

Art and Representation: The Rise of the “Mad Scientist”

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Introduction

Compared to traditional themes of love, crime, and power, science plays only a small role in nineteenth-century literature. That is not surprising if we consider that science was then hardly comparable in size and influence to our times. And yet, science is clearly visible in the literature, and among all the disciplines chemistry plays a very prominent role.

Chemistry’s visibility is not so much because writers and artists were acquainted with the field and employed its latest concepts and theories in their work. A rare exception was Johann Wolfgang von Goethe, an enthusiast and connoisseur of chemistry who based his novel about changing romantic relationships (*Wahlverwandschaften*, 1809, English: *Elective Affinities*) on contemporary ideas of chemical affinities. Instead, the dominating and overarching literary theme for the entire century in most Western countries, much to the dismay of scientists since then, was the “mad scientist,” who as a rule is a chemist or a physician performing chemical experiments.

Up to the 1990s the depiction of science in literature had received very little attention from scholars of literature studies because of barriers between the humanities and the sciences, including their historiography, and the monolingual or national focus of the humanities. Unlike alchemy (or some allegorical version of it), which through C.G. Jung’s psychoanalytical approach became a favorite subject, chemistry has remained a stepchild of literature studies, despite its powerful role in shaping the overall public image of science through the “mad scientist” trope.[1]

Although the term “mad scientist” was used first in the twentieth century for movie adaptations of literary themes from the previous century, the trope was created by nineteenth-century writers, who drew on earlier tropes, in particular the “mad alchemist,” a literary figure developed in satire since the fourteenth century, and the sixteenth-century Faust legend. The historical background allows us to recognize the emergence of the “mad scientist” with this alchemical legacy as a stepwise transformation from the late eighteenth century onwards. The following three sections describe this genealogy from the “mad alchemist” to the standard “mad scientist” and highlight its most famous version, Mary Shelley’s *Frankenstein*. In the standard form, the scientific madness consists largely of the obsession with some laboratory work on material perfection combined with hubris, moral naivety, and social seclusion.

Once the standard trope was established, writers developed variations on it by modifying “scientific madness” to include apparent schizophrenia, as for instance in *Dr Jekyll and Mr Hyde*, and various forms of moral disorder, from perverted means and goals in the name of science to criminal intent. At the end of the century the “mad scientist” was also transformed into more benign figures, such as the “benevolent but absent-minded scientist,” and the heroic detective Sherlock Holmes.

The “mad scientist” trope, including a variety of fictional capabilities attributed to chemistry, dominated nineteenth-century literature such that the actual societal impacts of chemistry, including industrialization and pollution, remained almost invisible. In contrast, visual representations of chemists and chemistry, which were mostly commissioned by chemists to demonstrate achievement and social status, lack any reference to the trope. The “mad

scientist” began to dominate the visual representation of chemistry only in the early twentieth century with film adaptations of literary classics, which could draw on the iconographic repertoire of the “mad alchemist.” Finally, I provide an overall account of the literary image of chemistry that goes beyond the “mad scientist” and suggest why that stereotypical image was so negative.

Precursors to the “Mad Scientist”: the “Mad Alchemist” and the Faust Legend

The concept of the “mad scientist” that would dominate the nineteenth-century literary depiction of science in general and of chemistry in particular goes back to the late-medieval “mad alchemist,” a literary product from early debates about alchemy (Schummer 2006). In the early fourteenth century, certain European kings, particularly in France and England, produced counterfeited money to finance their wars and to pay their tithes to the Pope, which resulted in a papal bull against alchemy in 1317, denouncing it as fraudulent (Ganzenmüller 1938; Ogrinc 1980; Obrist 1996). Many kings who officially forbade alchemy nonetheless continued financing it in secret for centuries, and others would do as well.

Numerous authors, particularly those who supported the papal supremacy, reinforced the critique of alchemy (Read 1947; Linden 1996; Meakin 1995). In the fourteenth century, they included influential philosophers, such as Nicole Oresme; inquisitors who, like Nicolaus Eymericus, saw in alchemical practice demons or devils at work; and newly emerging fiction writers such as Dante Alighieri who put alchemists in the deepest hell in his *Divine Comedy* (1310–1321, *Inferno*: Canto XXIX). Francesco Petrarca was the first to vividly describe how a miserable seeker of gold-making ruins his life (*Remedies for Fortune Fair and Foul*, 1353–1366, chapter 111 “On Alchemy”). Soon Geoffrey Chaucer would turn the alchemist into a wretched figure of satire in his *Canterbury Tales* (ca. 1390, “Canon’s Yeoman’s Tale”), starting a popular literary tradition, including for instance Sebastian Brant’s *Ship of Fools* (1494, chapter 102), Erasmus of Rotterdam’s *Colloquies* (1518, “Beggar Talks” and “Alchemy”), Reginald Scott’s *The Discoverie of Witchcraft* (1584, 14th book), and Ben Jonson’s *The Alchemist* (1610).

In its fully developed version, the “mad alchemist” consists of two figures or phases, the “miserable seeker” and the “tempter” or “cheating alchemist.” The “tempter” infects the “miserable seeker” with the obsession of gold-making by some trickery and promises of richness. The “seeker” receives or buys substances, equipment, and technical guidance from the “tempter” and secludes himself in a laboratory where he works day and night. He ruins his health from the smoke and other poisons, isolates himself from his social environment, loses his public reputation, spends all his money on the work, and brings poverty and shame on his family (if he has one). As a drug addict can become a drug dealer, so also the “miserable seeker” in a second phase may turn into a “tempter.” He then infects other victims whom he sucks dry to finance his own obsession. If the “tempter” himself is not an addict, he is usually said to come from abroad and bears various devilish attributes.

The extraordinary literary success of the “mad alchemist” theme, a truly medieval invention without ancient models, was probably due to its usefulness in satire and its general moral effect. The “miserable seeker” ruins himself because of both his stupidity and greed, two widespread follies against which many authors wrote. In Chaucer’s story, a yeoman, a canon, and a priest are subject to satire. Erasmus made fun of the stupidity and greed of priests and academic scholars. Jonson ridiculed the entire nobility and middle class. In Scott’s story, a greedy king is fooled.

During the eighteenth century the popularity of the “mad scientist” temporarily faded. On one hand, other literary tropes, such as the “gamester,” emerged that could serve the same purpose. On the other hand, alchemy probably became more popular in Europe, where circles

devoted to various kinds of obscurantism greatly flourished during the so-called time of Enlightenment.

