but ultimately fires his gun to scare them off, giving Barnes the opportunity to escape into the jungle. Hagedorn takes off after him, instructing the boat's captain to wait three hours for him. The captain waits five hours, then leaves. The story is far removed from the urban streets of the best-known *Black Mask* stories, and the short vignette is in no way a mystery story, but unlike Daly's "soldier of fortune," Hagedorn is undeniably a detective, and his dialogue evinces the laconic stoicism of a hardboiled protagonist. He tells Barnes, "Maybe man-hunting isn't he nicest trade in the world but it's all the trade I've got" (32). And when Barnes jumps off the boat, he says, "Looks like I'm not going to take him back alive after all—but my job's done. I can shoot him when he shows again, or I can let him alone and the *muggars* will get him" (33). Terry Mack or Race Williams likely would have let Barnes die, but Hagedorn backs down from this thought. Of course, it would have been a nonissue had Hagedorn's reflexes been slightly faster; Hammett writes, "Hagedorn's automatic came out a split second too late; his prisoner was over the side and swimming toward the bank" (33). Hammett's protagonists tend to be slightly less tough than Daly's and feature a greater degree of moral complexity.

[26] Emphasis on experience is reflected in the stories' narrative voice; first person narration was common among the most famous *Black Mask* stories because it allows the reader to gain insight into the detectives' reasoning and thought processes. In another Carroll John Daly story titled "Blind Alleys," for example, the detective explains why, when pistol-whipping someone, he always holds his gun by the handle: "No reversing the gun when I smack a lad. My rods are too finely tuned for that and I'm not anxious to have a bullet run up my sleeve" (13). Lines like this indicate that detectives derive their epistemological authority not from a particularly scientific method, but rather from lived experience—they don't know what they know because they deduced it; they know what they know because they've been around the block a few times. This ethos also carries over from the stories into the magazine's portrayal of the authors. In an editorial statement in the February 1928 issue, the magazine praises its authors' lived experiences, writing that Dashiell Hammett had been head of Pinkterton Detective agency, Erle Stanley Gardner had been a criminal and corporate lawyer, Tom Curry had been a police reporter, Raoul Whitfield—who wrote stories set in airfields—had flown planes in World War I, etc. The editorial statement asserts, "It is a first requirement of *Black Mask* that its writers *know* what they are writing about" (vi).

[27] Of course, there is nothing inherently masculine about instinct. In fact, somewhat ironically, an adjective that is often paired with "intuition" is "woman's." In *The Maltese Falcon*, for example, Sam Spade relies heavily on luck, but intuition is only mentioned twice. Both times, Spade asks his assistant Effie what her women's intuition tells her about his client, Brigid O'Shaunessy. The first time she asserts, "That girl is all right" (124). Later, she maintains, "I still believe that no matter what kind of trouble she's gotten into she's all right" (156). Hammett leaves it open to interpretation whether Effie's sympathetic position had some legitimacy, but Brigid is far from all right. That intuition should work for Hammett's males while Effie's "woman's intuition" fails her suggests not only the gendering of intuition but the propriety of men's association with it and

the impropriety of women claiming it. It is acceptable for a man to think about what his gut says, but a woman should be all body and bodily reactions; if she tries to think, she mishears what the body says.

[28] Martin's image of being "windy with authority" can be compared to Race Williams's dismissal of the Ku Klux Klan and "all the wind about cleaning up the world" in Caroll John Daly's short story, "Knights of the Open Palm" (436).

[29] This was deliberate on Lewis's part; in 1920, when he was still early in the writing process, he told Hardcourt, his publisher, "two years from now we'll have them talking of Babbittry" (Hutchisson 56).

[30] The ellipses are mine.

[31] The ellipses are mine.

