The Fate of Invention in Late 19th Century French Literature

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ABSTRACT

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This dissertation reads the novels of Jules Verne, Albert Robida, Villiers de l'Isle-Adam and Emile Zola, investigating the representation of inventors who specialize in electricity. The figure appears as the intersection of divergent literary movements: Zola, the father of Naturalism and leading proponent of a 'scientific' approach to literature, Villiers de l'Isle-Adam, decadent playwright and novelist, Robida, leading caricaturist and amateur historian, and Verne, prominent figure in the emerging genre of anticipation, all develop the inventor character as one who succeeds in realizing key technological aspirations of the 19th century. The authors, however, take a dim view of his activity.

Studying the figure of the inventor allows us to gain insight into fundamental 19th century French anxieties over the nation's progress in science and technology, its national identity, and international standing. The corpus casts science as a pillar of French culture and a modern expression of human creativity, but suggests that social control over how progress is achieved is more important than pure advancement, no matter the price of attaining control. There is a great desire for progress in this period, but as society's dependence on scientific advancement is becoming apparent, so is its being ignorant of the means through which to achieve it. In fiction exploring this subject, the inventor appears as an intercessor, standing at the articulation of

cultural aspirations in science and cultural fear over their timely, socially-constructive realization.

Chapter 1 focuses on the works of Jules Verne, elaborating a portrait of the inventor as he appears in the series of the *Voyages Extraordinaires*. The character returns with remarkable preponderance in subsequent installments of the series, with Vingt mille lieues sous les mers (1870), L'Ile mystérieuse (1874-1875), Les Cinq cents millions de la Bégum (1879), Robur-le-conquérant (1886), Le Château des Carpathes (1892), Face au drapeau (1896) and Maitre du monde (1904) all showing him as best poised to advance French science. Emphasis is placed on his private, reclusive pursuit of the discipline, which is contrasted by the author through the development of characters representing official science, such as professors and engineers. This distinction is read in the context of Verne's educational mission, which supports the official scientists and emphasizes service to the community and the growth of their respective disciplines.

Chapter 2 analyzes Albert Robida's key satirical futuristic novel La Vie électrique (1892). Unlike Verne, Robida illustrates perversions of progress, offering a world in which the rhythm of life is sped up to an untenable pace by inventors. Set in the 20th century, in this version of France technology is fully integrated in everyday life, the inventor is a popular idol and successful businessman. Despite this great departure from the model proposed in Chapter 1, the figure of the inventor is defined through the same seclusion and dedication to research, disdain for education and oversight of his activities. The author thereby succeeds in simultaneously illustrating the realization of France's hopes and fears about its technological development at the turn of the century. Whereas Verne gives voice to the dominant ideological perspective on

science, Robida's position as satirist enables him to critique it while retaining a degree of hope, not only through aspects of the plot but also his copious illustrations.

Chapter 3 focuses on the figure of Thomas Edison as the protagonist of Villiers de l'Isle-Adam's L'Eve future. Borrowing the electrical inventor from anticipation, the novel finds its other main source in the topoi of the decadent movement. The inventor's real-life persona is offered as guarantee of the extraordinary achievement of his fictional counterpart, in contrast to Verne's conveying realism through scientific detail. The inventor cynically markets his work to a decadent audience, but Villiers also relies on the repertoire of this tradition to condemn him. The author merely plays at integrating Edison into the line one would imagine for him. Prometheus and Frankenstein are the mythological and literary standards against which the new figure is compared, but are quickly dismissed. Villiers then suggests Goethe's Faust as the most reliable model, only to reveal in a final, negative assessment of the Edison that he is, in fact, Mephistopheles. The novel thus constructs a modern legend of the inventor as a fusion of contemporary journalism and older literary archetypes.

Chapter 4 reads Zola's Travail (1901) as a utopian re-writing of Germinal (1885). It argues that Travail realizes Germinal's closing warning that 'new men' would eventually emerge, though it is not to avenge tragedy. These 'new men' are the same 19th century workers of Germinal, whose violence and lack of education Zola had described as infantilizing, but this time, they are the children of better fathers, who prepare them to adapt and evolve. The transformation of the working-class community depicted in the *Evangile* is possible through the work of a Vernian inventor, Jordan. Zola repeats many of the topoi of the character's representation in our other authors, which are again associated with singular success in the domain of electricity. Through Jordan, Zola moves away from his Naturalist of heredity, where

the efforts or ambitions of the individual were thwarted by the manifestation of an ancestral *tare*. Travail uses the inventor figure to propose a new model, one which allows for the transmission of acquired characteristics, and in which positive change is possible.

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INTRODUCTION

Speaking in a 1925 lecture series on "Science and the Modern World" at Harvard, Alfred North Whitehead remarked that "the greatest invention of the nineteenth century was the invention of the method of invention."[1] The mathematician cited as evidence the professionalization of the study of science in this period, as well as the emergence of a process by which scientific ideas are re-imagined and applied to yield useful technologies. Over the last decades of the 19th century, a diverse group of French authors, working in very different genres, produced works centered on the very process of invention. Emile Zola, the father of Naturalism and leading proponent of a 'scientific' approach to literature, Villiers de l'Isle-Adam, decadent playwright and novelist, Albert Robida, leading caricaturist and amateur historian, and Jules Verne, prominent figure in the emerging genre of anticipation, intersect in their development of an inventor character who succeeds in realizing key technological aspirations of the 19th century by mastering electricity.[2] Though similar characters can be found in earlier 19th century European fiction, what distinguishes the fin-de-siècle fictional inventor is that that despite his achievement, the authors who create him condemn his activity.

What drove such dissimilar authors to produce narratives of scientific success that paradoxically end in the inventor's punishment? This dissertation shows that at the end of the 19th century, a complex of fundamental French anxieties over the nation's progress in science and technology find literary expression through the figure of the inventor. Zola, Villiers de l'Isle-

[1] A. N. Whitehead, Science and the Modern World. (New York: The Free Press, 2011) 96.
[2] This observation is made, for example, by Timothy Unwin in Jules Verne: Journeys in Writing, Piero Gondolo della Riva in the introduction to Verne's Paris au XXe Siècle, Philippe Willems in "Robida's Stereoscopic Vision of the Future" and Jacques Noiray's work on Zola's *Evangiles*.

Adam, Robida and Verne all take essentially the same position despite their literary and personal differences. The structural similarity of their narratives provides clear evidence of the weight of these anxieties. Their novels suggest that social control over how progress is achieved is more important than pure advancement, no matter the price of attaining control. Though censured, the work of fictional scientists is never trivial or quixotic, reaching into key 19th century fields such as transportation, communications, medicine, and armament. There is a great desire for progress in this period, but as society's dependence on scientific advancement is becoming apparent, so is its being ignorant of the means through which to achieve it. In fiction exploring this subject, the inventor appears as an intercessor, standing at the articulation of cultural aspirations in science and cultural fear over their timely, socially-constructive realization.

The choice of electricity as the inventors' field of expertise exploits its dual nature in the century's imaginary: it is both spectacular and represents cutting-edge science. Electricity is both impressive to the general, unspecialized public and has genuine standing among the scientific community. It denotes the appearance of progress and has the capacity to achieve it. The best illustration of this duality is in the 1900 Paris World's Fair. The event was an opportunity for France and the other participants to recapitulate the century's technological achievement and look to the future. Its very popular *Palais de l'Electricité* put the electrical machines powering all exhibits both at work and on display. With half the space allotted to French devices, and the rest shared by its international competition including the United Kingdom, Germany and the United States, visitors were reassured of their nation's development. The success of a further attraction, the *Salle des Illusions*, also depended on the two aspects of electricity, but its presentation no longer assigned them equal value. The performance of this light and mirror show, the illusion, depended on obscuring from the visitors' view the complex electrical apparatus producing it.

Both the way in which electricity features in the discourse and practice of imperial rivalry and its being put on show for the general populace, are key to the plots developed by Verne, Zola, Villiers and Robida.

The 19th century World's Fairs contributed to the representation of science as a crucial pillar of the rationalist Western nation. Control over the advancement of science is consequently of great importance. Francis Bacon's New Atlantis (1627) proposes an early example of such a utopian society, the House of Salomon, in which the study of science is strongly supported by the government and where, in turn, science gives the government enduring imperial power.[3] In the 19th century, as Michael Adas demonstrates in Machines as the Measure of Men, technology becomes the fundamental Western distinction in the colonial encounter, second only in importance to Christianity. He argues that technology drove both "Europeans' overseas expansion and their compulsion to measure and catalogue the worlds they were 'discovering.'"[4] His readings of European explorers' and missionaries' accounts suggests that the categorization of indigenous peoples as 'ignorant savages' was based on their reaction to both unknown weapons and scientific instruments. The comparison of devices such as ships and tools, as well as engineering and agricultural techniques of the societies encountered by Europeans weighed heavily in their assessment of relative human worth.

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[3] Christopher Kendrick argues that "the society of Bensalem is "protoscientific and imperial in design," and in this work, unlike in Bacon's earlier production, greater emphasis is placed on the social function of science, rather than its practice.
Markku Peltonen suggests that "The New Atlantis" is a privileged place in Bacon's work where his reflection on politics and the 'great state' and science intersect.
Peter Pesic's "Wrestling with Proteus Francis Bacon and the "Torture" of Nature" suggests that scientific work aimed at explaining the 'secrets' of nature is depicted by the author as heroic labor.

[4] Michael Adas, Machines as the Measure of Men: Science, Technology, and Ideologies of Western Dominance (Ithaca : Cornell University Press, 1989) 2.

The French viewed the importance of science to improving the nation's international standing as all the greater after the defeat in the Franco-Prussian war. Germany was thought to have won because of its superiority in this domain. Ernest Renan may be the most quoted source to have observed the necessity of increased education in the sciences in France, but he was not the only one. The 1876 preface of the 'petit Lavisse,' the history textbook used in the public schools of the Third Republic, reminded its readers of the famous line that "l'instituteur allemand a vaincu à Sadowa et à Sedan."[5] That this was the reason for their success in the Austro-Prussian and Franco-Prussian wars, was an opinion shared by the German side. Werner von Siemens remarked in 1891 that "No nation in the world has done so much for scientific and technical education as Germany, and especially Prussia… Its educational institutions produce a large number of highly trained scientists whose profession, in almost all cases, is teaching."[6] A relevant criticism of French education in the sciences was that "emphasis tended to be on the abstract, intellectualist character of higher education and on the neglect of applied research."[7] Fox, Zwerlig and Tampakis suggest this is an inadequate explanation for how far France lagged behind Germany and the US in terms of its progress in the science-based industries at the end of the 19th century, but it is indicative of the deep anxiety of public opinion on this issue.[8]

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[5] French historian and Sorbonne professor Ernest Lavisse is the author of the textbook, Histoire de France : cours élémentaire.
Philippe Alexandre, "Le patriotisme à l'école en France et en Allemagne, 1871-1914. Essai d'étude comparatiste". *Themenportal Europäische Geschichte*, 2007. 10/04/2014. http://www.europa.clio-online.de/2007/Article=265 87.

[6] David Cahan, "The institutional revolution in German physics, 1865-1914"*Historical Studies in the Physical Sciences* 15.2 (1985) 1.

[7] Robert Fox, "France in perspective: education, innovation, and performance in the French electrical industry, 1880-1914". Education, Technology and Industrial Performance in Europe, 1850-1939 (Cambridge: Cambridge University Press, 1993) 201.

[8] They show that the role of the Ecole Normale Supérieure in training both scientists and science pedagogues has been understated, pointing out also that secondary education in the sciences was of high caliber. Fox and Weisz stress also the importance of emerging *facultés des sciences* outside Paris, which in the 19th century include Lyon, Grenoble, Marseille, Bordeaux, and Toulouse.

In this period, France appeared possessed of an unbridled enthusiasm for science, with notable examples being the lionization of Pasteur for his work toward the germ theory of disease, or the election of Claude Bernard to the Académie Française in 1868. These scientists were not only accomplished in their respective fields, they also led national research and teaching institutions. By the 1890s Pasteur was at the head of the eponymous Institut, and was working toward raising the profile of the Ecole Normale Supérieure. His recruitment efforts rendered it more highly productive in scientists than the Ecole Polytechnique.[9] Meanwhile, Bernard was a leading physiologist at the Collège de France, but his renown was also due to his ability to inspire non-specialists. In 1865, the *Revue des Deux Mondes* commissioned him to write "Étude sur la physiologie du Coeur," and a few years later the same magazine published his account of "Des fonctions du cerveau," both prepared for a general audience. In the literary world, his admirers included Emile Zola, who took Bernard's Introduction à l'étude de la médecine expérimentale (1865) as a central reference for his own Roman expérimental (1880). The 19th century inventor novels grow from this public fascination with scientific work, its discoveries, and ability to explain the natural world. While Zola and Verne embraced their contemporaries' interest, Robida and Villiers de l'Isle-Adam ridiculed it. In their condemnation of inventors, however, the works attest to how deeply conflicted about science and scientists the period remains.

The intersection of science and literature has a rich 19th century history, which helps shed light on the production of the authors I bring together. The works of Verne, Zola, Robida and Villiers de l'Isle-Adam intersect in their engagement with contemporary science and

[9] Kostas Tampakis,"The Unrecognized Mechanism: History of Science Education in the 19th Century," *Almagest* 2.2 (2011) 86.

representation of the electrical inventor as both an innovator and a contemptible figure. As noted above, this coherence is particularly striking in light of their otherwise profound literary differences. The literary and mythological precursors of the fin-de-siècle electrical inventor novels define the main axes of inquiry along which I study their protagonists. In an effort to understand how the value of scientific work is constructed in literature, I identify the scientific goals of the fictional inventors and those of the scientific community with which they come into contact in the works studied, and compare their methods and motivation.