After Gutenberg’s revolution in printing technology around 1450, many of the books mentioned went into print and were illustrated with woodcuts, including the best-selling books by Petrarch and Brant, most likely illustrated by Albrecht Dürer and Hans Weiditz the Younger, respectively.[2] Their visual representations of an alchemist working in the laboratory became highly influential for the subsequent imagery of the “mad scientist” in nineteenth-century literature and twentieth-century movies. Weiditz depicted in 1519 the laboratory overstuffed with partly broken alchemical apparatus (alembics, retorts, various vessels, bellows), and the alchemist in worn-out clothes obsessively working at the smoking furnace, while his assistant stands in the background scratching his head. In Dürer’s woodcut from 1494, the “mad alchemist” is of higher social status and still at an early state of his obsession, because he is performing a distillation at the furnace under the guidance of the “tempter.” It was obviously modeled on a popular image circulating at the time (around 1480), in which the alchemist is instructed by the Antichrist with the devil acting in the background.

Through Pieter Bruegel the Elder’s famous painting *The Alchemist* (1558), which depicts both the final state of the alchemical obsession by a farmer and the entry of his family into an almshouse, the “mad alchemist” motif moved to Flemish genre painting. In the seventeenth century David Teniers the Younger (1610–1690) and many of his colleagues produced dozens of satirical alchemist paintings, which they sold all over Europe. Moreover, they merged the then famous motif of quack medicine, a man gazing at a flask filled with some colored liquid representing uroscopy, with the mad alchemist motif, because both the quack and the alchemist were considered cheaters. Strangely enough, late-nineteenth-century chemists would adopt exactly that posture of gazing-at-a-flask as the emblematic image of their science (see below).

In the sixteenth century, Johann Spies created the influential literary character Faust in *Historia von D. Johann Fausten* (1587), which Christopher Marlowe almost immediately popularized in the English-speaking world (*Dr. Faustus*, 1589). Faust is an alchemist, but also a healer, astrologer, and necromancer. He is not just tempted by the devil, but makes an explicit deal with him in order to increase his technological power, a feature of the story that makes the Faust legend clearly derived from the “mad alchemist.” In the early nineteenth century, Goethe would reimagine the Faust story into a romantic tragedy of a scholar longing for wisdom beyond human reach, in stark contrast to the “mad scientist” of the nineteenth century.

The Standard “Mad Scientist”

At the turn of the nineteenth century writers of many countries revived the trope of the “mad alchemist” and transformed it into the standard form of the “mad scientist.” From that trope, various other types were later derived by variations in “madness,” to be dealt with in subsequent sections. Like his precursor, the standard “mad scientist” is obsessed with some chemical project, secludes himself in the laboratory, works day and night, and becomes socially isolated. As a rule he is a male chemist, amateur or professional, or a physician turned to chemical research, and his laboratory is largely equipped with the stuff of the “mad alchemist.” His goal might still be gold-making, but it could also be creating diamonds, elixirs for longevity, antidotes to poisons, new medicines, artificial life, or other things of public fascination; generally forms of material perfection according to widely shared values. He might still be guided by selfish motives, but usually he works “in the name of science,” seeks scientific fame for his accomplishments, and most often does it for the betterment of humanity. Unlike the “mad alchemist,” the “mad scientist” is typically successful in his scientific deeds. Thus, in contrast to medieval and early modern writers, modern authors attributed tremendous creative capacity and power to chemistry.

Thus far, the “mad scientist” appears to be an omnipotent benefactor to humanity by successfully achieving goals of material perfection. However, in all standard “mad scientist” stories the desired goals, once achieved, turn into evil by some unforeseen consequences or by accident. The general lesson is that scientists are powerful in their deeds but disastrous in the consequences of their actions, because they lack a broader understanding of the social and moral context in which they act. In other words, their scientific aspiration for improvement is morally naive.

I will first discuss some standard examples that illustrate the transformation from the mad alchemist, then highlight the most famous example, Mary Shelley’s *Frankenstein*, before I deal with the modifications.

Already in 1799, William Godwin, a political philosopher and novelist, the father of Mary Shelley, published *St. Leon: A Tale of the Sixteenth Century*. After a foreigner reveals the secrets of both gold-making and an elixir of youth to the protagonist, Count Reginald de St. Leon, his life turns to despair. Whenever he makes gold, he is persecuted by officials, to whom his sudden wealth is suspect, even though he tries to spend it for the benefit of the poor. He is forced to leave his family and wanders aimlessly through Europe, letting his children believe that he has died in order to restore their reputation. At times he is put into a dungeon to practice gold-making for others. And when after decades he first uses his elixir of youth, he almost destroys the love of his son.

Whereas Godwin set his “mad scientist” plot in the sixteenth century, as Robert Browning also did in his play *Paracelsus* (1835), others openly portrayed contemporary chemistry in the disguise of alchemy. For instance, in Honoré de Balzac’s (1799–1850) “mad scientist” novel *La Recherche de l’absolu* (1834, English translation as *The Quest of the Absolute, The Alkahest, or The Philosopher’s Stone*), Claes is a former student of Lavoisier, who ruins his wealth, health, reputation, and family with his only partly successful obsession with synthesizing gold, diamonds, and organic substances.[3] Despite the use of various details from modern chemistry, the plot is still very close to the medieval “mad alchemist” stories, as are, for instance, Friedrich Halm’s play *Der Adept* (1836, *The Adept*) and Wilkie Collins’ *Jezebel’s Daughter* (1880), albeit put into different narrative styles.

Thematic variations were introduced either by new and surprising endings or by novel “scientific” motives. Successful gold-makers not only face the envy of their neighbors and their own moral corruption, but also initiate the process of economic inflation that makes their gold worthless, as in Wieland’s *Der Stein der Weisen* (1786–1789, *The Philosopher’s Stone*) and Edgar Allan Poe’s short story “Von Kempelen and His Discovery” (1840). Diamond-making replaced gold-making, as in Jean Paul’s satirical novel *Der Komet oder Nikolaus Marggraf* (1820–1822, *The Comet or Nikolaus Marggraf*) or in H.G. Wells’ short story “The Diamond Maker” (1894), where after fifteen years of obsessive work and on the edge of starving an amateur chemist is eventually successful in his experiments, but runs into trouble with the police when trying to sell his diamonds.