[32] The interpretation of *Arrowsmith* as more earnest than satirical appears to be colored in part by the story behind *Neighbor*. Hutchisson seems particularly guilty in this regard, devoting several pages to discussing Lewis's work on this novel before he provides an interpretation of *Arrowsmith*. Hutchisson notes that in a character sketch for the protagonist of *Neighbor*, Lewis calls him "Christ-like," and later, that he described Debs as "a Christ spirit" (92-93). Describing Lewis's encounter with De Kruif, Hutchisson writes, "[Lewis] was looking for a heroic person on whom to base a narrative, and he found one in the young doctor. Lewis saw that Debs was the real thing, but Lewis could not understand Debs's blue-collar constituency. De Kruif was different" (95). But Lewis's fictionalized account of De Kruif's life turned out to be quite far from hagiography; Martin Arrowsmith is a selfish and unlikable anti-hero for most of the novel. It is funny to note that Martin actually compares himself to Christ at one point, but this only serves to underscore his conceitedness and his social awkwardness. When his wife chides him for not being more social, Martin responds, "'If they had their way, these sentimentalists would've had a Newton—yes, or probably a Christ!—giving up everything they did for the world to address meetings and listen to the troubles of cranky old maids" (293).

[33] The italics are in the original.

[34] Drawing on Epstein's study of AIDS activism might be useful in understanding Martin's obstinance. The people of St. Hubert do not engage in organized activism, but they do make their position known. Lewis writes, "The citizens came in Committees to beg him to heal their children, and he was so shaken that he had ever to keep before him the vision of Gottlieb" (365-367). It is worth speculating why these pleas remain unpersuasive. Epstein lists four ways in which AIDS activists constructed their credibility:

- Appropriating "the languages and cultures of the biomedical sciences"
- Establishing themselves as an "obligatory passage point" in gaining access to a population of research subjects
- "Yoking together moral (or political) arguments and methodological (or epistemological) arguments. For example, activists have contended that the inclusion of women and members of racial minority groups in clinical trials is both more ethical, insofar as it provides more widespread access to experimental medications, and scientifically preferable by virtue of the fact that it produces more generalizable findings"

- Seizing upon "preexisting lines of cleavage within the biomedical establishment" (335-336).

There are preexisting lines of cleavage among the experts working in the Caribbean. Martin feels an "unhappy pride" (365) in resisting both the St. Hubert Surgeon General, Inchcape Jones, and one of his idols, the famous Doctor Gustaf Sondelius, who so strongly objects to Martin's experiments that he refuses to take the phage treatment himself, telling Martin, "'You shall not inject me till you will inject all my Negro friends down there too'" (337). But Sondelius asks Martin to "forget science"; he does not yoke together the moral and the methodological arguments because he, like Martin and Gottlieb, sees these arguments as diametrically opposed to one another. It was not until the AIDS epidemic that a different perspective emerged. But importantly, none of the four means employed by AIDS activists are available to the citizens of St. Hubert because they are colonial subjects. The only layperson who serves as an obligatory passage point in gaining access to patients is the colonial Governor, Sir Robert Fairlamb, and his skepticism towards Martin's project erodes after Inchcape Jones commits suicide (359). Except for Doctor Oliver Marchand, who agrees with Martin's course of action, the black characters in the novel lack agency, and as a result, they can only make Martin feel bad about his course of action; they are denied the opportunity to develop a credible counterargument.

[35] This is based on a real incident. One of Frederick Novy's laboratory assistants contracted the plague and died after smoking a contaminated cigarette in 1901 (Markel "Prescribing Arrowsmith").

[36] Lewis writes, "Because death had for the first time been brought to him, he raged, 'Oh, damn experimentation!' and…gave the phage to everyone who asked" (376). By giving Leora's death as the reason for Martin's change of heart, Lewis exposes the limits of the cold-hearted scientist's capacity for empathy.