The first precursor of the inventor figure is Prometheus. In Hesiod's Theogony and Works and Days, Prometheus was a creator, fashioning men out of clay, and repeatedly defying the gods to benefit his creation. He first tricked Zeus into accepting the lesser parts of sacrificed animals humans offered him, and when the god prohibited fire to man, Prometheus stole the divine spark from Mount Olympus. The punishment for this audacious act was severe and eternal: the Titan was chained to a rock, having his liver devoured by an eagle day after day. The 19th century inventor novels allude to Prometheus to characterize the resourcefulness of their character. For example, Zola's inventor is cast as an intercessor between the sun, ultimate source of fire and energy, and humanity. In a more literal manner, Villiers' protagonist in L'Eve future applies his skills to the development of an android. The audaciousness of Prometheus, coupled with his extraordinary punishment are recurrent motifs in the work of the French authors, though the logic connecting them is very different than in the ancient sources. Prometheus' daring theft of fire from Zeus was undertaken in an effort to improve the life of his creation. Unlike this advocate of humanity who defied the gods, in the 19th century, the inventor is a gentleman

scientist.[10] He works in private, and has limited interactions with his contemporaries. He is depicted as a specialist in the cutting-edge science of the period, electricity, but his success, intra-diegetically unmatched, earns him and his devices condemnation, and often destruction. The spectacular scenes of Promethean punishment of inventors often close the novels, prompting us to seek the offence.

Elise Radix's study of the popularity of Prometheus as a mythological allusion in 19th century French literature points to the divorce of audacious offence and punishment in his representation.[11] The two main aspects of the myth dominate different halves of the century, with the offence marking the first, and the second focusing on punishment. Prometheus is first a symbol of French civilization, representing a heroic triumph of culture over nature, and standing for unstoppable progress. In the latter part of the century, however, the depiction of the mythological hero decays into pessimism, with references being primarily made to his punishment. Radix reads this figure in the context of the fin-de-siècle imaginary as evidenced in decadent and naturalist works. Though she does not identify the inventor as a particular Promethean figure, the critic does turn her attention to texts in which authors reflect on the status of science. Her examples include Zola's Assommoir (1877) and Le Docteur Pascal (1893), as well as Verne's Vingt mille lieues sous les mers (1870) and some of his late novels. It is the pursuit of science itself which is Promethean both through its daring nature, and because it is an area in which civilization continues to advance, thereby resembling the use to which the figure

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[10] William Whewell writes that the ideal of a gentleman scientist was to be "a man liberally educated, whose avocation was science as an intellectual *cum* philanthropic recreation, to which he might indeed devote most of his time without ever surrendering his claim to be a private gentleman of wide culture. In particular, to be thought to be pursuing science for money was distasteful" (cited in Haynes, p. 7).

[11] Elise Radix, L'homme-Prométhée vainqueur au XIXe Siècle and Le Déclin du Prométhéisme dans la littérature fin-de-siècle (Paris : L'Harmattan, 2006).

was put in the beginning of the century. These works, however, speak to the failure of positivism, not in the scientific domain, but to offer insight into human nature or morality.

In the case of inventors, a first such shift, a step toward the divorce of Promethean offence from Promethean punishment evident in the late 19th century texts occurs in Mary Shelley's Frankenstein (1818). From its title, the novel equates the Titan's theft of fire with the ability to control electricity, an accomplishment that renders the protagonist, Victor Frankenstein, 'the new Prometheus.' The epithet reflects both the audaciousness and magnitude of his act. Though his putting together a creature from the parts of various cadavers and animating it is the best-remembered exploit of this character, Shelley inscribes defiance at the root of his development. Frankenstein's education goes against the grain of scientific authority at the time.

In pursuing his specialization, the young doctor challenges the wisdom of his "enlightened and scientific age."[12] Upon his first arrival at university, his mentor dissuades him from continuing to study the works of medieval alchemists Albertus Magnus and Paracelsus, whom the student had discovered in his youth, in favor of natural philosophy. The change represents a movement from a science that is no longer perceived as being one to modern science. Lawrence Principe suggests that this view of the early modern alchemy became popular in the 18th century, when the supporters of chemistry were promoted it as a rigorous, respectable discipline.[13] Chemistry broke with the goals of alchemy, which included identifying the philosopher's stone, the substance through which metals could be transmuted into gold, and preparing an elixir of life, which would offer youth or immortality. The denunciation of alchemy

[12] Mary Shelley, Frankenstein (Philadelphia: Chelsea House, 2004) 37.
[13] Lawrence Principe, "Alchemy Restored," *Isis* 102.2 (2011): 305-312.

was led by representatives of scientific societies, such as Bernard de Fontenelle and Étienne-François Geoffroy of the Académie Royale des Sciences, who also cast its practitioners as engaging in socially unacceptable and disruptive behavior.[14]

In Frankenstein, the proposed transition away from alchemy is interpreted in much more Romantic terms by the protagonist, who perceives little difference between the two disciplines other than their relative popularity in the eyes of the academic establishment. His disenchantment is with the goals, rather than the methods of modern science, the characteristics that his professors believe define natural philosophy as scholarship: "I was required to exchange chimeras of boundless grandeur for realities of little worth."[15] In the character's imagination, his work represents a return to "the dreams of forgotten alchemists."[16] From this point of view, the opposition of alchemy and natural philosophy appears not to be that between a debunked science and a veritable one, but between a high-aiming, creative pursuit, and a utilitarian one. Frankenstein's work, which overtly undoes the natural order of things in practice, is also aberrant in its theory. He applies the methods of modern science to the pursuits he associates with alchemy: he uses electricity to give life back to the dead and combine different species. In this experiment, electricity becomes a modern equivalent of the alchemists' elixir of life. This substance was the ultimate goal of alchemical research, and was thought to bestow eternal life, or youth, upon those who consumed it.

Frankenstein's Promethean offence is, then, not the use of science per se, but its application toward goals that are not those embraced by its official practitioners. Working in

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[14] Ibid. 306.
[15] Mary Shelley, Frankenstein (Philadelphia: Chelsea House, 2004) 37.
[16] Ibid. 38.

defiance of the wisdom of the scientific establishment that oversees the discipline is a characteristic that also describes the French inventors studied here, though the scope of their activity is less grand. Though sometimes their projects are large-scale, as is the case for Zola's Jordan, whose work will improve the living and working conditions of an entire social class, the inventors' achievements are realizations desirable to their fictional environment. For Frankenstein, punishment represents the condemnation of defiance to natural, moral and scientific order. It is of Promethean proportion through its amplitude: the creation is destroyed in a fire, and Frankenstein dies on the ice of the North Pole.

As Richard Sha explains, the science of Frankenstein primarily draws on the Galvani - Volta controversy over the existence of 'animal electricity,' a dispute dating from the beginning of the 19th century.[17] Luigi Galvani was the proponent of the theory, maintaining that animate bodies contained an innate amount of electricity. The conclusion was based on experiments involving a closed electrical circuit running through the muscles of a dead frog, which made them contract.[18] Alessandro Volta disagreed, arguing that the flow of electricity was instead due to the connection of metal rods used in the circuit, a hypothesis based on his work with the voltaic cell. This apparatus, announced in 1800, would eventually prove Volta's interpretation was correct, but Galvani won over the popular imagination through spectacular demonstrations. His supporters traveled through Europe, showing different instances of animal electricity, using, at Galvani's advice, recently deceased specimens, so as to avoid any possible interference from

[17] Richard Sha, "Volta's Battery, Animal Electricity, and Frankenstein." *European Romantic Review* 23.1 (2012).
[18] Marcello Pera, The Ambiguous Frog: the Galvani-Volta Controversy on animal electricity. (Princeton: Princeton University Press), 2014.

the soul / spirit or will.[19] Iwan Rhys Morus discusses a particularly 'flamboyant experiment' performed by Giovanni Aldini in 1802 at the Royal Society in London, which is relevant to Shelley's novel.[20] Aldini ran a current through the body of an executed criminal, an event which received wide press coverage.

The Galvani-Volta debate inspires Shelley through the fundamental questions it poses regarding the electric nature of life, as much as through its images. One newspaper recounted that the human experiment made it that "the jaw of the deceased criminal began to quiver … one eye was actually opened. In the subsequent part of the process, the right hand was raised and clenched, and the legs and thighs were set in motion" (Anon., p. 364). This scene anticipates the monster's animation, with its inability to understand humanity translating into literary terms the semblance of life science was able to bestow on the corpse. There are two significant differences, however: Aldini's exhibition was well-attended and it was recognized as valuable scientific work. Her scientist would be much less respected, suggests Sha, in an effort to "warn readers not to be swept away by a vitalist logic of occult forces that enabled the collapse of man-made electricity with life".[21] Indeed, for the 1831 edition of the novel, she minimized the chemical and electrical references in the presentation of Frankenstein's work.[22] Though Shelley took a position against certain scientific aspects, she did not seek to accurately represent scientific theory or its

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[19] Marco Piccolino, "Animal Electricity and the birth of electrophysiology: the legacy of Luigi Galvani," *Brain Research Bulletin* 46.5 (1998).
[20] Iwan Rhys Morus, "Galvanic cultures: electricity and life in the early nineteenth century," *Endeavour* 22.1 (1998) 8.
[21] Richard Sha, "Volta's Battery, Animal Electricity, and Frankenstein," *European Romantic Review* 23.1 (2012) 21.
[22] In " 'More Subtle than the Electric Aura': Georgian Medical Electricity, the Spirit of Animation and the Development of Erasmus Darwin's Psychophysiology", Paul Elliott discusses Shelley's use of electricity in Frankenstein in connection to the beliefs of important electricians of the period, including Erasmus Darwin and Joseph Priestley, on the possible electrical nature of the soul. "Shelley's creation became the ultimate symbol of perverted science, yet her monster is a much more ambiguous creation, especially in the first edition, reflecting contemporary perceptions of the potential of galvanic medicine, and it is significant that Darwin's reflections on the spirit of animation and re-animation were cited by the Shelley as a principal source" (p. 217).

application, or indeed to speculate on the future of the discipline. These goals, however, will become those of the late 19th century inventor novels, despite their adoption of characters that resemble Frankenstein: in Verne, the accurate representation of science is paramount to his educational mission, in Zola, the social responsibility of science is foregrounded, while Robida and Villiers focus on the economic and political impact of unsupervised science.

Iwan Rhys Morus' Frankenstein's Children shows that despite their absence from Shelley's book, these questions are already present in the beginning of the century. The study discusses electricity as an emerging domain of scientific specialization and its cultural impact in Shelley's England (1800-1850), with particular attention to encounters between experimenters and their lay audience. Much like the novelist's protagonist, and the fictional scientists of early 19th century France discussed below, real British electrical scientists were actively engaged in efforts to legitimate their practices as scientific. Morus relies on Bruno Latour's Science in Action to analyze how different historical or social factors contributed to the status of individual scientists and technologies.[23] He focuses on the actors in the production of 19th century knowledge, the people and places integral to the development of electrical science. Key examples are Michael Faraday and William Sturgeon, and their strategies of representation and popularization of their work. These two figures embody to the author the elite and popular sides of experimentation, but resemble each other in being self-fashioned characters appropriate to the respective spheres in which they moved.

[23] Bruno Latour, Science in Action: How to Follow Scientists and Engineers through Society (Milton Keynes: Open University Press, 1987).

According to Morus, Faraday played the 'humble and disinterested investigator of the natural world,' leaving his contemporary biographers to collect glimpses of the 'real' person.[24] This façade was essential to his success with the patrons of science at the Royal Institution, which he eventually came to lead. Living up the 'disinterested investigator,' Faraday began a series of Friday Evening Discourses, public lectures in which new research was presented in an effort to garner support for its continuation, and advertise the Institution. Though beneficial on both accounts, this image of science obscured the work undertaken in "laboratories and workshops where technicians laboring with forges, furnaces, and foul-smelling galvanic batteries [which] supported the dazzling natural philosopher in the lecture theatre above them."[25] Exhibiting that type of scientific labor was the work of William Sturgeon, instrument-maker and demonstrator, who worked to promote the technician as a man of science. He presented his work together with many other artisans in the *National Gallery of Practical Science*, whose aim was that of "Blending Instruction with Amusement."[26] This Gallery was addressed to a popular audience, being located in an arcade, next to fashionable shops. Visitors could listen to lectures that explained scientific phenomena through machines such as the microscope, Babbage's analytical engine, magnets, batteries, but also watch scientists at work. Sturgeon, for example, carried out work on electromagnets at the Gallery, and cited the transparency of his process as an argument in his favor in a later scientific dispute.

The distinction between the private and public places of science, as well as the type of work performed in them is fundamental to the elaboration of the inventor figure in 19th century

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[24] Iwan Rhys Morus, Frankenstein's Children : Electricity, Exhibition, and Experiment in Early Nineteenth-Century London (Princeton: Princeton University Press, 1998) 42.
[25] Ibid. 42.
[26] Ibid. 75.

literature. The artisanal laboratory, and the difficulty of presenting their work to the public mark the representation of inventors in French literature of the period. A notable example of the scientist as an extraordinary, single-mindedly dedicated but contemptible person is in Balzac's La Recherche de l'absolu (1834). The protagonist, Balthazar Claës is a wealthy amateur chemist who embarks on the titular quest after hearing from an itinerant scholar of a process that would allow him to reproduce any substance.[27] John Tresch sees in Balthazar the best example of the "drama and high stakes" of romantic science, an early 19th century theory of knowledge that combines science and human consciousness in establishing truth.[28] To him, the 'absolute' is a modern equivalent of the alchemists' *prima materia*, the key to life and thought. Balthazar's quest is conceived with reference to this pursuit, but like in Frankenstein, in an effort to stress its modern, scientific nature.