The traditional literary use of elixirs of life was superseded by chemical research with poisons and antidotes, usually performed by doctors who were considered to experiment with life and death, a form of “playing God.” The American author Nathaniel Hawthorne set the stage with one of his most famous “mad scientist” short stories, “Rappaccini’s Daughter” (1844), where of a doctor it is said that “He would sacrifice human life, his own among the rest, or whatever else was dearest to him, for the sake of adding so much as a grain of mustard seed to the great heap of his accumulated knowledge.” Dr. Rappaccini has fed his daughter since early childhood with poison to make her strong and resistant against the rigors of the world, but then she happens to come in contact with an antidote and dies. In Wilkie Collins’ novel *Heart and Science. A Story of the Present Time* (1883), Dr. Benjulia’s obsessive research with poisons and antidotes, for the betterment of science, kills not only numerous test

animals and leads him to poverty; his posthumous laboratory remains are also abused by others for committing murder.

Although the creation of life would much later become the most popular “mad scientist” topic through movie adaptations of Mary Shelley’s *Frankenstein* (see below), it does not play much of a role in the nineteenth century. Another famous literary use of the “creation of life” theme is in Goethe’s *Faust II* (1832), but that is not a typical “mad scientist” story. Faust’s former *famulus*, Wagner, who has become a doctor of science and concocts a homunculus in his chemical laboratory, is portrayed as an idiot. Once alive, the homunculus leaves his surprised creator back in his laboratory and joins Faust and Mephistopheles on their adventure trips. In H.G. Wells’ *The Island of Doctor Moreau* (1896), a physician creates new animals by surgery to improve their natural evolution, but that does not involve any chemistry. The first “mad scientist” story that features the chemical creation of simple life forms is perhaps “Microcosmic God” (1941) by US science-fiction author Theodore Sturgeon.

During the nineteenth century the “mad scientist/chemist” was featured not only in novels, short stories, and plays but also in other literary forms and media, including fairy tales – e.g. “Das Wasser des Lebens” (1812–1815, “The Elixir of Life”) by the Grimm Brothers; “Der Stein der Weisen” (ca. 1835, “The Philosopher’s Stone”) by Hans Christian Andersen – and even numerous operas (Griffel 1990).

Mary Shelley’s Frankenstein

Mary Shelley’s *Frankenstein, or the Modern Prometheus* (1818/1831) has become the most famous literary example of the “mad scientist.” When scientists create something that is otherwise known only from natural sources, today’s media frequently comment on it with the prefix “Franken,” such as in “Franken-food” or “Franken-bacteria.” The media thereby seem to refer to a simple plot – a “mad scientist” creates a human-like being who runs amok – whereas the novel itself is quite unusual in two regards.

First, in ethical terms *Frankenstein* is probably the most eloquent and deliberative “mad scientist” story that has ever been written. Shelley organized the book with alternating moral monologues by Victor Frankenstein and his creature, who each reflect on their situation, what they have done, why they did it, and how they should be morally judged, including strong self-accusations. Second, it includes the most radical criticism of science one can think of. Rather than just pointing out a certain failure or some scientific misconduct by a man who has lost his senses, it suggests that the failure is an inevitable result of science in general, of scientific curiosity, no matter how high its moral standards are. That becomes clear if we look closer at Victor’s career in science.

In the first chapters Shelley has Victor narrate in retrospect his childhood, adolescence, and studies at the University of Ingolstadt. The narrative recapitulates the history of Western science, such that Victor’s years of age each correspond to the previous centuries (Schummer 2008). At thirteen he becomes interested in science, “the birth of that passion which afterwards ruled my destiny” (Shelley 1831), such as the Latin world, in the thirteenth century, became interested in natural philosophy after the first texts of Greek science had been translated from Arabic to Latin. Between thirteen and fifteen he reads texts by Albert the Great, Agrippa of Nettesheim, and Paracelsus, authors of natural philosophy and alchemy from the thirteenth to sixteenth centuries. “Under the guidance of my new preceptors I entered with the greatest diligence into the search of the philosopher’s stone and the elixir of life” in order to “banish disease from the human frame and render man invulnerable to any but a violent death” (27).

Next, Victor is confronted by entirely new theories presented by “a man of great research in natural philosophy,” probably inspired by Descartes, who visits his family and explains electric phenomena. He falls into a temporary period of (Cartesian) skepticism, remarking that “It seemed to me as if nothing would or could ever be known” (28), after which he, at

seventeen, focuses on mathematical studies because they are “built upon secure foundations,” such as the rising mechanical philosophy in the seventeenth century including Newton. Interestingly, Victor describes that period of mechanical studies as “the last effort made by the spirit of preservation to avert the storm that was even then hanging in the stars and ready to envelop me.” However, “Destiny was too potent, and her immutable laws had decreed my utter and terrible destruction” (27).

When he is eighteen, an age that corresponds to the eighteenth century, Victor enrolls in the University of Ingolstadt to study natural philosophy, where the subject is already fully dominated by chemists teaching a new doctrine. He first meets Professor Kempe, who is still busy criticizing the old doctrines, reflecting the debates of the Chemical Revolution in the late eighteenth century. Then he listens to a lecture by Professor Waldman, who develops great visions that make Victor an adept of the New Chemistry. Modern scientists, says Waldman, “penetrate into the recesses of nature and show how she works in her hiding-places. ... They have acquired new and almost unlimited powers” (34). For Victor, in retrospect, those were “the words of the fate – enounced to destroy me” because “From this day natural philosophy, and particularly chemistry, in the most comprehensive sense of the term, became nearly my sole occupation” (36).

Victor soon works in Professor Waldman’s laboratory, making a name for himself in the invention and improvement of chemical instruments, which corresponds to historical efforts at gravimetric and electrochemical instrumentation in the late eighteenth and early nineteenth century. At the age of twenty, when the nineteenth-century novel turns into a futuristic vision of the twentieth century, Victor begins researching the causes of life. With the obsession and self-sacrifice of a “mad alchemist,” he tries to revive a dead body that he has constructed from parts of human corpses. Details are missing, but again Shelley presents the final step as a natural consequence of the previous science. The crucial idea was “so simple ... I was surprised that among so many men of genius who had directed their inquiries towards the same science, that I alone should be reserved to discover so astonishing a secret” (38).

Through Victor’s biography, Shelley in effect narrates the history of science, from the Middle Ages to the future, as a necessary and predestined process towards the final catastrophe. Good intentions cannot prevent that disaster, but even foster its occurrence. As Victor reflects on his life: “I had begun life with benevolent intentions and thirsted for the moment when I should put them in practice and make myself useful to my fellow beings” (74). Because neither his good intentions nor the predestination of science can excuse Frankenstein’s guilt, the only option would be to abstain from science. And thus Shelley has the dying Victor say: “Seek happiness in tranquility and avoid ambition, even if it be only the apparently innocent one of distinguishing yourself in science and discoveries” (196). In later adaptations of Frankenstein – beginning with the 1823 play *Presumption; or the Fate of Frankenstein*, to the many Hollywood movie productions in the twentieth century – both the sophisticated moral discussion and the general theme of the tragic predestination of science were removed.