[37] This trope does not only appear in Lewis's novels; near the beginning of his Nobel Prize acceptance speech, Lewis alludes to "one good pastor in California who upon reading my *Elmer Gantry* desired to lead a mob and lynch me" (Hutchisson 235-236). This same anecdote appears in a 1945 *Time* magazine profile of Lewis, but in the magazine, the pastor is from Virginia (106). It is unclear whether these anecdotes are exaggerations on Lewis's part or whether pastors actually made public statements calling for Lewis to by lynched.

[38] According to *Historical Statistics of the United States*, in the ten years leading up to the publication of *Arrowsmith*, there were 539 lynchings. These statistics follow "the definition of the term 'lynching' endorsed by anti-lynching activists in 1940, that (1) there is legal evidence that a person was killed, (2) the action was illegal, (3) it was performed by a group of three or more people, and (4) the group acted under the pretense of service to justice, race, or tradition." Broken down by race and by year:

	White	**Black**	**Total**
1915	13	56	69
1916	4	50	54
1917	2	36	38
1918	4	60	64
1919	7	76	83
1920	8	53	61

1921	5	59	64
1922	6	51	57
1923	4	29	33
1924	0	16	16
Total	53	486	539

[39] Describing this night, Lewis writes, "Then for half an hour did Dr. Arrowsmith and Dr. Marchand, forgetting the plague, forgetting the more cruel plague of race-fear, draw diagrams" (354). This contrasts with Whitman's Learn'd Astronomer. For Whitman, diagrams are alienating, whereas for Lewis, they can bring people together.

[40] Here again, Martin's attitude towards scientific institutions reflects Lewis's attitude towards literary institutions, as evinced by Lewis's refusal of the Pulitzer Prize. Lewis wrote to his publisher that his letter refusing the prize "ought to make it impossible for any one ever to accept the novel prize (not the play or history prize) thereafter without acknowledging themselves as willing to sell out" (Parry xii).

[41] Lewis justified accepting the Nobel Prize after he had rejected the Pulitzer Prize because the latter was given to a particular book because it presented "the wholesome atmosphere of American life," a criterion to which Lewis objected, while the former was awarded "on the basis of excellence of work" with "no strings tied" (Hutchisson 263). The $46,350 also probably provided a good incentive.

[42] The scholar is Henry van Dyke.

[43] Robert Andrews Millikan, University of Chicago professor who won the Nobel Prize in Physics in 1923 for measuring the charge of an electron and for his work on the photoelectric effect.

[44] Albert Abraham Michelson, University of Chicago professor who won the Nobel Prize in Physics in 1907 for measuring the speed of light.

[45] Frederick Banting, a Canadian medical scientist who won the Nobel Prize in Physiology or Medicine in 1923 for his discovery of insulin.

[46] Theobald Smith, a pioneering epidemiologist and pathologist.

[47] Whether or not Lewis's more cynical perspective on reality would win out was far from settled when he was at the peak of his popularity. In 1927, *Time* magazine published a front page review of *Elmer Gantry* that excoriated Lewis for, among other things, the unreality of his work:

> What folk of the 21st Century are going to ask about the 20th Century cinemas, tabloid newspapers and this book, is: "Did such people really live in the U.S.?" Their hastier historians will say: "Yes," and show convincing clippings…. Of course these headliners are no more representative of the U.S. clergy than Senator Heflin is representative of the U.S. Senate. But the Castigator [Lewis], trained on newspapers to inflict sansculottism, portrays skeletal types of Americanos with all the malice, which is more than all the art, of which he is capable (39).

In a way, this question evinces the same preference for standardization that Lewis so frequently satirizes, whereby the real, the representative, and the average are all conflated. But the question

as to whether or not Lewis's work is realistic—rhetorically powerful though that question may be—matters less than the question as to whether his work is satirical or idealistic.

[48] The ellipses are in the original text.

[49] Pre-Socratic Greek philosopher who was the first to define general principles and set forth hypotheses, leading many to call him the "Father of Science."

[50] Another pre-Socratic Greek philosopher who is considered by many to be the "Father of Science."

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