His immediate goal is to produce diamonds, instead of gold, "les anciens alchimistes, qui croyaient l'or décomposable, conséquemment faisable, reculaient à l'idée de produire le diamant; nous avons cependant découvert la nature et la loi de sa composition."[29] The task is thus meant to demonstrate the advancement of science, and Balthazar sees in his work the carrying out of the mission of the natural philosopher: explaining the natural world. As he puts it, "je fais les métaux, je fais les diamants, je répète la nature."[30] Since his fictional universe is not interested or educated in the sciences, the formulation meets condemnation as an attempt to

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[27] Georges Thouvenin provides a detailed account of the real-life incident that inspired Balzac, indicating that he draws from it the character of the wandering scientist as well as the name of the quest, *l'absolu*. His reading, however, minimizes the importance of science to the novel, stressing instead "la grande influence qu'un homme d'une vaste intelligence étant arrivé à exercer sur un individu, sans nul autre sortilège que l'ascendant de sa parole et l'expose de ses théories" (p. 868).
[28] John Tresch, The Romantic Machine: Utopian Science and Technology After Napoleon (Chicago: University of Chicago Press, 2012) xii.
[29] Honoré de Balzac, La Recherche de l'Absolu (Paris : Librairie Nouvelle, 1860) 97.
[30] Ibid. 105.

imitate God's creation: "tu oublies, Claës, que tu commets le péché d'orgueil dont fut coupable Satan. Tu entreprends sur Dieu. … Dieu dispose d'une puissance que tu n'auras jamais."[31] The scientific materialism of the quest is found reprehensible, since it suggests that everything in nature, including by extension human life, could be reproduced without God.

Balzac's insistence on the protagonist's training confirms that he is meant to stand out from against this background as fully a scientist, rather than a heretic.[32] We learn early on that "Il fréquenta donc beaucoup les savants et particulièrement Lavoisier, qui se recommandait alors plus à l'attention publique par l'immense fortune d'un fermier général, que par ses découvertes en chimie; tandis que, plus tard, le grand chimiste devait faire oublier le petit fermier général."[33] His wife, whom Balzac characterizes as dutiful to him, and a devoted Christian, being the one who utters the rebuke cited above, makes a great sacrifice in order to reach her husband. She educates herself in his domain, informing him : "J'ai lu Fourcroy, Lavoisier, Chaptal, Nollet, Rouelle, Berthollet, Gay-Lussac, Spallanzani, Leuwenhoek, Galvani, Volta, enfin tous les livres relatifs à la science que tu adores. Va, tu peux me dire tes secrets."[34] Though the reader, like Balthazar, is motivated by the promise of an ultimate scientific discovery, his family wants the quest to end because he has invested all their resources in it. The diamonds he hopes to synthesize, the long-awaited fruit of his labor, would merely replace the unique diamond jewelry his wife brought as dowry. Over the course of the novel, they are traded for diverse laboratory supplies which, when combined, yield only smoke.

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[31] Ibid. 105.
[32] At the time he was writing this novel, Balzac was astronomer François Arago's friend, and frequented the Paris Observatory, while Félix Savary, the physicist and astronomer consulted on his drafts (Tresch, p. xiii).
[33] Honoré de Balzac, La Recherche de l'Absolu (Paris : Librairie Nouvelle, 1860) 29.
[34] Ibid. 72.

Balthazar's exclusive focus on his work resembles the obsession of many other Balzacian characters, but through its scientific inflection is a precursor to that of the late 19th century inventors.[35] Like other figures of the *Comédie humaine*, the protagonist is monomaniacal, as the narrator informs us: "il avait déjà cinquante-neuf ans. A cet âge, l'idée qui le dominait contracta l'âpre fixité par laquelle commencent les monomanies."[36] This particular mental illness was very popular at the time, as Marina van Zuylen shows in discussing the literary enthusiasm for the new medical term, noting that one of its cultural effects was to turn what had previously been mere eccentricities into pathologies.[37] It was defined in the early 19th century through the work of psychiatrists Philippe Pinel, his pupil Jean-Etienne Dominique Esquirol, and Etienne-Jean Georget as an *idée fixe* preventing the subject from exercising free will.[38] Once Balzac has identified his character through this term, the reader holds little hope he might abandon his quest. Balthazar's case stands out in that it is a 'private passion,' whereas others in the *Comédie humaine* are "moved by greed, gold, or girls."[39]

The private character of scientific work is a defining characteristic of the inventor novels, where it is found unproductive and contemptible, a perversion of the discipline. In the case of Balthazar, it is interpreted as madness in the fictional universe. The novel is set in the 18th century, and in a very conservative environment. His laboratory is in the most remote attic of the

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[35] Tresch explains that Balzac's protagonist shares some of his defining traits with Arago, and his obsessiveness and absentmindedness are drawn from André Marie Ampère (p. xiii).
[36] Honoré de Balzac, La Recherche de l'Absolu (Paris : Librairie Nouvelle, 1860) 187.
[37] Marina Van Zuylen, Monomania: The Flight from Everyday Life in Literature and Art (Ithaca: Cornell University Press, 2005).
[38] Though the psychiatrists developed the concept based on their work in asylums and from studies of criminals, Henri Ellenberger underlines the close relationship of their endeavor to that of the writer: "many of Pinel's case histories seem to be borrowed from Balzac's novels" (p. 283).
[39] Marina Van Zuylen, Monomania: The Flight from Everyday Life in Literature and Art (Ithaca: Cornell University Press, 2005) 20.

family mansion, and, to an outside observer appears as "des machines bizarres."[40] Upon visiting it, his daughter is moved to exclaim in terror, "Mon père est fou!"[41] It is not merely the unintelligible accumulation of equipment that provokes this reaction, "la singularité des objets qui l'entouraient, l'obscurité dans laquelle se trouvaient les parties de ce vaste grenier" but the fact that he is found "presque agenouillé" before it.[42]

The strange worship of this mechanical idol is the public interpretation of the private obsession with science. Its particularity is all the clearer when read against the much more public craze, to which Balthazar is oblivious: tulipmania. The height of the tulip-bulb fad is in 1637, but its story was of great interest to the 19th century.[43] What has long been considered the definitive account of the pricing speculation, Charles Mackay's *Extraordinary Popular Delusions and the Madness of Crowds* was published in 1841, and as Earl Thompson shows, smaller-scale repetitions of the event arrive periodically through the 18th and 19th centuries. Balzac's novel is set in 18th century Flanders, and centers on a Dutch family, so it is not surprising that Balthazar would inherit a large collection of tulips from his father. He also possesses a singular exemplar, a seven-colored *tulipe gueule-de-dragon*, the petals of which appear golden around the edges. The reader becomes aware of both the value and the beauty of the tulips early on, with reminders being offered with some regularity through the conversation of secondary characters. The tulips

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[40] Honoré de Balzac, La Recherche de l'Absolu (Paris : Librairie Nouvelle, 1860) 201.
[41] Ibid 202.
[42] The lengthy description of the laboratory does not aim to explain the machinery, only to show how well-appointed Balthazar kept it. For example, he uses both solar and electric power: "Le récipient de cette machine était coiffé d'une lentille formée par de doubles verres convexes dont l'intérieur était plein d'alcool et qui réunissait les rayons du soleil, entrant alors par l'un des compartiments de la rose du grenier. Le récipient, dont le plateau était isolé, communiquait avec des fils d'une immense pile de Volta" (p. 201).
Citations from Honoré de Balzac, La Recherche de l'Absolu (Paris : Librairie Nouvelle, 1860) 202.
[43] Anne Goldgar's recent study Tulipmania: Money, Honor, and Knowledge in the Dutch Golden Age shows that the popular account of the event is not historically accurate, and exaggerates the spread of speculation, as well as the gains and losses. Among the works she cites as inspired by the tulip craze is also Alexandre Dumas's La Tulipe Noire (1850).

remain pure decorative items for the protagonist, until he is made aware of their value, and he sells them in order to fund his quest. The protagonist's ability to resist this interest of his contemporaries reveals the full extent of Balthazar's isolation in his passion, and his disengagement from the society in which he lives.

Balthazar's use of electricity is minimal, but he is a precursor of the inventor appearing in the fiction of the fin-de-siècle in terms of his isolation, focus on science, and difficult relationship with society. Balzac maintains his domain of specialization as a scientific one, as is the frame through which to read him. Balthazar suffers from monomania, he is no lunatic or heretic. His achievement is scientific, though not the one desired by him or his family: diamonds (the possession of his wife) are processed into smoke (the product of experimentation). Similarly, the narrator's summary of the two poles of Lavoisier's renown, his work as a chemist, and the wealth acquired as a *fermier general*, which is offered as a goal for Balthazar, are reversed in his story: nothing is known of his work other than how much it cost.

Writing on the inspiration Balzac takes from Pinel and the alienist doctors, Lawrence Rothfield stresses how attuned the author is to the ambiguities inherent in psychiatric categories.[44] Balthazar is no mere monomaniac; there is no particular object that incites his pathology: it is instead directed toward an ideal. Rothfield concludes that the behavior renders him a genius: "In an ideal word, these monomaniacal geniuses would thrive, but in the degraded environment of French society they can only sicken and die."[45] Balzac does not offer a definitive answer on the value of the protagonist's work, maintaining the suspense through the novel's

[44] Lawrence Rothfield, Vital Signs: Medical Realism in Nineteenth-Century Fiction (Princeton University Press, 1994).
[45] Ibid. 62.

conclusion. This is a novel about scientific obsession, rather than a novel about science. Raising the question of whether the protagonist is a genius takes precedence over the answer. Balthazar dies shouting 'Eureka' though unable to communicate the secret he believes he has discovered. The inventor as a genius suffering from lack of recognition reappears in the late 19th century inventor novels, in the context of the authors' reflection on the purpose and value of scientific work. In Balzac, it resurfaces as a consideration in Illusions perdues (1837), which focuses more closely on the social reception of invention and the divide between the inventor and his public.

Whereas Frankenstein and La Recherche de l'absolu offer extraordinary tales of scientists engaged in spectacular, extreme research, Illusions perdues presents a strong counter-point in David Séchard, a socially-minded inventor. His quest is to manufacture paper through vegetable sources, thereby achieving a much faster, much cheaper product than his competition. As the owner of a printing shop, David hopes to use this discovery for profit, but when discussing its impact in the fictional universe, he often mentions increased library holdings, and more affordable access to knowledge for the general public. Illusions perdues represents a precursor of the late 19th century novels because Balzac recommends David's story as representative of the fate of inventors. Though the typical narrative to which the author alludes is tragic, as Antoine Adam observes, this inventor succeeds in avoiding it.[46] Balzac's rescue of the inventor is achieved by steering him away from invention to entomology, becoming a gentleman scientist. He is thus able to avoid the obsession that had marked Balthazar and the late 19th century inventors.

[46] Antoine Adam, "Introduction" Illusions perdues (Paris : Garnier-Freres, 1961).

This orientation appears in Illusions perdues as David's reward after enduring the many trials and tribulations of Book III, *Les Souffrances de l'inventeur*. Balzac's final word on David leaves him "[a]près avoir dit adieu sans retour à la gloire, il ne saurait avoir d'ambition, il s'est rangé dans la classe des rêveurs et des collectionneurs : il s'adonne à l'entomologie, et recherche les transformations jusqu'à présent si secrètes des insectes que la science ne connaît que dans leur dernier état."[47] Entomology is a growing discipline in the first half of the 19th century, so David is turning his attention to work that continues to be relevant to his contemporaries.[48] Such a disinterested analysis of nature is most unlike the work of the fin-de-siècle inventors. Their work is in applied science, and they direct their efforts toward developing new technologies. The inventors do not disseminate their discoveries in any of the socially-sanctioned ways: they do not teach, publish, or sell their work. In this, they become the opposite of the official counterparts they are assigned, who are research scientists, professors of science, and engineers associated with reputable fictional, or real, institutions such as the Muséum d'Histoire Naturelle or the Académie Française.

The typical inventor's character, which is implicit in Balzac, is suggested already in the first book of Illusions perdues. David's wife Eve observes: "J'avais deviné … que vous étiez un de ces inventeurs auxquels il faut, comme à mon pauvre père, une femme qui prenne soin d'eux."[49] The use of the demonstrative in 'un de ces' denotes her familiarity, and that of the reader, with a certain type of the inventor. Thus far his only quality is absent-mindedness, perhaps because he is overly-focused on his work. David's trajectory will take him away from

[47] Honoré de Balzac, Illusions perdues (Paris : Houssiaux,1874) 570
[48] Annick Opinel, "The Emergence of French Medical Entomology: The Influence of Universities, the Institut Pasteur and Military Physicians (1890–c. 1938)." *Medical History* 52.03 (2008).
[49] Honoré de Balzac, Illusions perdues (Paris : Houssiaux, 1874) 88.

his wife, which, unlike in the case of the Claës family, will not be ruinous. She is intrepid and is more business-oriented than David, who is marked by "la naïveté du savant."[50] Eve's presence acts to ground the inventor, as an intermediary between him and society. The bulk of David's work takes place while she is pregnant, but Balzac bridges the distance between them by juxtaposing episodes of their stories. To the reader, this renders the pregnancy a flattering metaphor for the inventor's undertaking.