Once the “mad scientist” had become an established figure, any kind of madness would suffice for the purpose of entertainment. The following five sections discuss the five most important types of madness, each of which was established in the nineteenth century as a distinctive variation on the original form of the “mad scientist.”

Psychological Twist

British “mad scientist” stories frequently come with a psychological twist that goes beyond the madness of the standard form. That twist has fascinated scholars of literature studies who have suggested various Freudian-style interpretations, but a simpler interpretation becomes obvious if we compare a few examples.

Frankenstein, my first example, stands out because it is composed of alternating monologues by Victor and his creature. Both reflect on their own individual but related situa-

tion with the same kind of sophisticated moral reasoning. At times it is even difficult to distinguish the two voices. Scholars have argued for some time that Shelley intended Victor's creature to be his alter ego, a motif that she borrowed from British gothic novels of the late eighteenth century (Tropp 1976: 37). However, the alter ego is not just an imagined part of Victor's soul. Instead, Victor creates the creature "in his own liking," or better, what he considered it to be, i.e. a being with the physiological and intellectual capacities of a human. However, what he has forgotten to add to his creation, and what the creature deeply complains about and what makes him eventually run amok, are the emotional and social sides of human beings. Victor is successful in the physiological and intellectual parts of his experiment, but he profoundly fails because his creature possesses an incomplete soul.

The second and most famous example of a "mad scientist" with a psychological twist is Robert Louis Stevenson's novella *Strange Case of Dr Jekyll and Mr Hyde* (1886). Dr. Jekyll is a physician who has turned to chemical research on psychiatric drugs. He develops both a psychological theory and two related drugs, the first drug to separate the good and evil forces of the soul and the second one to reunite them. Because he is unhappy with his own temper, which at times he is unable to control, he tests his theory and the drugs at first on himself. That temporarily turns him into the violently aggressive Mr. Hyde, who commits murder and other violent crimes. When the aggressive personality begins to dominate him and the second drug runs out because of lack of supply of chemicals, he commits suicide while in the temporary state of Dr. Jekyll to prevent the world from suffering more evil from Mr. Hyde. As with Victor Frankenstein, Dr. Jekyll fails because his science, while providing effective chemical tools, is based on an incomplete understanding of the human psyche.

The third, psychologically more twisted example is Charles Dickens' fourth Christmas story, *The Haunted Man and the Ghost's Bargain* (1848), about the chemistry professor Mr. Redlaw. The poor man is haunted by memories of grief and pain and makes a Faustian bargain with a ghost, who is actually his alter ego. He would lose all his painful memories if, in return, the entire emotional side of his memory is deleted and the same mental condition spreads to anyone whom he meets. As a result, he is soon surrounded by people who lack any social and emotional capacities that would rely on their memory, and Redlaw becomes even unhappier. Although Dickens' "thought experiment" includes a mysterious Faustian bargain (with oneself) rather than scientific manipulations of the human soul, the story follows a similar line as the other two examples.

As a rule, the "mad scientist" stories with a psychological twist are focused on creating or tampering with the human psyche, rather than producing gold, diamonds, elixirs of life, or other material entities. They tell the same story of scientific hubris and failure by lack of understanding and circumspection, despite the powerful scientific tools for manipulation in their hands, as in the standard "mad scientist" stories. Thus, the psychological twist is not a variation of the original "scientific madness," as in the subsequent examples, but it derives from the specific goal of tampering with the human psyche.

Moral Perversion

Both the standard "mad scientist" and the version with a psychological twist seek some kind of perfection according to values largely shared by society, but they fail for lack of circumspection. In ethical terms, even though they might have had good intentions, they do wrong because their actions have adverse effects that they naively did not foresee. Several nineteenth-century authors, particularly from France, modified the "mad scientist" by varying the ethical theme, such that the "scientific madness" turns into moral perversion rather than moral naivety.

In one version of this moral perversion, achieving an acceptable goal requires methods that are morally wrong. For example, in Alexandre Dumas' fictional autobiography of Cagliostro (*Joseph Balsamo: Mémoires d'un médecin*, 1844–1846), to prepare an "elixir of life,"

Cagliostro's master of alchemy, Althotas, demands the last drops of blood from a child, for which the child must of course be murdered. The prolongation of one life requires the death of another, an act unscrupulously approved by the "mad scientist."

A second version of moral perversion involves immoral research goals. The "mad scientist" is mad because he has lost any sense of cultural reality and moral values, and ruthlessly pursues his strange goals. His activity needs to be distinguished from mere crime (see below) by pointing out that he allegedly acts "in the name of science" or even for the benefit of humanity. This type of "mad scientist" first appeared in nineteenth-century literature, and would later become a frequent fixture in Hollywood movies of the mid-twentieth century.

For example, the French pioneer of science fiction, Jules Verne, frequently described as a utopian, developed a particularly salient form of the moral perversion of "scientific" goals. In his short story *Une fantaisie du docteur Ox* (1872, *Dr. Ox's Experiment*) the main character, "an able chemist as well as an ingenious physiologist," visits a rural town where people live a peaceful, calm, and happy life. Dr. Ox convinces them that they would benefit from a gas lighting system fueled by hydrogen. And so he builds a factory for the electrolytic dissociation of water into hydrogen and oxygen.

However, Dr. Ox is not interested in lighting or in hydrogen. The project is a ruse that enables him to integrate himself in the town and perform his treacherous work in an undisturbed manner. His actual goal is to produce large amounts of oxygen in order to conduct a socio-psychological experiment on the town's population "in the interest of science." According to his hypothesis, the increased oxygen concentration in the air would change the mentality of rural people, by stirring up eagerness and aggressiveness, which he considers an improvement, an essential step to "reform the world." However, before Dr. Ox can start the experiment, the gas plant explodes by accident.

One might be tempted to read Dr. Ox's Experiment as a parable of contemporary industrialization: modern technology transforms not only the means of production but also the personality of the people. However, Dr. Ox is not an industrialist but a scientist who conducts a social experiment, or better, a chemical experiment on society under the guise of technological improvement. The change of mentality in the rural town is not a side effect but the actual goal of the project: common virtues, such as peacefulness, contentedness, and happiness, should turn into the vices of eagerness and aggressiveness. Because Dr. Ox confuses vices and virtues in the name of science to reform the world, and because he cheats others in order to achieve his goals, he represents the morally perverted "mad scientist" whom no one should trust.

Criminal Intent and Power Hunger

Death by poisoning (that is, using chemicals) has always been a popular theme in dramas, from Euripides' *Medea* (431 bc) and Shakespeare's *Hamlet* (1609) to modern detective novels. In most of these cases, the murderer's knowledge of chemistry is minimal or unnecessary. The "criminal chemist," on the other hand, systematically uses his expert knowledge of chemistry to commit crimes, not in the name of science, but for his personal enrichment or empowerment. The character can be traced back to the medieval tempter who first makes his victims addicted to alchemy by some chemical trickery and then sucks them dry financially. Whereas the late eighteenth century featured various comical versions of this trope, for instance in Giacomo Casanova's *The History of My Life* (1770–1772), Rudolf Erich Raspe's *Baron Munchausen* (1785), and the pseudonymously published *Confessions du Comte Cagliostro* (1787), nineteenth-century authors would employ this theme in the new genre of crime and detective novels.

For example, Wilkie Collins, generally considered the founder of British detective novels, wrote not only fully fleshed versions of the standard "mad scientist" (see above) but also the first modern version of the "criminal chemist." In his novel *The Haunted Hotel, a*

Mystery of Modern Venice (1878), a talented young chemist, Baron Rivar, gives up his promising research career for the chemical pursuit of gold-making, which consumes both his own fortune and that of his sister. To cover the expenses of his experiments, he convinces her to marry a man whom they murder together to perpetrate a life insurance fraud. To that end, they show to the insurance company the dead body of the servant who has coincidentally died from bronchitis, while Baron Rivar uses his chemical skills to completely dissolve the corpse of the murdered man in acid.

Chemistry began to dominate the “criminal scientist” genre probably for two reasons. First, the crime theme was already existent in “mad alchemist” stories where the obsession with gold-making let the “mad alchemist” pursue his work by any means, including criminality. Unlike later authors, Collins simply reworked that old plot in *The Haunted Hotel*. Second, authors thought that chemistry had extraordinary capacities, at least in the view of their readers, which could make for interesting crime stories.

The most famous example of the second reason is H.G. Wells’ novel *The Invisible Man* (1897); its numerous film and television series adaptations in the twentieth century speak for the great popularity of the theme. The main character, Griffin, who had once studied medicine and “won the medal for chemistry,” moves to a small town and outfits a chemical laboratory to create a substance that would temporarily change the “refractive index” of the human body to that of air. He succeeds and becomes invisible upon taking the drug, which allows him to act incognito. Griffin’s invisibility enables him to threaten and punish people anonymously, giving him a thirst for power, and a desire to establish a “reign of terror” in which he can impose any rule that pleases him.

While other nineteenth-century “criminal chemists” typically pursue riches, corresponding to the old “mad alchemist” theme, Griffin strives for power and domination. Already in 1871, the American author William Henry Rhodes, writing under the pseudonym “Caxton,” had in his short story “The Case of Summerfield” (1871) a chemist who seeks power by threatening to destroy the oceans with his new invention that enables him to “ignite” water. Both Caxton and Wells created the prototype for a popular character in science fiction during the twentieth century: the super-villain “mad scientist” who strives for world domination (Schummer 2021).

Absent-Minded Benevolence

A few years after he had introduced the morally perverted chemist Dr. Ox, Jules Verne published another story that contained a prototype of the “benevolent and absent-minded scientist,” who would in the mid-twentieth century become a popular character in adventure movies and comics series for children (Schummer 2021). In Verne’s space adventure novel *Hector Servadac* (1877, *Off on a Comet*), a comet strikes the Earth and carries off a piece of the Earth with its inhabitants, including the hero Hector. When the group begins exploring the comet, they meet a man who once was Hector’s science teacher. We first learn about Professor Rosette by Hector’s memories of several funny stories in which Rosette was tricked by his pupils. For instance, while preparing a chemical experiment, Rosette was so preoccupied that Hector and his classmates could easily make fun of him by replacing some chemicals without Rosette noticing, so that the experiment did not work.

In the meantime Rosette had turned into an ambitious astronomer, who actually planned his travel on the comet by calculating the time and place of the strike. Although he is a strange person to deal with and at times absent-minded and eccentric, he turns out to be extremely helpful to the others. Thanks to his scientific knowledge, they learn about their location, the size and properties of the comet, and how to live on it. He calculates the comet’s orbit and the next time when it comes close to Earth, which eventually helps them to return home.

The “benevolent and absent-minded scientist” still resembles the “mad scientist,” with such characteristics as his absent-mindedness or obsession with his work, his eccentric and unsociable character, and at times a sinister appearance. However, when his interests harmonize with those of others, he is helpful, with surprising and wondrous capacities. He is never the main character, neither hero nor villain, but an essential actor in the plot, like a *deus ex machina* who allows authors to make sudden narrative turns in their stories. However, the “benevolent and absent-minded scientist” is rarely a chemist, but rather a general scientist-engineer, as if the character would not easily fit the stereotype of a chemist.

Heroic Crime Investigation

The negative image of fictional chemists throughout the nineteenth century was partly compensated for by a single character of extraordinary popularity, the private detective Sherlock Holmes. The British author and physician Arthur Conan Doyle introduced Holmes in his 1887 novel *A Study in Scarlet*, to be followed by three other novels and fifty-six short stories published during the next forty years. Right at the beginning of the first novel, Holmes is introduced as a passionate and ingenious experimental chemist who has just discovered a chemical reagent to detect traces of blood. The discovery serves his other great passion, resolving intricate criminal cases, by identifying blood stains on the clothes of possible murderers.

Much more than a mere instrument in crime investigation, chemistry prominently features in many stories involving Holmes. On the one hand, Holmes occasionally secludes himself overnight in his private laboratory to obsessively work on some chemical analysis, which his friend and assistant, Dr. Watson, always notices with bewilderment. On the other hand, chemical reasoning, as for instance in classical organic structure elucidation, as Holmes confesses many times, is the model on which he resolves his criminal cases, to the astonishment of fictional policemen and actual readers. By smartly interacting with the subjects and diligently observing even the smallest details, he eliminates all possible explanations until only one remains. There would probably no better approach to illustrate that chemical method to a broader audience than by applying it to exciting cases of criminal investigation.

Holmes is even more benevolent than Professor Rosette, and he is the main hero of all stories. And yet, Holmes is still a derivative of the “mad scientist.” He is eccentric, obsessive in his work, cold-blooded in all other matters, not very sociable, and largely remains mysterious to others, including Watson, the narrator of most of the stories. However, the entire collection of stories also serves as an invitation and guide for understanding that type of person better, to acknowledge his eccentricity as a different but useful way of reasoning, rather than condemning it as a form of madness.