A further characteristic of the inventor, as Balzac imagines him, is that he has insufficient funds to finish his work. David is particularly plagued in financial matters, with his father and his best friend continually taking advantage of him. He is forced to reach out to his competition in the printing business, a situation in which Balzac stages an unspoken exchange between the two representatives: "Cet homme devait être un inventeur; on ne pouvait pas avoir son encolure et rester oisif! – Exploitons-le?"[51] We can note that the inventor's public immediately recognizes him as such, and that their first reaction is to take advantage of him. Another of Balzac's maxims suggests that it is the fate of inventors to lack of recognition from the public. He writes, "Hélas ! comme on va le voir, les inventeurs ont bien encore d'autres maux à supporter, sans compter l'ingratitude des masses à qui les oisifs et les incapables disent d'un homme de génie : Il était né pour devenir inventeur, il ne pouvait pas faire autre chose."[52]

In Illusions perdues, the inventor is thus condemned, but not for a perverse application of science. His suffering and his quest lack Promethean dimensions, being derived instead from mundane, worldly sources: family relations, business competition, money lending and credit, and

[50] Ibid. 446.
[51] Ibid. 415.
[52] Ibid. 402.

patent laws. Meant to encourage progress in the sciences, 19th century patents are too expensive for many who seek them. In addition, in order to receive protection, inventors must disclose the novel machine or process they have imagined. For this reason, Balzac calls the certificates "la plaie des inventeurs," suggesting that the disclosure only enables others to take subsequent advantage of the discovery, leaving the inventor with little to gain from having his rights recognized.[53]

David's exemplarity as an inventor is of secondary interest in the novel. Balzac places greater emphasis on the story of Lucien de Rubempré, an ambitious writer. He is David's friend and brother-in-law, responsible for many of the inventor's financial troubles. This character is relevant to understanding the inventor figure in Balzac because David is recommended as his reflection, his fated development being a replication of Lucien's, but also because he is ultimately successful in avoiding it. The title of the first book, *Les deux poètes*, gives a first indication of how closely intertwined the poet and the scientist are: much of the narration is in the plural, with 'tous deux' as subject. A particularly relevant example casts the relationship of the two protagonists as born of their affinity for poetry: "Tous deux étaient arrivés à la poésie par une pente différente. Quoique destiné aux spéculations les plus élevées des sciences naturelles, Lucien se portait avec ardeur vers la gloire littéraire ; tandis que David, que son génie méditatif prédisposait à la poésie, inclinait par goût vers les sciences exactes."[54] The two characters thus appear to pursue specializations for which they are not destined, yet the novel demonstrates that invention and literature are most alike in that they are doomed professions in the 19th century.

[53] Ibid. 461.
[54] Ibid. 18.

Balzac cites a literary authority on this account: "Mercier disait dans son *Tableau de Paris*, il y a environ cinquante ans, que la littérature, la poésie, les lettres et les sciences, que les créations du cerveau ne pouvaient jamais nourrir un homme ; et Lucien, en sa qualité de poète, n'a pas cru à l'expérience de cinq siècles."[55] The novel's second book, *Un Grand homme de province à Paris*, shows Lucien leaving his home town to seek fame in the capital, only to fail repeatedly, and at great financial cost to himself and David.[56] Adam Bresnick analyzes his trajectory as an anti-*Bildungsroman*, since it recapitulates the representative progression of such a novel but does not allow the protagonist to learn from the experience. Unlike him, the inventor escapes his archetypal tale, retreating from the pursuit of innovation into entomology. The change, however, is possible through Eve's influence: "Ève a eu l'esprit de le faire renoncer à l'état d'inventeur."[57] David's marriage is endowed with all the happiness that Balthazar's lacked, with Balzac building Eve into the inventor's strong anchor in the community.

At the end of the 19th century, the notion that the inventor's narrative is typical is conveyed most evidently in the works of Jules Verne, where it receives as a corollary that the inventor, too, is a type. His series of *Voyages Extraordinaires* spans fifty-four adventure novels, published between 1863 and 1905. Their peripatetic plots focus on various aspects of the exploration of exotic parts of the world and their inhabitants by French protagonists. Unlike their literary predecessors identified here, these works are explicitly interested in accurately representing scientific notions. Following the positive reviews of the first installment of the series, Cinq semaines en ballon (1863), which praise it for its ability to present geographic and

[55] Ibid. 422.
[56] AK Chanda includes Lucien in his elaboration of the type of the 'young man from the provinces' in 19th century literature, where the Balzacian character appears together with Julien Sorel. The comparison includes a discussion of the ideas they hold above their station and of their own aptitudes as obstacles to their social-climbing.
[57] Honoré de Balzac, Illusions perdues (Paris : Houssiaux, 1874) 570.

other scientific information in an engaging manner, Verne's editor declares an educational mission for the series.[58] Its goal is exhaustive and entertaining, "de résumer toutes les connaissances géographiques, géologiques, physiques, astronomiques, amassées par la science moderne, et de refaire, sous la forme attrayante et pittoresque qui lui est propre, l'histoire de l'univers."[59]

The inventor novels form a cohesive subset of Verne's novels featuring revolutionary machines, and are considered prominent examples of *littérature d'anticipation.*[60] This French literary genre is characterized by speculation on a variety of social, cultural and scientific aspects of contemporary life.[61] One might be tempted to translate *littérature d'anticipation* as 'science fiction,' but as Jean-Marc Gouanvic explains in his Sociologie de la traduction: la science-fiction américaine dans l'espace culturel français des années 1950, the English loan expression was only adopted in France after the Second World War. It denoted at that time literary production encouraged by the popularity of translations of American texts. In contrast, *littérature d'anticipation* is considered to be of French origin and to predate the 20th century.[62] Louis-

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[58] Verne's reviews are collected in Jean-Michel Margot, Ed. Jules Verne en son temps: vu par ses contemporains francophones (1863-1905) (Belles Lettres, 2004).
[59] Jules Verne, Voyages et aventures du Capitaine Hatteras (Paris : Hetzel, 1866) 2.
[60] Arthur Evans "Science Fiction vs. Scientific Fiction in France: From Jules Verne to J.-H. Rosny Aîné." *Science Fiction Studies* 15.1 (1988): 254-76, 338-68
Paul K Alkon, Science Fiction Before 1900 (New York : Routledge, 2013).
[61] There is a distinction with other popular genres with which anticipation novels might be associated, such as *le fantastique*, *le merveilleux*, and *l'utopie*, but which diverge from the modern, scientifically-inclined historical period. Daniel Fondanèche's study of 'littérature d'imagination scientifique' comprising works published between 1845 and 1910 is among the first to elaborate the distinction.
[62] Marc Angenot's "Science Fiction in France before Verne" discusses the wide variety of "narratives of conjectural imagination that describe a society axiomatically different from the empirical society around the author," starting in 1805, and proceeds by grouping the texts in terms of major themes.
Writing on English-language texts from the same period, Clarke insists on the necessity to draw "a crucial distinction in the categorization of future fiction. Although they are quite properly entered under 'science fiction' in contemporary classifications, a sensible taxonomy will note that they belong to one division of a multiplex genre. Future fiction is the only term we have to cover the immense range of these projections and anticipations: utopias, dystopias, coming wars, interplanetary journeys, Last Man stories, and the many varieties of science fiction" (xi)

Sebastien Mercier's 1770 novel L'An 2440, rêve s'il en fut jamais is often cited as the first work in the genre because of its speculation on Parisian life in a distant century, though Voltaire's "Micromégas" (1752), presenting the travels of extraterrestrial scientists to Earth as a critique of the 18th century, and Restif de la Bretonne's La Découverte australe par un homme volant (1781), which featured innovations in aviation and speculation on evolution, are also frequently mentioned as notable early works.[63]

In the 19th century, anticipation grew to embrace a variety of themes. The most prominent early French text is Jean-Baptiste Cousin de Grainville's Le Dernier homme (1805), which treats what would become a popular subject for the genre, 'the last man.'[64] The novel was translated into English, and served as inspiration for Mary Shelley's The Last Man (1826), a Romantic exploration of isolation at the end of the world. Louis Geoffroy's Napoléon et la conquête du monde 1812- 1832: Histoire de la monarchie universelle (1836) is representative of another popular topic of anticipation, alternative military history. The novel includes extensive discussion of military strategy that could have brought Napoleon victory as well as speculation on developments in the arts and sciences. Interest in this type of anticipation is sustained throughout the long 19th century, with particular resurgence after the French defeat of 1870. As Clarke mentions in his Tale of the Next Great War, *la guerre de demain* is the subject of over four hundred stories in English, French, or German before 1914.[65] These accounts of fictional

[63] Satirical works that employ the device of fantastic voyages, such as Cyrano de Bergerac's L'Autre monde ou les états et empires de la Lune (1657), as well as utopian texts, starting with Thomas More's 1516 text, or Francis Bacon's New Atlantis (1627) are occasionally identified as texts inspiring the genre.
[64] Among the successors of Grainville, Paul Alkon also names A. Creuzé de Lesser's Le Dernier homme (1831), Elise Gagné's Omégar ou le dernier homme (1859), and Camille Flammarion's La Fin du monde (1894).
[65] The name of this theme is taken from the title of the first work by the most prolific French author, Commandant Emile Augustin Cyprien Driant. His 1888 La Guerre de demain explores many types of warfare and battle conditions in which the French emerge victorious over the Germans.

battles between the European nations, feature stereotypical representations of the peoples involved, and play on the fears of their readers about the coming century.

A further significant strain of 19th century anticipation, futuristic fiction, is analyzed by Paul Alkon in his Origins of Futuristic Fiction. The critic distinguishes Felix Bodin's Le Roman de l'avenir (1834) for its inclusion of a critical preface delineating criteria for the elaboration of literature set in the future, which the novelist calls *littérature futuriste*. Bodin's very successful novel contains a preface in which the author discusses the aesthetic of futuristic fiction aimed at achieving "a novel whose elements all worked coherently to elicit a sense of the marvelous within a plausible framework of realistic setting and action."[66] Stylistically, such novels should be markedly different than 'utopian speculation,' implying that the future world should not be described to the reader in minute detail. In his own novel Bodin makes reference to technological and social revolutions, but does not explain how they came about. As Alkon concludes, the goal of Bodin's literature is to "recapture, in appropriate images agreeable to the modern world, imaginative equivalents of older sources of poetic emotion that can no longer serve as material for the novelist's art. Aesthetic effects must have primacy over speculative content. Readers must be moved, not simply instructed."[67]

Among the writers who break with Bondin in favor of speculation are Emile Souvestre and Camille Flammarion. Souvestre's Le Monde tel qu'il sera (1846), a dystopia of the year 3000, references new developments in steam technology in an effort to illustrate how the 19th

[66] Paul Alkon, Origins of Futuristic Fiction (Athens, University of Georgia Press,1987) 245.
[67] Ibid. 253.

century drive to technological progress may not yield an ideal world.[68] The fictional character John Progres is at the center of a caricature of technical perfection, a utilitarian society that is disinterested in the individual, and overly wealth-focused. Camille Flammarion's La Pluralité des mondes habités (1862) takes a scientific perspective, studying *les conditions d'habitabilité des terres célestes, discutées au point de vue de l'astronomie, de la physiologie et de la philosophie naturelle*. Flammarion is the author of many popular books on astronomy, which seek to explain scientific notions to the lay public. The author however does not stop at presenting specialized knowledge, also discussing its implications through theories inspired by his spiritualist beliefs. His novel Uranie (1889), for example, ponders alien life-forms, and shows the characters reach distant planets through reincarnation. Robert Crossley's reading places this type of work in the domain of 19th century 'misappropriation of scientific research' in the sense that it promises through its title to advance scientific dissemination, but is instead devoted to the popularization of the paranormal.

Verne's works share in Flammarion's educational goal, but are not concerned with the depiction of the future, nor with distant planets, being instead set in the 19th century. The 'mondes inconnus' of the collection's title are those revealed through geographic exploration, which together with a sustained focus on extrapolation from contemporary science and technology are Verne's additions to the thematics of this tradition.[69] In Jules Verne Rediscovered Arthur Evans situates the didactic drive of the novels as a mediator between the two principal

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[68]Raymond Trousson, "Emile Souvestre et le Monde tel qu'il Sera" De l'Utopie à l'Uchronie: formes, significations, fonctions (Tubingen : Gunter Naar Verlag 1988).
Jean-Jacques Bridenne, La Littérature française d'imagination scientifique. (Paris, Dassonville, 1950).

[69] Evans writes that imitators or continuators of Verne's anticipation include André Laurie, Gustave Le Rouge and JH Rosny Aine, noting that French production in this domain all but disappears around the First World War.

literary responses to science in the 19th century.[70] It falls between the Romantic rejection of science, or its depiction as a new face of the occult, and its positivistic promotion. He argues that Verne sought to teach his readership in an effort to prepare them for the future, the novels functioning as "representational model for enlightened social adaptation".[71] Such measures are necessary because the expectation of the *Voyages Extraordinaires* is that in the 20th century, knowledge of science would be indispensable to all areas of life.

The inventor novels distinguish themselves in the series through the much greater emphasis placed on the human source of technological progress. They illustrate an alternate present, in which revolutionary scientific advances have been made, and certain technological devices far supersede those available at the time.[72] As a group, they frustrate this education-focused reading because they depict the inventor as a reclusive genius who repeatedly demonstrates technological excellence, but whose tale ends in spectacular destruction together with his work. The character best suited to demonstrate adaptation would seem to be punished for possessing the very ability desired of the readers. One explanation, which nevertheless sidesteps the figure of the inventor, can be found in Jacques Noiray's Le Romancier et la machine. He argues that Verne's works distinguish between science and technology, with much greater emphasis being placed on the former. 'L'object technique' is a narrative means to the satisfaction of the educational mission: "l'exploration géographique, qui permet l'acquisition des connaissances et fonde la conquête et la mise en valeur des richesses naturelles, n'est rendue

[70] Arthur Evans, Jules Verne Rediscovered : Didacticism and the Scientific Novel (New York: Greenwood Press, 1988).
[71] Ibid. 34.
[72] Marie-Hélène Huet, L'histoire des Voyages extraordinaires (Paris : Minard, 1973).

possible que par la présence efficace de la machine."[73] Though it is not the focus of the series, Noiray argues that the technology of the *Voyages Extraordinaires* is what fascinates the reader. Verne's meticulous research gives the machines a great degree of verisimilitude, while the necessity to advance the plot into unexplored territories transforms them into imaginary, fantastical devices. In comparison, the fictional innovator responsible for them fades away.

A figure modelled on the Vernian inventor appears also in Emile Zola's Travail (1901). The novel demonstrates the positive effects of electrification in a factory town. This large-scale undertaking represents the transition from the hardships of the 19th century industrial environment to a utopian 20th century. Though spear-headed by a philosopher, it is only possible through the work of Jordan, who works in seclusion and is uninterested in the possible effects of his discoveries on the community. It is surprising to find such a character in Zola because despite their shared enthusiasm for science, he and Verne are very different in the use they make of contemporary theories. Their differences extend to their ideas on the purpose of literature, which are reflected in their assessment of each other's writing.