While Doyle himself created in 1912 Professor Challenger, an irascible biologist who experiences various adventures and mysterious events, other authors developed characters modeled on Holmes. Perhaps the most famous variation was chemistry professor Craig Kennedy, who appeared in numerous short stories and novels published between 1910 and 1918 by US author Arthur Benjamin Reeve. Nearly all the characteristic traits of the “mad scientist” have disappeared in Craig Kennedy, who embodied Reeve’s vision of “criminal science” that would simply “apply science to the detection of crime, the same sort of methods by which you trace out the presence of a chemical” (*The Silent Bullet* 1910: 3).

Environmental Pollution in Novels

By the second half of the nineteenth century, European countries were well aware of the problems of pollution from chemical and other industries (Homburg *et al.* 1998: 121–201). Although the issue of pollution would naturally have lent itself to the “mad scientist” trope by featuring chemists or chemical firms who in their obsession for some material perfection pollute the environment with a lack of circumspection, it is almost absent in the literature of the period. There were complaints about noise, smoke, smell, dust, lighting, and other human-

made annoyances in metropolitan areas, and there was a new appreciation of untouched nature, from early-nineteenth-century German Romanticism to Henry David Thoreau’s *Walden* (1854), which has recently been called “nature writing.” However, the notion that nature as such could be severely affected, damaged, or endangered by industrialization was largely unknown in the nineteenth century.

One of the very rare early novels to focus on industrial pollution of the natural environment is *Pfisters Mühle* (1884, *Pfister’s Mill*) by the German author Wilhelm Raabe. It does not deal with untouched nature, but with a recreational area close to Berlin, literally the natural environment of a big city. By a creek there is an old mill to which a restaurant catering to daily visitors from Berlin was once attached. Dr. Eberhard Pfister, a language teacher, inherited the mill from his father and sold it to a company. The firm has recently built a sugar plant upstream and wants to turn the mill into another plant. Pfister, who spent his youth there, visits the mill site to show it to his young wife. However, nothing is as it was before. The sugar industry has turned the creek into a sewer with dark brown foul-smelling water. The vegetation and fauna has completely changed, and the mill and restaurant are run down and abandoned.

Pfister asks his former mentor Dr. Asche (the name is a colloquial German term for money) for advice. Dr. Asche recently shifted his interests from ancient languages to modern chemistry. He does some chemical analysis but cannot help further. Instead, he realizes the financial opportunity to establish a huge factory for chemical dry cleaning in the surroundings of Berlin. Raabe here alluded to what was the biggest dry cleaning plant in Germany in 1873, W. Spindler, a few kilometers upstream from Berlin, whose business caused massive pollution.

Raabe’s novel describes the process of industrialization using several themes in parallel: from traditional craft to modern industry, from undisturbed beautiful nature to a malodorous sewer, from philology of ancient languages to the modern science of chemistry, and from the pursuit of wisdom to the longing for money. However, the novel was not well received and nearly fell into oblivion before it received renewed attention in the late twentieth century. The fictional treatment of environmental destruction by chemistry in *Pfister’s Mill* remained a rarity in the nineteenth century, and would only re-emerge in the twentieth century.

Novelists continued to disregard the environmental theme well into the twentieth century (Schummer 2021). When it appeared in literary works after World War I, it was only in apocalyptic visions of total world destruction, first by poison gas and then by other scientific inventions such as nuclear energy and runaway bugs. Environmental pollution in the proper sense would only appear in the final decades of the twentieth century in the eco-thriller genre after the division of hero and villain had been sorted out anew, such that a scientist-hero fights the polluting chemical industry that has now assumed in part the role of the “mad scientist.”

The Visual Representation of Chemists and Chemistry

Like the environmental pollution theme, the “mad scientist” theme is almost absent in nineteenth-century visual representation of chemistry, but for largely different reasons. First, the visual representations of chemistry in that period were mostly commissioned by chemists or chemical firms, as in portraits, technical drawings, and paintings of industrial landscapes. Second, just as the visual representation of the medieval “mad alchemist” appeared only later in illustrations of printed literary works, so did the nineteenth-century literary creations of “mad scientists” visually appear only in movie adaptations of the next century. Thus, the visual image lagged behind the literary image. However, once the motion picture industry was established, “mad scientist” movies began to dominate the visual image of science, starting with *Frankenstein* (1908) and *Dr Jekyll and Mr Hyde* (1910).

Considering that very little historical research has been done on visualization of science in the nineteenth century, the following can only briefly survey the visual representation of chemical laboratories, portraits, and industrial landscapes.

Following the French *Encyclopédie*, detailed technical drawings of laboratory apparatus and equipment became popular illustrations and important sources of information in encyclopedias, handbooks, and textbooks, commissioned by scientists and tailored to scientists, students, and interested laypersons. Nonetheless, independent artistic representations of laboratories, painted for a general audience, continued to depict medieval alchemical laboratories, from Joseph Wright of Derby's *The Alchemist Discovering Phosphorus* (1771/1795) to Carl Spitzweg's *The Alchemist* (ca. 1860). Thus, the iconography that originated from illustrations of the "mad alchemist" literature and which had been elaborated in the seventeenth century (see above) seems to have further dominated the public visual imagination of a chemical laboratory.

Because portraits of chemists were mostly commissioned by the depicted chemists themselves, or posthumously by their pupils and followers, they illustrate how chemists wanted to be seen at the time. In his pioneering work, Marco Beretta (2001) has pointed out the important role of portraiture – in paintings and engravings, on medals, and as statues – on shaping the historiography of chemistry. Starting with the famous painting *Portrait of Antoine-Laurent and Marie-Anne Lavoisier* (1788) commissioned by Madame Lavoisier and created by her art teacher Jacques-Louis David, portraits of Lavoisier at first served to promote his "chemical revolution." At the turn of the nineteenth century, portraits celebrated Lavoisier as a martyr of science, because of his arrest and execution by the Jacobins, which was actually for his privileged role as tax collector rather than as scientist. Later they contributed significantly to the creation of heroic legends about Lavoisier. As Beretta (2001: 57) put it: "In the iconographic representations, the tendency to idealize Lavoisier and his contribution and to see him as a legend grew throughout the whole nineteenth century, finally culminating in the monumental bronze statue in front of the Eglise de la Madeleine in 1900." Thus, contrary to the dominant public image of the "mad scientist" trope, not least in France, chemists tried to establish the legend of a heroic chemist.

Self-commissioned portraits of nineteenth-century chemists largely fall into four groups, depending on their depicted surroundings.[4] In the first group, chemists are shown sitting on a chair with some glassware or chemical apparatus in the background and books or notes in the foreground, echoing David's portrait of Lavoisier and indicating an emphasis on both experimentation and theorizing. In the second group, books or notes are the only props, pointing to their theoretical inclination. A third type of portrait shows the chemist at work in his laboratory, emphasizing the role of experimentation. In the fourth type of images, the chemist is depicted with, or proudly presents, his most important invention, reflecting their desire for technological improvement. For example, William Henry Perkin holds a skein dyed with the first synthetic aniline dye in his famous portrait of 1892. These four types of portraits illustrate both different personal orientations and different styles or scientific identities between the experimental, theoretical, and applied field.

The third type of portrait, the chemist at work in his laboratory, is particularly instructive about the dynamics of visual culture. The most common pose of that type is a chemist holding a flask at eye level and gazing at it, which would become the stereotypical image of a chemist in the twentieth century. This particular pose has a long iconographic history that shaped its cultural meaning (Schummer and Spector 2007). From the thirteenth to the sixteenth centuries, it was commonly found in portraits of doctors examining a urine flask. Originally it had signified uroscopy and had been an emblem of medicine. When uroscopy fell into disrepute, the pose became a symbol of quack medicine, then of fraudulent alchemy, and eventually of any kind of fraud. Artists widely used that pose in satire from the early sixteenth to the late nineteenth centuries, including satirical drawings of chemists. Chemists were most

likely ignorant of the cultural history of that pose when they embraced an established symbol of fraud as a professional icon at the end of the nineteenth century.

Like portraits, images of chemical factories were usually commissioned. However, there are examples of non-commissioned nineteenth-century paintings of industrial landscapes, mostly of the iron industry, that provide some insight into independent artistic renditions (Schummer and Spector 2007). While the environmental effects of industry in the form of noise, smoke, and odors had already been noticed and publicly debated, artists tended to depict industry in one of two ways. Either they emphasized the smoke and the fire by colorful and mysterious renderings, reminiscent of a spectacular sunset and in the style of sublime landscape painting. Or they set the factory into a benign picturesque landscape. In the last type of images, regardless of whether they were commissioned or not, the smoking chimney was a common symbol of economic growth and prosperity, because for most people heating their home with an open fire that inevitably produced smoke was a luxury.

That artistic tradition was taken to an extreme in one of the first chemical plant paintings, Robert Friedrich Stieler’s commissioned image of the BASF factory in Ludwigshafen, Germany from 1881.[5] The panoramic painting is filled with factory buildings and even suggests that they would continue in both directions off the frame, like a truncated view of a medium-sized city. It includes twenty-two smokestacks, most of them emitting black smoke, and about thirty sources of white smoke or steam, whereas the embedding landscape with a cloudy sky has receded into the background. Numerous workers and carriages on the streets, loading and unloading boats on the riverfront, and an incoming freight train emphasize vibrant economic activity. What might strike us today as a source of tremendous environmental pollution was in the late nineteenth century still an artistic symbol of enormous prosperity and growth.

Conclusion

The Literary Image of Chemistry

Before the rise of visual media such as movies and TV, literature clearly dominated the public image of science. Nineteenth-century visual representations of chemistry, which were mostly commissioned works and lacked any reference to the “mad scientist” trope, hardly reached out to a broader public. If they were meant to correct the literary image in the form of heroic portraiture, they had little to no effect. Indeed, chemists’ attempt to create a visual image of themselves was so disconnected from the general discourse that they (accidentally) embraced an age-old symbol of fraud as their professional icon.

During the nineteenth century, writers shaped a distinctive multifaceted literary image of chemists and chemistry that would have a long-lasting impact. They did so not only by “mad scientist” stories proper, but also by including characters in their narratives who are only said to be chemists and by letting other characters express their views about chemistry. By putting the “mad scientist” in this broader context of the overall image of chemistry in literature we can, in conclusion, try to understand why chemistry was considered so special among all the disciplines.

As the “mad scientist” stories suggest, chemistry is acknowledged as having great power and could bring about wondrous results that go beyond anything imagined before. For instance, the Count in Wilkie Collins’ *The Woman in White* (1860) argues, “Chemists – I assert it emphatically – might sway, if they pleased, the destinies of humanity. ... Mind, they say, rules the world. But what rules the mind? The body (follow me closely here) lies at the mercy of the most omnipotent of all potentates – the Chemist.”

Chemists are also described as particularly intelligent in their scientific reasoning, which is proved not only by their results but also in the way they argue, conclude, and explain. However, their passion for science is typically contrasted with a lack of interest in liter-

ature, the arts, and humanities, as well as with a certain clumsiness in human affairs and with social seclusion. That combination makes them suspect in many regards and subject to various associations that threaten prevailing metaphysical and religious views.

In a modest form, chemistry is associated with skepticism and nihilism. For instance, the German writer Karl Ferdinand Gutzkow had his character Oleander in *Die Ritter vom Geiste* (1850/1851, *Knights of the Mind*) argue against the school of critical philosophy: “... these philosophers of the absolute Nothing are the Liebig’s of the invisible world Such as the chemical retort invents element after element, each being decomposed over and again, such does the philosophical, heartless intellect of the school resolve Everything into the perfect Nothing by criticism ... even believing that the immortality of the soul would have been disproved.” It is therefore no coincidence that the arch-nihilist Bazarov in Ivan Turgenev’s *Fathers and Sons* (1862) is a passionate chemist who takes the received metaphysical ideas apart like the chemist doing an elemental analysis of a substance. His skepticism is paired with contempt for the traditional wisdom: “A decent chemist is twenty times more useful than any poet.”

Chemistry is also sometimes associated with the protagonists of the Enlightenment movement and the French Revolution. The association goes via the Order of Illuminati (Latin for “the enlightened”), a secret society founded by Adam Weishaupt at the University of Ingolstadt in Bavaria in the late 1770s, about which there were strong rumors in the nineteenth century that they had instigated the French Revolution. For instance, in Alexandre Dumas’ *Joseph Balsamo* (1844–1846) already mentioned, the “mad scientist” Althotas is said to be the head of the Illuminati, aiming at overthrowing the monarchs of Europe. And Mary Shelley placed Frankenstein at the University of Ingolstadt certainly for no other reason than to establish that link.

Chemists are frequently portrayed as being both materialists and atheists, *i.e.* they do not believe in the existence of a soul or God, which for many nineteenth-century authors were views closely connected to each other. Unlike other sciences, chemistry is described to convey such a worldview. For instance, after a brief dialogue between a chemist and a physicist in *La Peau de Chagrin* (1831, *The Magic Skin*), Balzac explains: “The universe for a mechanic is a machine that requires an operator; for chemistry – that fiendish employment of decomposing all things – the world is a gas endowed with the power of movement.” In Dostoyevsky’s *Brothers Karamazov* (1879) Mitya Karamazov learns about neurochemistry and then desperately confesses to his brother and priest: “I am sorry to lose God ... [and the belief that] I’ve got a soul, and that I am some sort of image and likeness. ... It’s chemistry, brother, chemistry! There’s no help for it, your reverence, you must make way for chemistry.”