Zola was among the early reviewers of Verne's novels, and his coverage was at first positive. Writing for *L'Evénement*, he called the *Voyages Extraordinaires* "[une] fantaisie aimable et instructive, […] écrit pour les enfants et les gens du monde, plein d'intérêts dramatiques et d'enseignements utiles," finding that the works "instruisent en excitant la curiosité au plus haut point."[74] However, as Verne's success continued, and he went on also to

[73] Jacques Noiray, Le Romancier et la machine: l'Image de la machine dans le roman français, 1850-1900 (Paris: J. Corti,1981) 13.
[74] « Jules Verne » *L'Événement*, 1866. Cited in Jean-Michel Margot, Jules Verne en son temps (Amiens : Encrage, 2004) 21.

produce profitable plays based on his novels[75], Zola's commentary became increasingly negative.[76] In 1878, we read "celui-là n'écrit pas précisément des romans," and he went on to speculate that *roman* might not even be the proper term for the works. Verne was merely writing in the service of the "goût du public [qui] est à ces vulgarisations amusantes de la science." To Zola, then, his emphasis on progress, positivist faith in science and the optimism that characterized the majority of the *Voyages Extraordinaires* merely espoused the ideas of the 19th century bourgeois.[77]

His criticism of Verne was not motivated by a difference in sales figures, as show Timothy Unwin and Renoir Bachelier, who have investigated the links between the two authors' reception and their readings of each-other.[78] This was a time when the naturalist is a commercially-successful author, having already published the first seven novels of the *Rougon-Macquart* series, including L'Assommoir. Zola's comments are of interest because they depict him as the opposite literary figure to the one into which the naturalist is shaping himself: Verne is not an intellectual, lacks a concept of literature as driving principle for his work, and takes

[75] Zola doesn't sign his theatre adaptations; Robida mocks Verne's collaborator, together with Zola's literary production, in his novels.
[76] Charles Lemire paraphrases negative comments Verne received from other writers as an accusation of his having produced "un tissu d'invraisemblances sans psychologie et sans style" (p. 107)
[77] The exception to this fictional worldview, which goes unnoticed by Zola, appears to be the case of the inventor novels, in which scientific excellence is punished.
[78] Renoir Bachelier, "Verne lecteur de Zola : entre dégoût, rivalité et admiration," *Loxias 38*, 28/08/2012. URL : http://revel.unice.fr/loxias/index.html?id=7127

cues from his readers.[79] He also does not look kindly on Verne's investment in the marketing of his novels[80], or the pretension to the literariness of his works.[81]

As Unwin shows, another of Zola's objections was to what has since been identified as the hybridity of Verne's fiction. His "massive reliance on scientific and technological discourse," allowed non-fictional passages to interrupt the narrative, rendering the novels a mix of the artistic and the utilitarian which was uncommon for the period.[82] In the case of Zola's fiction, however, David Baguley argues that it too offended through the inspiration it took from science. Unlike Verne, however, naturalism was problematic not because of its representational practices, but its selection of themes. The critic writes in Naturalist Fiction. The Entropic Vision, that "the attraction and odium that [naturalism] caused were due to the combination that it entailed of the familiarizing mimetic procedures of realist fiction and a fundamentally disturbing body of themes."[83] These include crime, alcoholism and promiscuity, the unseemly side of 19th century society, which was presented as a consequence of industrialization, and of life in the urban environment.

Zola's writings on naturalism explain not only the choice of topics that would become commonplace for the genre, but also his theory of literature in scientific terms. As Yves Chevrel explains, "l'œuvre naturaliste est le plus souvent conçue comme l'exploration d'un système, la mise en évidence de ses rouages, de ses règles de fonctionnement […] tantôt sur un modèle

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[79] Bachelier shows that Verne's correspondence attests to his having read Zola, and admired the realism and scientifism of his work.
[80] Terry Harpold discusses Verne's cooperation with his editor JP Hetzel as masterful "*avant la lettre* content repurposing" that relied on serialization and republication of the novels in different formats, bindings and illustrations, aimed at maximizing profit by attracting a wide variety of readers.
[81] Unwin and Evans comment on Verne's frequent literary allusions in the *Voyages Extraordinaires* as well as his discussions of literary style in his correspondence with Hetzel.
[82] Timothy Unwin, Jules Verne: Journeys in Writing (Liverpool: Liverpool University Press, 2005) 13.
[83] David Baguley, Naturalist fiction: the Entropic Vision (Cambridge: Cambridge University Press, 1990) 233.

biologique, tantôt sur un modèle mécanique."[84] The analytic task of naturalist literature is explained by Zola in his Roman Expérimental (1880), which posits that

> le romancier est fait d'un observateur et d'un expérimentateur. L'observateur chez lui donne les faits tels qu'il les a observés, pose le point de départ, établit le terrain solide sur lequel vont marcher les personnages et se développer les phénomènes. Puis, l'expérimentateur paraît et institue l'expérience, je veux dire fait mouvoir les personnages dans une histoire particulière, pour y montrer que la succession des faits y sera telle que l'exige le déterminisme des phénomènes mis à l'étude.[85]

On the side of observation, Zola lived up to this goal by minutely documenting each novel through research and by visiting the locales he was interested in representing, resulting in extensive preparative dossiers.[86] In the naturalist's own words, the purpose of this effort can be summarized as "la revendication du vrai dans les arts et dans les lettres."[87]

Zola found that literature could achieve the highly-valued truth quality when it drew on science, a process that rendered the writer akin to the experimenter. In support of this driving notion of Le Roman expérimental, the author cited from Claude Bernard's Introduction à l'étude de la médecine expérimentale (1865) extensively. Though this, Zola was illustrating his theory of literature and of the author even as he elaborated it. His source was referenced as an authority, "un savant dont l'autorité est décisive," whose principles were applied in a new field. Baguley comments the number and length of Zola's citations, noting that he did little to integrate them, so

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[84] Yves Chevrel, "Questions de méthodes et d'idéologies chez Verne et Zola. Les Cinq cents millions de la Bégum et Travail" (*La Revue des Lettres Modernes,* 1978) 99-100.
[85] Emile Zola, Le Roman expérimental (Paris : Charpentier, 1880) 22.
[86] In this aspect of their preparation, Hamon, Evans and Noiray point out that Zola and Verne are very much alike.
[87] This letter dates from 1877: (Corr III p.234-5).

that the reader remained alert to the mix of literary and scientific discourses. This juxtaposition, the same that had shocked in Verne's works, did not carry into Zola's novels, which were imagined as a laboratory where 19th century society could be modeled starting from certain types.

Most notably, his cycle of the *Rougon Macquart*, subtitled *Histoire naturelle et sociale d'une famille sous le Second Empire* (1871-1893), was presented as a study of heredity, tracking the evolution of the title characters through several generations. In the preface to the first novel, La Fortune des Rougon (1871), Zola explained his purpose using the scientific vocabulary and perspective on literature he would explain in the later, theoretical work

> Je veux expliquer comment une famille, un petit groupe d'êtres, se comporte dans une société, en s'épanouissant pour donner naissance à dix, à vingt individus qui paraissent, au premier coup d'œil, profondément dissemblables, mais que l'analyse montre intimement liés les uns aux autres. L'hérédité a ses lois, comme la pesanteur. Je tâcherai de trouver et de suivre, en résolvant la double question des tempéraments et des milieux, le fil qui conduit mathématiquement d'un homme à un autre homme.[88]

Unlike Verne, then, Zola turns his attention to the human, civilized world, rather than the natural domain. As Baguley suggests, "naturalist writers assume the prevalent scientific vision of man, but demonstrate the degrading, dehumanizing implications of that vision."[89]

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[88] Emile Zola, La Fortune des Rougon (Paris: Charpentier, 1875) 1.
[89] David Baguley, Naturalist Fiction: the Entropic Vision (Cambridge: Cambridge University Press, 1990) 217.

In the *Rougon-Maquart*, hereditary predisposition to alcoholism is one of the main traits that tie together the protagonists, and in notable cases its inevitability is conveyed through the use of machines. In L'Assommoir, for example, Gervaise's susceptibility to drink is rendered as her succumbing to a monstrous still, which is showcased expressly because of its power over working-class patrons: "la curiosité de la maison était, au fond, de l'autre côté d'une barrière de chêne, dans une cour vitrée, l'appareil à distiller que les consommateurs voyaient fonctionner, des alambics aux longs cols, des serpentins descendant sous terre, une cuisine du diable devant laquelle venaient rêver les ouvriers soûlards."[90] The unsettling nature of the machine becomes translated in the character's imagination as its personification. To Gervaise, the still "gardait une mine sombre…à peine entendait-on un souffle intérieur," while to an already faithful customer, "elle était bien gentile."[91] The animated, negative presence of the still becomes all the more worrisome for Gervaise as more alcohol is consumed, "elle eut la sensation d'un malaise plus inquiétant derrière son dos. Elle se tourna, elle aperçut l'alambic" until she falls prey to it, "prise par ses pattes de cuivre."[92]

The predatory still is described in several scenes, with a level of detail reminiscent of the apparatus in Balthazar's laboratory. This machine, however, has no particular unique inventor, its source being secondary to its use. Unlike in Balzac and Verne, this representative Zolian machine is an avatar of the inevitable. In the case of Gervaise, it announces the manifestation of the inherited *tare*, but this individual tragedy stands, in turn, for the many afflictions of her social class. Zola writes that the working class are "ignorants et gâtés par le milieu de rude besogne et de misère où ils vivent," indicating that the protagonist's story speaks to the social injustices that

[90] Emile Zola, L'Assommoir (Paris: Flammarion, 1871) 36.
[91] Ibid. 44.
[92] Ibid. 364 and 366.

go uncombatted in the 19th century.[93] Noiray shows their oppression is both rendered as the side-effect of a social machine engaged by the bourgeoisie (including banks, les Halles, and department stores), and carried out through industrial machines.

In the first volume of his Le Romancier et la machine, Noiray analyzes the symbolic value of machines in Zola's work, arguing that author makes versatile use of large-scale machinery in his novels by focusing on its three key qualities of *dynamisme*, *complexité*, *artificiel*. The last is the most fundamental, with technology being characterized by an "étrangeté absolue," which serves in the naturalist novel to accentuate inhuman working conditions.[94] A chronology of French fiction featuring machines reveals their increased presence after the mid-19th century, from 1840-1870, coinciding with a period of great industrial development in France. Zola's work is part of this wave, but despite his devotion to the realist mode, his machines present an opportunity for poetic reflection.

A notable example is the mine in Germinal, where, as in the case of the still discussed above, the accumulation of technology appears as a "dieu anthropophage accroupi."[95] Noiray shows that this metaphor is no mere negative representation, but is directly inspired by the arrangement of the mine Zola observed during his documentation trip. He concludes that for the naturalist, technology brings together "matérialité concrète et potentialités imaginaires."[96] In the novel, the nefarious influence of mining technology on the workers drives the plot, from the protagonist's being able to fine employment because an industrial accident has made a position available, to the workers destroying the equipment in revolt. Zola's descriptions paint machines

[93] Emile Zola, "Préface" in L'Assommoir (Paris: Charpentier, 1877) np.
[94] Jacques Noiray, Le Romancier et la machine: l'Univers de Zola (Paris : J. Corti, 1981) 425.
[95] Ibid. 175.
[96] Ibid. 175.

as a fiery hell in which the workers are mere fuel, fed to and digested by them. This dual nature of naturalist technology allows it to become "un mythe … un modèle général d'interprétation imaginaire d'une réalité impossible à saisir autrement que sous forme métaphorique."[97]

If in Zola's naturalist work machines are a metaphor for 19th century society through their ceaseless, predictable activity, their origin is of little significance. This explains why the inventor is a new character, appearing only in the *Evangiles*, the series of four novels begun in 1898 and left unfinished at the time of Zola's death.[98] These novels, entitled Fécondité, Travail, Vérité and Justice, are more optimistic than the *Rougon-Macquart* and though still realist works, they present a positive near-future rather than grim everyday life. Through its fictional chronology, Travail is the most forward-looking of the series, presenting the evolution of a town into the mid-20th century. Thanks to the inventor's mastery of electricity, it is a utopian community in which the members can find fulfilling work. Noiray explains the success of Jordan as the triumph of science, attesting to the author's renewed optimism, but in this novel, Zola's technology is no longer a metaphor, and its human source is assigned a very visible place. Championing Jordan's work and applying it on a large scale is a significant task of the protagonist, Fourierist philosopher Luc. The inventor's achievement is to derive and prepare a radiant 20th century from the 19th century of naturalist literature. This focus on technology in Zola's Travail has result of establishing key difference between the *Evangiles* and the *Rougon-Macquart*, prompting us to reinterpret the author's work as a whole.

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[97] Ibid. 376.
[98] Noiray finds that the inventor appears for the first time in Zola's work in *Paris* (1898), but is split between two characters, a pure and applied scientist. He also identifies in the Naturalist's large cast of characters several that foreshadow the inventor, but who are negatively described as mad scientists, a seemingly Romantic figure (p. 193-4).

Rivalling the complexity of the task Zola assigns the inventor, Villiers de l'Isle-Adam has his version of the figure produce a counterfeit person in L'Eve future (1886). The decadent writer is the author of mystery or horror stories collected as *Contes cruels* (1883), and fantastical plays that draw on Romanticism. The subject of his only novel places it in the tradition of stories about the artificial humans, and both the topic and the act of taking inspiration from previous works bespeak the decadent nature of Villiers' writing. The text most frequently cited as reference to Villiers' is E.T.A. Hoffmann's "The Sandman" (1816), which enjoyed renewed popularity in the fin-de-siècle having been adapted as the first act of Offenbach's opera *Les Contes d'Hoffmann* (1881).[99] The two share the premise of a scientist who invents a mechanical woman, and both have an unsuspecting young man fall in love with her. Villiers however moves away from this model by taming the fantastic. In Todorov's terms, the suspense of Hoffmann's story is derived from his leaving the reader "to hesitate between a natural and supernatural interpretation of the events described."[100] Villiers however does his best to prevent this, reinforcing instead the realism of his characters and settings through extensive, detailed descriptions, and dialogue that serve to unambiguously place them on the side of the natural and supernatural. It is for this reason that his inventor is Thomas Edison, a figure he announces to be gathered from the press, and the young man for whom the artificial woman is designed is a representative decadent figure.[101]

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[99] Hubert Desmarets, Création littéraire et creatures artificielles : "L'Eve future", "Frankenstein", "Le Marchand de sable," ou, le je(U) du miroir. (Paris: Editions du Temps, 1999) and Jacques Noiray, L'Ève Future ou le laboratoire de l'idéal (Paris : Belin, 1999).

[100] Tzvetan Todorov, The Fantastic: A Structural Approach to a Literary Genre (Ithaca: Cornell University Press, 1975) 33.

[101] Chantal Collion-Diérickx, La Femme, la parole et la mort dans Axël et L'Eve future de Villiers de L'Isle-Adam (Paris: Champion, 2001) and Felicia Miller-Frank, Mechanical Song: Women, Voice, and the Artificial in Nineteenth Century French Narrative (Stanford: Stanford University Press, 1995).

In his L'Eve future ou le laboratoire de l'idéal, Jacques Noiray comments on the close association of the artificial with the supernatural, writing "le monde artificiel n'apparait plus ici comme l'envers, le négatif du monde réel, mais comme une porte ouverte sur l'au-delà ; plus proche de l'idéal parce que détourné des apparences trompeuses de la nature."[102] This assessment of the artificial brings together the outlooks Villiers' two characters have on the world in an intersection that does not occur in Hoffmann. It is achieved through the author's much greater investment in the scientific background of the artificial. The work of the inventor is so technologically accomplished it appears magical to its decadent audience. The reader, however, does not vacillate between its interpretations as scientific or supernatural.

That Villiers adapts the theme of the artificial being in what are sought to be thoroughly scientific terms indicates he views science and technology as an integral part of his century, but his perspective on its work is ironic.[103] One such indication is that he chooses an extraordinary goal for his inventor, one which verges on the unbelievable in the domain of 19th century French literature. He gives this enterprise the full scope of science, as feared by its contemporary public. As Noiray suggests,

> Il ne s'agit plus ici seulement de récupérer, au nom de l'humanité, un bien dont elle a été privée par l'injustice et l'arbitraire d'un dieu ; il s'agit beaucoup plus gravement, de se dresser contre l'ordre institué par le Créateur … et de chercher, par les moyens de la science humaine, a rétablir l'Eden sur la Terre. La révolte est, ici, luciférienne : c'est la

[102] Jacques Noiray, L'Ève future ou le laboratoire de l'idéal (Paris : Belin, 1999) 64.
[103] In the notes to the Pléiade, Raitt and Castex discuss Villiers' efforts toward scientifism, his research into chemistry and physics that allow him to write believably about Edison's work, if not with scientific accuracy.

contestation générale, par une humanité qui se veut désormais assez sûre d'elle-même, de l'autorité divine et de l'ordre du monde.[104]

What Edison achieves in L'Eve future represents control not only over the natural world, but over humanity, thereby divesting the world of God. Linda Simon suggests in Dark Light: Electricity and Anxiety from the Telegraph to the X-Ray that this is a commonly-held fear in the latter 19th century, a reaction to progress in the science, and greater technological encroachment in people's everyday lives, but is exacerbated in the case of electricity. The belief in the electrical nature of the soul, which had already been at the heart of Mary Shelley's Frankenstein, finds renewed support as medical therapies involving electricity become more commonly applied. She shows that the treatment of both bodily ills through the new fluid increases in popularity through the century, and its applications come also to include the treatment of mental illness by the 1870s.

Villiers' disdain for science is a further dimension of his writing inherited from decadence. Touching on the relation of science and literature, his friend Jean Lorrain observed in the introduction to a volume of his *contes*, "je plains au fond de moi les enfants de cette génération, qui lisent du Jules Verne au lieu de Perrault, et du Flammarion au lieu d'Andersen."[105] He predicts that "ces futurs chevaucheurs de bicyclettes" are destined to lose the ability to feel "l'amour du merveilleux" because of their readings. L'Eve future attests to a similar love for the *merveilleux*, which bespeaks the late 19th century's interest in medieval

[104] Jacques Noiray, L'Ève future ou le laboratoire de l'idéal (Paris : Belin, 1999) 362-3.
[105] Jean Lorrain, Princesses d'ivoire et d'ivresse (Paris : Société d'éditions littéraires et artistiques, 1902) 2.

objects and literature and is assigned to the repertoire of Edison's fictional interlocutor.[106] This early form of the supernatural colors the character's imagination, giving him the frame through which to interpret the inventor's work, investing novel scientific marvels with traditional enchantment.

Though not associated with the decadent movement, caricaturist Albert Robida was equally interested in late 19th century medievalism. As an amateur historian of the city of Paris, he was among those who bemoaned Haussmann's modernization, which involved the demolition of many medieval and Renaissance buildings.[107] For example, one of his caricatures represents Haussmann and his experts at work on the *enlaidissement* of the city, rather than its *embellissement*, a popular term used to promote the project.[108] Robida was a member of the *Société des Amis des Monuments de Paris*, an organization founded in 1884 to document Parisian architecture, and lobby for the preservation of monuments.[109] He uses his position as editor of *La Caricature* to uphold their goals, as for example, through a first-page illustration against the proposal to build the Paris metro above ground.[110] Published June 19 1886, the cover depicts Paris as a woman being attacked, pierced by the many viaducts supporting the metro, linking monument to monument.

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[106] A famous literary example can be found in JK Huysmans' A Rebours, where the decadent aesthete Des Esseintes collects rare medieval books and retables. This author, as well as many of his contemporaries including Zola, were avid collectors of medieval objects themselves (Elizabeth Emery, "Protecting the Past: Albert Robida and the Vieux Paris Exhibit at the 1900 World's Fair." *Journal of European Studies* 35.1 (2005): p.62).
Jean Lorrain, Princesses d'ivoire et d'ivresse (Paris : Société d'éditions littéraires et artistiques, 1902) 2.

[107] Paris de Siècle en Siècle (1896) is Robida's best known book on the topic, though he is also the author of L'Île de Lutèce : enlaidissements et embellissements de la Cité (1905) and illustrates an 1897 luxury edition of Villon's Grand Testament with Parisian scenes.

[108] Peter Soppelsa, "Visualizing Viaducts in 1880s Paris" (*History and Technology* 27.3 2011) 371.

[109] Ruth Fiori, L'Invention du vieux Paris : Naissance d'une conscience patrimoniale dans la capitale. (Paris : Mardaga, 2012) 99.

[110] In "Protecting the Past," Elizabeth Emery argues that Robida's illustration was a very efficient advertisement of the conservationist cause.

The official counterpart of this association is the *Commission du Vieux Paris*, established in 1897 with a similar aim of protecting the past, and maintaining a record of the city's evolution. Robida worked with them toward the production of a Vieux Paris exhibit for the 1900 World's Fair. This reconstruction does not seek historical accuracy, but strives for the impression of a bygone age. Much as they used to coexist on the Ile de la Cité, buildings from different periods share the same space on the right bank of the Seine. Visitors to this exhibit, the third highest-earning of the Exposition, enter through the Porte Saint-Michel, immortalized by Zola in a photograph during one of his walks.[111]

This was not the first time Robida and Zola crossed paths. In his time at *La Caricature* (1880-1892), he had a keen interest in current literary and cultural events. In 1880, he joined in ridiculing Zola's newly-published Nana for what is considered to be its immoral, salacious writing. He renamed certain issues of the magazine 'Nana-Revue,' and dedicated them to satirical speculation on how the naturalist author got his ideas (consorting with prostitutes), his motivation (money), and what the wider implications of his writing could be (corruption of youth)[112]. Robida was equally familiar with Verne's work, producing as his first futuristic novel Les voyages très extraordinaires de Saturnin Farandoul dans les 5 ou 6 parties du monde et dans tous les pays connus et même inconnus de M. Jules Verne (1879). This parody brought together events and characters of all of Verne's novels published to date, but Robida did not constrain his

[111] Elizabeth Emery, "Protecting the Past: Albert Robida and the Vieux Paris Exhibit at the 1900 World's Fair." *Journal of European Studies* 35.1 (2005) 65.
[112] Brigitte Diaz shows that the same is true of Robida's 1881 caricatures of Nana. She adds that though he vilifies Zola, he assigns much less blame to the newspaper that serialized the novel. "«Desinfectionner la littérature» : la presse contre la pornographie littéraire", *Médias* 19, 17/05/2013, URL : http://www.medias19.org/index.php?id=13400.

hero to the same rules of realism Verne designed for his, preferring instead to give the protagonist fantastical, exaggerated exploits in the Vernian universe.

Robida's further satirical novels carry on the same tone, but diverge greatly in their representation of technology. In the trilogy of Le Vingtième siècle, the author revisits his beloved Paris, but as a 20th century metropolis saturated by electrical technology. This future defines itself through its technological prowess, but it is also negatively defined through its opposition to a past Robida keeps indistinct, and which agglutinates earlier ages. The expansion of the city to 60 arrondissements relies on its consumption of the architecture of the past through the re-use of major landmarks as stations for many new modes of transportation.[113] For example, the Tour St. Jacques becomes an *aéro-cab* station, the towers of Notre Dame are the central station of the Parisian *aéronefs* and a café as well, and the Arc de Triomphe also celebrates modern priorities: it is a luxury hotel with a restaurant, gardens and a panoramic view of the city.

This representation of the future brings together Robida's interest in the history of Paris, and the conservation of its monuments with his concern for the development of science. Though presented as a dystopian world, there is also an enthusiasm for the positive potential of this discipline. Robida's fiction allows 19th century dreams of increased comfort, industrial automation and fast and reliable transportation to be realized through electricity. The pessimism that marks at times his novels is combatted by his rich illustrations and textual embellishments, which provide a pleasurable or humorous distraction from text.[114] He is much more interested in the social impact of technology than Verne, as evidenced by his taking up subjects such as La

[113] In 1860, the city grew from 12 arrondisements to 20.
[114] Books as physical objects and beautiful editions are of great importance to Robida. He worked as an illustrator, publishing a successful Rabelais, and co-authored with Octave Uzanne a volume of Contes pour les bibliophiles (1895).

Guerre au vingtième siècle (1887), and discussing La Fin du cheval (1899, in collaboration with Pierre Giffard) as a comical consequence of widespread use of bicycles. Like the other authors in this group, he too is focused on the inventor as a singular source of progress, and resembles Villiers in his making marketing of inventions a central factor in their success. They exploit the knowledge gap between themselves and their customers, using their gains to fund further research. Robida warns that if left unchecked, the rapid pace of progress desired by inventors will become unsustainable; the Parisian monuments cannibalized by the future foreshadow the fate of the 20th century.

In discussing the tendency of the mid-19th century toward the commodification of electricity, Morus writes, "for most Victorians who paid attention to such matters, electricity had little immediate to do with fields of force or even a luminiferous ether. Electricity was a matter of spectacular show of light and sparks, amusing galvanic shocks to the unwary, electric telegraphs communicating at a distance, and fancy cutlery electroplated in silver."[115] Robida's characterization of the future through its numerous electrical machines reflects the same perspective. His fictional 20th century is an exaggeration of the tendencies of the 19th, with the author also capitalizing on the knowledge gap between the technological producer and consumer. This future's technological saturation relegates the public to the role of an enchanted admirer of electricity.

In Dark Light, however, Linda Simon notes that though this conception was indeed widespread, electrification met also with resistance, being represented as dangerous physically, as well as morally. Simon studies primarily the reception of electricity in America, but many of

[115] Iwan Rhys Morus, Frankenstein's Children : Electricity, Exhibition, and Experiment in Early Nineteenth-Century London (Princeton: Princeton University Press, 1998) 261.

the fears and anxieties she identifies are shared by the authors of the French inventor novels. Her approach is to survey reactions to particular developments, with notable examples being telegraphy, treatment for neurasthenia, and the X-ray. These applications of electricity which extend man's reach into the natural world, the body and the mind, bring forward questions of the character of consciousness and will, impinging on the domain of metaphysics and religion.

This latter reaction, Simon goes on to argue, was associated by the 19th century with the work of the scientist, rather than the inventor. This distinction was one of the driving principles of Edison's self-representation, which is reconstructed from his interviews and correspondence. In his case, not being a scientist went together with what Simon terms his 'profession of anti-intellectualism.'[116] He aimed to be honest and hard-working, with the expectation that this would lead the public to see his products as equally reliable. In contrast, scientists were malevolent and overly dedicated to the pursuit of abstract work. Edison saw traditional scientific work, the discovery of natural principles, as less important than invention because of its accidental character. He weighed process over pure knowledge, suggesting for example that Newton invented theory of gravitation because he had spent years elaborating and testing it.[117]

Despite the explicit preference Edison held for the inventor over the scientist, he drew no distinction between applied and abstract science. These, however, are the distinct domains of the fictional inventor and scientist in the late 19th century French novels. There, the scientist is the face of national advancement, recognized for his work, and serves as a foil of the reclusive inventor, who is punished through the destruction of his technology. Simon suggests that in

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[116] Linda Simon Dark Light: Electricity and Anxiety from the Telegraph to the X-ray (San Diego: Harcourt, 2005) 137.
[117] Ibid. 129.