Many Christian authors combined atheism or agnosticism with the hubris theme by having chemists daring to “play God,” which in the Christian mythology of the Fallen Angels was the original crime of Satan. Indeed, this appears to be an overarching theme of all “mad scientist” stories, reminiscent of a prominent accusation of alchemy in the Middle Ages: the chemist who aspires to create material improvements in his laboratory is “playing God.” For instance, in Balzac’s already mentioned *La Recherche de l’absolu* (1834), Claes argues with his wife:

“I shall make metals,” he cried; “I shall make diamonds, I shall be a co-worker with Nature!” “Will you be the happier?” she asked in despair. “Accursed science! Accursed demon! You forget, Claes, that you commit the sin of pride, the sin of which Satan was guilty; you assume the attributes of God.”

Beyond hubris comes Satanism and megalomania. In *La Peau de Chagrin*, Balzac let his chemist, Baron Japhet, straightforwardly confess: “I believe in the devil.” And Alexandre Dumas has his Dr. Sturler, believing that he has found a poison’s antidote, pronounce: “Am I not God like God – more God than God since I can retake and give back life, cause death to be born, and destroy death?” (*Le Comte Hermann*, 1849, Epilogue).

In general, the portrayal of chemists in nineteenth-century literature contrasts their scientific intelligence and power over nature with their naiveté and corresponding deficit in moral reasoning. The most common character trait, indeed part of the standard form of the "mad scientist," is the lack of circumspection and precaution, based on the misunderstanding that good intentions alone are important in moral matters. This literary image of chemists became firmly established during the first half of the nineteenth century, such that an author would only need to mention in passing that a character is a chemist, or has a chemical laboratory, to connect to the trope.

Why Chemistry?

Why did so many nineteenth-century authors, including the most famous and influential ones, develop such a negative image of chemistry among all the sciences? Today's readers might be inclined to see these negative portrayals as early warnings of environmental problems and disasters caused by the chemistry industry. However, the "mad scientist" was developed in the early nineteenth century, when the chemical industry hardly existed. When it actually existed and environmental issues were publicly debated later in the century, writers showed almost no interest in those topics, as we have seen above. Moreover, it is difficult to find a single historical example of a real scientist who would meet the criteria of the "mad scientist" as portrayed in the literature. Therefore, actual experience could not have served as a model. Nor can we celebrate Mary Shelley and other authors as ingenious prophets of a future industrial age that was totally beyond their imagination. Our answer to the question must therefore be more complex, and consider the general intellectual context of the time.

One reason for the emphasis on chemistry is the long-standing literary heritage of the "mad alchemist," a well-developed and handy character of satire that could easily be revived and adjusted to contemporary science. The fact that "mad scientists" are still today frequently surrounded by alchemical apparatus supports this thesis, but why was the "mad alchemist" revived at the turn to the nineteenth century and specifically directed at chemistry?

One answer might be found in the shifting ground of scientific disciplines during the nineteenth century, when the traditional religious-based educational system at universities was transformed into professional training in the different branches of science. In the new university system, both chemistry and physiology established laboratory experimentation as a new style of scientific research that no longer depended on received metaphysical or religious foundations. Because chemists and physicians performing chemical experiments are the main characters of nineteenth-century "mad scientist" stories, it is likely that many authors felt uneasy with this kind of science that tried to be "independent" of metaphysics. Thus, they recurrently described their fictional chemists as being materialist, nihilist, and atheist, although contemporary chemists provided little historical evidence for that.[6] Rather than the individual researcher, it was the experimental approach that exclusively focused on material events (thus, "materialism") and intentionally excluded metaphysical and religious ideas in explanations (thus, "nihilism," "atheism"), which made chemistry and physiology suspect. Moreover, because nineteenth-century authors used the same attributes (materialism, nihilism, and atheism) to discredit the Enlightenment, they could metaphorically relate that movement to chemistry, even though prominent chemists like Lavoisier actually represented the old political system.

Much of nineteenth-century literature was written for the moral education of adults, and many works express extremely conservative, if not fundamentalist, Christian ideas. The very notion that science could change nature in order to improve the material conditions of life, by inventing some new useful materials or by developing a medicine against an illness, raised the age-old accusation of "playing God," with runs through most of the "mad scientist" stories. Moreover, because for many Christians the Bible remained the only basis of morality,

a science or medicine that was not based on religion could easily result in evil or crime. That seems to be the main reason for all the variations of moral failure by “mad scientists.”

Furthermore, for much of the nineteenth century, poets, novelists, and playwrights represented the humanities or even wisdom, at least in public life, more than philosophers, historians, and philologists. The rise of the intellectual and economic status of the natural sciences, particularly chemistry with its rapid discovery of new elements and apparent powers of creation, undoubtedly caused a certain rivalry and envy, and posed a threat to the traditional status of the humanities as the arbiter of morality.

Finally, once the “mad scientist” was established, it took a literary life of its own. Compared to previous centuries, late-nineteenth-century writers were extremely productive in inventing new literary styles and genres. Establishing a new style or genre works best with classical or well-known themes that allow readers to more easily recognize the novel from the traditional. To that end, the “mad scientist” trope proved extremely successful in various literary genres, from romance to crime to science fiction.

Notes

- 1 Works that go beyond allegorical alchemy include Read (1947), Krätz (1990), Haynes (1994), Linden (1996), Meakin (1995), Schummer (2006), Schummer et al. (2007), Schummer (2008), Labinger (2011), and Ziolkowski (2015).
- 2 For the images discussed in this section, see Schummer and Spector (2007).
- 3 As Balzac explained in a letter: “Le héros de La Recherche de l’absolu représente tous les efforts de la chimie moderne” (the heroes of La Recherche de l’absolu represent all the efforts of modern chemistry) (Balzac in Ambrière 1999: 401).
- 4 For exemplary images and more details, see Schummer and Spector (2007).
- 5 Many later online reproductions of the paintings have cut off parts or rendered the image such that less smoke is visible.
- 6 For instance, in the first half of the nineteenth century most leading chemists believed in one or the other form of vital forces. Pasteur, one of the most prominent chemists of the second half, was deeply religious and devoted much time to disproving “spontaneous generation,” which in his view would have undermined the belief in a creator God.

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