American literature of the same period inventors are similarly considered untrustworthy. For example, in Frank L. Baum's "The Master Key," an intrepid boy is given two electrical devices by the Demon of Electricity. Through them, he is able to learn the inner character of people, and gain knowledge of what anyone is doing anywhere. To Simon, the devastating effect is that "privacy is obliterated; anyone's activities can be made public and anyone's mind invaded, all in the service of disseminating truth and knowledge."[118]

Of greater significance to this study is that Baum also touches on international competition in the sciences, and represents inventors as overwhelmed with enthusiasm for new technology. He stages an encounter between the boy and a French scientist, who, when shown the Demon's devices reacts by "positively gasp[ing] for breath, so powerful was the excitement he experienced at witnessing these marvels. "Eet is wonderful—grand—magnifique!" he exclaimed."[119] As in the French novels, the expertise of the inventor is not questioned, only his desire to work for the benefit of the community. Through the boy's special glasses, the French scientist is revealed to be both cruel and evil, though not foolish. He attempts to kill the boy and steal the machines because he is consumed with interest in them.[120] In contrast, the boy acts generously and collegially toward him, advising that "you may be able to discover their construction for yourself. Now that you know such things to be possible and practical, the hint should be sufficient to enable a shrewd electrician to prepare duplicates of them."[121] Baum closes the story by having the boy relinquish all of the devices the demon had given him, because

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[118] Ibid. 260.
[119] L. Frank Baum, The Master Key (Indianapolis: Bowen-Merrill Co. 1901) 130.
[120] Baum describes the physical manifestation of the scientist's interest and excitement in varied detail, but offers no explanation of his thinking. We are left to surmise that the French scientist wanted to possess the electrical devices because they were new or technological in nature.
[121] L. Frank Baum, The Master Key (Indianapolis: Bowen-Merrill Co. 1901) 131.

possessing them isolated him from his community: he flew above the world, saw through people, or walked among them invisibly. The story's moral, "it's no fun being a century ahead of the times" is the children's version of the lesson to be drawn from the 19th century inventor novels.

The same opinion of scientists is revealed in Roslynn Haynes's From Faust to Strangelove, which analyzes their representation in literature, and to a lesser extent, film as types. Her survey of 19th and 20th century sources includes Verne's novels, and posits the scientist as adventurer. The section focuses on the unique means of world exploration his machines afford him, concluding on his realization of the early scientific dream of dominion over nature. Haynes does not distinguish the inventor as a type in the case of 19th century literature, using the terms scientist and inventor interchangeably. However, the defining characteristics that are associated with this figure, such as working in private and producing technology which surpasses that of their contemporaries, and for which they are condemned, coupled with the inventor's lack of interest in education fits what she terms the type of the 'amoral scientist'.

This character is described in a chapter entitled *Scientia gratia scientiae*, in reference to the figure's wholehearted dedication to research and experimentation, but deals with 20th century works. Explaining the author's adaptation of *ars gratia artis*, the defining traits of this scientist are "single-mindedly pursuing knowledge for its own sake and denying responsibility for the consequences."[122] Haynes' amoral scientists further resemble the 19th century inventors because they specialize in a high-stakes domain of research that captures the public's imagination. In the wake of the Second World War, they are nuclear bomb-makers. Like the electrical inventors,

[122] Roslynn D Haynes, From Faust to Strangelove: Representations of the Scientist in Western Literature (Baltimore: Johns Hopkins University Press, 1994) 246.

these fictional characters work in isolation, and without the requirement to educate the public or communicate their findings to peers, which greatly reduces the social oversight so prized by the French novelists. The main difference between the two sets, however, is that the research of nuclear scientists is government-sponsored.

As we have seen, in 19th century French fiction, the sponsorship of science is an important question. Morus' research on findings issuing from elite and popular venues in London, shows that provenance did not factor in the perceived worth of scientific work. Both sides were assumed to be engaged in the production of the same type of knowledge. In the inventor novels, however, the origin of scientific discoveries – institutional versus private – is deeply relevant to its significance. Part of the inventor's condemnation is the destruction of his work, its exclusion from the scientific world. This side of the inventor narrative reflects French anxiety over its productions of electrical technology. It portrays negatively the pattern of innovation emerging in Europe at that time. As Fox and Guagnini argue, "innovation [in this area] before 1914, came less from laboratories than from the workshop."[123]

In France, Fox argues that in the latter part of the 19th century, and before the First World War, "scientists engaged in innovative technological research in electricity" were to be found only in "companies manufacturing a very narrow range of specialized components."[124] These remained independent of foreign interests, in contrast to more diversified French companies which were profitable primarily due to their investment in foreign technology. Verne, Zola,

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[123] Robert Fox and Anna Guagnini, "Sites of Innovation in Electrical Technology, 1880-1914" (*Annales historiques de l'électricité* 1, 2004) 159.
[124] Robert Fox, "France in perspective: education, innovation, and performance in the French electrical industry, 1880-1914" in Education, Technology and Industrial Performance in Europe, 1850-1939 (Cambridge: Cambridge University Press, 1993) 216.

Robida and Villiers de l'Isle-Adam may not have been keenly aware of this historical reality, but worked instead from the commonly-held belief that French electrical engineers were proficient in the application of their knowledge, while being active in its production. Their novels explore the context and ramifications of this perceived deficiency in French technological development at a key moment in history. Looking toward the turn of the 20th century, this is a time in which the past is being assessed, and the authors reflect on how it can become the future.

To explore this, in Chapter 1 I focus on the works of Jules Verne, elaborating a portrait of the inventor as he appears in the series of the *Voyages Extraordinaires*. The character returns with remarkable preponderance in subsequent installments of the series. Vingt mille lieues sous les mers (1870), L'Ile mystérieuse (1874-1875), Les Cinq cents millions de la Bégum (1879), Robur-le-conquérant (1886), Le Château des Carpathes (1892), Face au drapeau (1896) and Maitre du monde (1904) all show him as best poised to advance French science. His work, performed independently of the scientific establishment appears suspect to its official representatives. These scientists and engineers are devoted to the service of the community and the growth of their respective disciplines, while Verne's inventors are concerned with pure progress.

The endorsement of scientists over inventors supports Verne's educational mission. Like the author, they strive to explain the natural world to their contemporaries, ensuring its progress into the 20th century. The shock of the inventor's work to this frame is illustrated through the fictional public's panicked reaction, which is only quelled upon his death. These spectacular scenes punctuate the failure of the inventors' scientific individualism. In dismissing the sole producers of technology from the *Voyages Extraordinaires*, Verne endorses French science, as

practiced in his time. To him, the pace of progress is secondary to ensuring a public, open character of science. As a literary project, the role of anticipation is not to speculate about the nature of the nation's technological future, but prepare for it.

Chapter 2 analyzes Albert Robida's key satirical futuristic novel La Vie électrique (1892). Unlike Verne, Robida illustrates perversions of progress, offering a world in which the rhythm of life is sped-up by inventors to an untenable pace. Set in the 20th century, in this version of France technology is fully integrated in everyday life, the inventor is a popular idol and successful businessman. Despite this great departure from the model proposed in Chapter 1, the figure of the inventor is defined through the same reclusion and dedication to research, disdain for education and oversight of his activities. In one episode, for example, he experiments on his dinner guests. The same particular type of inventor is able to achieve progress in leaps and bounds. Scientific hubris is on evident display in Robida's fiction, but its punishment is more subtly stated. Inventors cannot combat degeneration, the malady of the 19th century, and which Robida's illustrations reveal affects their number more than others'. This failure of science is presented as the consequence of an overly efficient scientific nation, one which the author describes as having fashioned itself too closely on Germany and the United States.

Robida's future is constructed in close reference to the 19th century, through the exaggeration of tendencies apparent in contemporary society. The commodification of electricity, its taming, becomes the operating principle of the new society. The public, cast in the admirer's role, is now enslaved to it through the inventor's marketing of his work. To establish that this pace of progress is not desirable, the author shows that its end result is a world in which everyone works for the advancement of science, efficiently and at great cost. The inventor's

profitable business has allowed to him to coopt all of France into his ceaseless, unscrupulous experimentation. The author thereby succeeds in simultaneously illustrating the realization of France's hopes and fears about its technological development at the turn of the century. Whereas Verne gives voice to the dominant ideological perspective on science, Robida's position as satirist enables him to critique it while retaining a degree of hope, not only in aspects of the plot but his copious illustrations. The visual and the textual dimension weave a conflicted discourse about the potential of science.

Chapter 3 discusses the fictional version of Thomas Edison imagined by Villiers de l'Isle-Adam in L'Eve future (1886). Through this inventor, the author elaborates a fiction of the present meant to compete with the real in the reader's imagination. If Robida's satire made inventors live up to the comical exaggeration of their popular image, Edison is written with a close eye on his coverage in the press. This is Villiers' innovation of the standards of anticipation: fictional scientific achievement is presented as an extension of the real, rather than its caricature. The inventor's real-life persona itself is offered as guarantee of the extraordinary achievement of his fictional counterpart, in contrast to Verne's conveying realism through scientific detail.

L'Eve future finds its other main source in the topoi of the decadent movement. Villiers gives Edison an interlocutor who is a dandy reminiscent of des Esseintes from Huysman's A Rebours (1884). The inventor cynically markets his work to this audience, but Villiers also relies on the repertoire of this tradition to condemn the inventor. The author merely plays at integrating Edison into the line one would imagine for him. Prometheus and Frankenstein are the mythological and literary standards against which the new figure is compared, but are quickly

dismissed. Villiers then suggests Goethe's Faust as the most reliable model, only to reveal in a final, negative assessment of the Edison that he is, in fact, Mephistopheles. The novel thus constructs a modern legend of the inventor as a fusion of contemporary journalism and older literary archetypes.

Chapter 4 reads Zola's Travail (1901) as an utopian re-writing of Germinal (1885). This is readily visible from the exposition, when following a disastrous strike, protagonist Luc Froment takes on an audacious fight against 19th century capitalists, just as Etienne Lantier had attempted. Most importantly, Travail realizes Germinal's closing warning that 'new men' would eventually emerge, though it is not to avenge tragedy. What is significant about Travail's 'new men,' is that they are the same 19th century workers of Germinal, whose violence and lack of education Zola had described as infantilizing, but this time, they are the children of better fathers, who prepare them to evolve.

The transformation of the working-class community depicted in the *Evangile* is possible through the work of a Vernian inventor, Jordan. Zola repeats many of the topoi of the character's representation in our other authors, which are again associated with singular success in the domain of electricity. The author, however, tames the dangerous potential of electricity through Luc's concern for the proletariat. Jordan's work is applied by Luc, a social theorist, in support of his Fourierist reforms, and it transforms the factory town into an ideal community. Educated in the sciences, the new workers step into a brilliant 20th century that has deeps roots in the tenebrous 19th. Through Jordan, Zola moves away from his previous model of heredity, where the efforts or ambitions of the individual are thwarted by the manifestation of an ancestral *tare*.

Travail uses the inventor figure to propose a new model, one which allows for the transmission of acquired characteristics, and in which positive change is possible.

By reading the inventor novels of Emile Zola, Jules Verne, Albert Robida and Villiers de l'Isle-Adam in cultural and historical context, this study explores the relationship of 19th century French science and literature. The inventor figure appears as the intersection of the fundamentally different literary movements of anticipation, decadence and Naturalism. Though electricity captured the imagination of the period, becoming an avatar of progress and the future, the representation of fictional specialists working in this field attests to deep anxieties over the nation's advancement. The inventor narrative condemns the individualistic pursuit of science, becoming a cautionary tale meant to ensure that development in this domain is transparent and serves a social purpose. It allows the authors to contemplate France's transition into the 20th century. Their speculation relies on an evaluation of French cultural and historical heritage, of which the scientific tradition is demonstrated to be an integral part. Looking to the future, late 19th century literature suggests that, if tamed through subordination to public interests, electricity can be the guarantor of the nation's integrity and its international standing.

CHAPTER ONE: The Emergence of the Inventor

From the reviews of Jules Verne's early bestsellers, Cinq semaines en ballon (1863), Voyage au centre de la Terre (1864), and De la Terre à la Lune (1865), his work is recommended to the public both for its storytelling and wealth of scientific information it presents. This combination is termed an "heureuse originalité" (*Année géographique* 1865) and receives many accolades. Among them, an article surveying the *Bibliothèque d'Education et de Récréation*, the collection in which Verne publishes, describes the author as "un vrai savant et un conteur plain de verve … aussi un écrivain des plus distingués."[125] According to this reviewer, Verne's detailed documentation allows him to produce "une sérieuse et profonde étude des lieux, des choses et des caractères, encadrée de la manière la plus heureuse dans un récit qui devient vrai à force de naturel."[126]

Verne's editor, P. J. Hetzel seizes upon the idea that Verne's novels are original literary works that also illuminate scientific issues, and in order to foster their success proclaims the foundation of the *Voyages Extraordinaires* as a series. The declaration arrives in the *Avertissement*[127] to Verne's Voyages et aventures du Capitaine Hatteras (1867), and it is notable because of its choice to foreground science as an avatar of modernity.[128] To quote, the originality of the works is cast as their breaking with "l'art pour l'art", literature which Hetzel finds "ne suffit plus à notre époque, […] l'heure est venue où la science a sa place dans le domaine de la

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[125] Jean-Michel Margot, Jules Verne en son temps: vu par ses contemporains francophones (1863-1905) (Paris: Les Belles Lettres, 2004) 16.
[126] Ibid. 19.
[127] Because this preface is signed by Hetzel, Verne's editor, I will cite him as its author. Some scholars however believe it was in fact written by Verne (Evans, p. 30).
[128] Previously, this novel had been published in two parts, Les Anglais au pole Nord and Le Désert de glace, in the *Magasin d'éducation et de récréation* in1864.

littérature."[129] Verne's work is recommended as new, purposeful literature, but Hetzel is careful not to present the novels as too original, and thus unapproachable. To this end, after making reference to the unprecedented popularity of scientific vulgarization publications, the author suggests that the *Voyages Extraordinaires* are best suited to guide the readers through the rapidly evolving scientific development of their age. The role the novels serve, he hints, has not yet been identified by the public, because it finds itself overwhelmed, "empressé courir aux conférences qui se sont ouvertes sur mille points de la France."[130] The times' increased interest in science is represented as an anxiety-producing for the public: though interested in rapidly-developing science, readers must rush to hear the scientific lectures presented in various distant locations spread across France. Implicit in this is the idea that reading the novels will help calm the public by helping them adapt to modern life.[131]

Hetzel's preface suggests that the public alone cannot keep abreast of new developments, nor understand them without assistance. This is the situation Verne's novels are uniquely fit to remedy: they offer "ce qu'on promet si souvent, ce qu'on donne si rarement, l'instruction qui amuse, l'amusement qui instruit, M. Verne le prodigue sans compter dans chacune des pages de ses émouvants récits."[132] The many illustrations of the volumes echo this twin goal of education and entertainment. Landscapes, maps, exotic flora and fauna add detail and, as Terry Harpold suggests, "a realist illustration guarantees the narrative's probity, even at its most improbable turn" (np). Daniel Compère has described them as 'lateral windows', referring both to their

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[129] Jules Verne, Voyages et aventures du Capitaine Hatteras (Paris : Hetzel, 1866) 2.
[130] Ibid. 2.
[131] Arthur Evans, Jules Verne Rediscovered : Didacticism and the Scientific Novel (New York: Greenwood Press, 1988) 34.
[132] Jules Verne, Voyages et aventures du Capitaine Hatteras (Paris : Hetzel, 1866) 2.

position and function: they stand side by side with the text, informing it.[133] Imagined as one of the marketing assets of the novels, the original editions of which are still prized for their beauty, the illustrations also function to interrupt the reading, giving the reader a time to contemplate. In this, they can be seen to exact a calming influence on the public, and an invitation to use newly-acquired knowledge in deciphering them.

The *Avertissement* concludes with the novels' daring and comprehensive educational mission:

> les ouvrages parus et ceux à paraître embrasseront ainsi dans leur ensemble le plan que s'est proposé l'auteur quand il a donné pour sous-titre à son œuvre celui de *Voyages dans les Mondes Connus et Inconnus*. Son but est, en effet, de résumer toutes les connaissances géographiques, géologiques, physiques, astronomiques, amassées par la science moderne, et de refaire, sous la forme attrayante et pittoresque qui lui est propre, l'histoire de l'univers.[134]

Verne's 19th century reviewers come to see this vast goal realized in his work, calling, for example, Vingt mille lieues sous les mers, "une œuvre encyclopédique," ideally suited to "nous faire connaitre notre planète toute entière et le système auquel elle appartient" (p. 32). The choice of term, *encyclopédique*, emphasizes the wide range of scientific subjects the novel is seen to touch upon, as well as the usefulness of the works as educational tools. This is a point upon which contemporary commentators and many scholars since have agreed, and in the case of the particular novel, the concurrence encompasses also the notion that it tells the story of Prof.

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[133] Terry Harpold, "Reading the Illustrations of Jules Verne's *Voyages Extraordinaires*: The Example of Le Superbe Orenoque." *ImageTexT: Interdisciplinary Comics Studies* 3.1 (2006).
[134] Jules Verne, Voyages et aventures du Capitaine Hatteras (Paris : Hetzel, 1866) 2.

Aronnax.[135] He is the protagonist, a biologist who joins an international expedition in search of a mysterious marine animal, only to become a guest aboard Nemo's submarine. His significance will be discussed in greater detail in this chapter, but it is important to note at this time that he rises to prominence in the eyes of reviewers and critics because it is primarily through him that Verne relates scientific information: his main preoccupation is to classify and describe new species and gather a maximum of geographical knowledge.

Though focused on the place of science in the novels, the shortcoming of this critical perspective is that it overlooks the technological nature of the Nautilus and Nemo as the expert who produced it. In addition, it does not account for a repeatedly staged plot in the *Voyages Extraordinaires*, the encounter of establishment scientists with machines produced by a reclusive but brilliant inventor. In novels spanning Verne's career, inventors who have mastered electricity produce devices that terrorize the public.[136] The scientists, professors, or engineers sent to investigate them exert a calming influence on the public as they analyze the threat and expose it for what it is: a socially aberrant use of technology, a wrongful, selfish appropriation of science.

These fictional official scientists are representative of their real counterparts in the first half of the 19th century. Robert Fox describes this figure as "a member of a small and essentially undifferentiated elite," the protégé of a prominent *savant,* and a member of a "major Parisian institution of research or higher learning."[137] He shows that by the end of the century, the

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[135] Arthur Evans, Jules Verne Rediscovered : Didacticism and the Scientific Novel (New York: Greenwood Press, 1988).
Paul Alkon, Science Fiction Before 1900 (New York : Routledge, 2013).
[136] Because of my focus on electricity, I will discuss Vingt lille lieues sous les mers (1870), L'Ile mystérieuse (1874-1875), Les Cinq cents millions de la Bégum (1879), Robur le Conquérant (1886), Le Château des Carpathes (1892), and Face au drapeau (1896), Maitre du monde (1904). Similar inventors appear also in Sans dessus Dessous (1889) and L'Invasion de la mer (1905), but specialize in other domains.
[137] Robert Fox, "The Scientist and his Public in 19th Century France" *Social Science Information* 21 (1982) 697.

scientific community was both much larger and more impersonal, no longer centralized in the capital, and prominence in it depended more on qualifications and publications rather than patronage alone. Verne's novels arrive in the middle of this transition, responding to it. His official scientists stand for the glory of 19th century French science, the foundation upon which the future should be built. From a critical point of view, Evans explains that the official scientists rise to prominence because in their activity we find the intersection of literary and scientific discourse. The didactic drive of such characters gives Verne the opportunity to produce "traditional literary motifs and plot structures, for example the heroic quest, or the *roman d'apprentissage*" in which scientific knowledge may nevertheless be presented as such, and in appropriate scientific language.[138]

Verne's preference for establishment science over the advancements of the inventors is evidenced also through his charging official scientists with publishing accounts that detail the death of the inventors and the destruction of their machines. Given the educational mission of the novels presented in the *Avertissement*, it is not surprising that such events would be documented, but what strikes the careful reader is that despite the interest in scientific matters of the fictional universe, in their encounters with inventors, official scientists fail in their task. Instead of reporting detailed information on the machines, or trying to bring them, or their inventors, to the service of the community, Verne has these characters study the psychology of the inventor. They, as the reading public, are most interested in the reasons why inventors choose not to work for the community. This dismissal of the inventors' work, coupled with the spectacular scenes in

[138] Arthur Evans Jules Verne Rediscovered : Didacticism and the Scientific Novel (New York: Greenwood Press, 1988) 108.

which they and their machines are destroyed, represents their condemnation in the *Voyages Extraordinaires*.

This chapter analyzes the incompatibility of inventors with their century in terms of competing notions of science as a discipline, its functions, and responsibilities. To Verne, the way in which scientific knowledge is obtained is as important as the results yielded. Proper methods guarantee the usefulness, if not necessarily the accuracy of the results. For official scientists, science is not competitive, and they do not work exclusively for its advancement as a discipline. This is a fundamental divergence from the inventors' understanding of their work, and helps shape the reluctance of official scientists to perceive the machines as useful progress. Verne contemplates the functions of science beyond acquisition of knowledge and teaching to its moral duty to the nation and its service to the community. The author suggests that science must be understood by the French because though all might agree on its principles, its applications are widely divergent, and could become dangerous. Such a message bestows greater significance on the educational mission of the *Voyages Extraordinaires*, as they appear engaged in the service of the nation, rather than just the entertainment of the reading public.

Section 1.1: *Official scientists*

Aronnax, Vingt Mille Lieues sous les Mers (1870)

I will center my study on Verne's earliest inventor novel, Vingt Mille Lieues sous les Mers because it presents the official scientist in greatest detail, and use the later works to discuss the evolution of the character over the last decades of the 19th century. Verne's first story of the inventor's clash with his contemporaries begins with reports of a mysterious creature attacking European ships. A Franco-American expedition is mounted in response to public concern and as a consequence of disrupted international trade and communications. Verne's protagonist, Prof. Aronnax is the French representative on this expedition, and he is accompanied by his servant Conseil. Aboard the *Abraham Lincoln*, he befriends a fellow francophone, the Canadian *harponneur* Ned Land. When this ship is also attacked, the professor and his two companions are rescued from drowning by Cpt. Nemo, who had been using his submarine to exact revenge on Europe by interrupting its shipping.

Verne establishes the fictional 19th century public's interest in science from the first chapters of Vingt mille lieues sous les mers following the ship attacks, a public debate on the nature of the creature that had caused them ensues. The author notes that "aux chroniques scientifiques des grands journaux de la France et de l'étranger, la petite presse ripostait avec une verve intarissable" (p. 6). Though the conversation engages both scientific publications and the *petite presse*, it does not oppose scientists and uninformed laypeople. Both sides approach the issue as a scientific matter, with the professional papers maintaining that the attacks are being carried out by a large, but already known sea creature, and the popular side holding they are due

to a more monstrous, and as of yet unknown, creature. The difference of opinion is thus over the reach of modern science: those representing the profession believe that their discipline already knows or can explain anything about nature, and the amateurs believe there are still undiscovered aspects. From Verne's description, neither side is being unreasonable, though the *petite presse* stands out through its enthusiasm and sense of humor: "ses spirituels écrivains parodiant un mot de Linné, cité par les adversaires du monstre, soutinrent en effet que "la nature ne faisait pas de sots," et ils adjurèrent leurs contemporains de ne point donner un démenti à la nature, en admettant l'existence des Krakens, des serpents de mer, des "Moby Dick", et autres élucubrations de marins en délire" (p. 6). The mythological references attest to the sensationalism of the *petite presse*, and Verne's official scientist, Prof. Aronnax stands out though his well-argued analysis of the evidence available on the unknown creature. The opinion he prints in the New York Herald, at their invitation, serves as the reader's first impression of the strengths of scientific reasoning and of the scientist's engagement with his public.

The protagonist is introduced as a scientist and explorer in the employ of a famous 19th century research and teaching institution in the natural sciences, the *Muséum d'histoire naturelle*. In the fictional universe, Aronnax is well known through his publications, participation in scientific conferences and expeditions. His books are mentioned already in the first chapter, with Aronnx informing his readers, "j'avais publié en France un ouvrage in-quarto en deux volumes intitulé : *Les Mystères des grands fonds sous-marins*. Ce livre, particulièrement goûté du monde savant, faisait de moi un spécialiste dans cette partie assez obscure de l'histoire naturelle" (p. 14). Though he is internationally renowned, and his expertise is recognized by the government, Verne's description does not recommend him on his personal accomplishments. Aronnax's work

is not excellent because of its scientific proficiency alone, but because it carries out the educational and research aims of the *Muséum*.

The first expert opinion the professor offers does not surprise through its scientific originality. It strongly resembles those that other professionals had already expressed. He argues that, given the marks left on the ships, and the locations of the attacks, the creature responsible is most likely an unusual form of an animal already known to science: "Donc, jusqu'à plus amples informations, j'opinerais pour une licorne de mer, de dimensions colossales, armée, non plus d'une hallebarde, mais d'un véritable éperon comme les frégates cuirassées ou les "rams" de guerre, dont elle aurait à la fois la masse et la puissance motrice" (p. 13). His opinion is remarkable however because it represents a compromise between the two views opposed in the public debate. The professor holds with the *petite presse* that scientific knowledge is limited, but because the exploration of the Earth is yet incomplete. He does not, however, see an end to its means of acquiring information about nature or analyzing it, which is a notion implicit to the opinions of the other professionals. The official expert thus distinguishes himself as one who can make science accessible to the public, in an effort to educate and help sustain the public's interest in scientific matters.

Aronnax presents his conclusions in such a way as to not antagonize either of his publics, the popular or the learned. This concern separates him from the inventors, who, in Verne's depiction as well as that of Zola, do not understand the needs and concerns of their contemporaries, and cannot communicate with them. This character, however, is aware that his reputation as a scientist is related to the visibility of his work, since of one publication, he notes "Mon article fut chaudement discuté, ce qui lui valut un grand retentissement" (p. 17). This

comment privileges how much response the article received, rather than whether his opinion was accepted. Though Aronnax is addressing his fellow scientists, it is very likely that his words will become public. This echoes Hetzel's assertion in the *Avertissement* that "il a fallu faire place dans nos journaux aux comptes rendus de l'Académie."[139] The weight of public opinion in the assessment of the value of official science continue to be significant also in L'Ile mystérieuse, the sequel to this novel. Though his conjecture is false, we learn there that Aronnax's reputation does not suffer, and that his account of the months spent in Nemo's company was a bestseller.

Verne's official experts represent the nation, both politically, and in terms of the scientific practices in which they excel. Aronnax was the envoy of the French government on previous expeditions, as he relates "à l'époque où ces événements se produisirent, je revenais d'une exploration scientifique entreprise dans les mauvaises terres du Nebraska, aux États-Unis … le gouvernement français m'avait joint à cette expédition" (p. 12). He is also invited to join the expedition launched to identify the creature attacking the European ships in an official capacity. The secretary of the US Navy sends a letter stating «*Si vous voulez vous joindre à l'expédition de l'*Abraham-Lincoln*, le gouvernement de l'Union verra avec plaisir que la France soit représentée par vous dans cette entreprise*" (p. 21). This role makes him particularly mindful of the reception of his work abroad. For example, when he admits that 19th century biology may not know all species, he adds that must be cautious, since "je voulais jusqu'à un certain point couvrir ma dignité de professeur, et ne pas trop prêter à rire aux Américains, qui rient bien, quand ils rient" (p. 17). Aronnax takes measures against this and prepares his paper by consulting such varied sources as the "articles de fond de l'Institut géographique du Brésil, de

[139] Jules Verne, Voyages et aventures du Capitaine Hatteras (Paris : Hetzel, 1866) 1.

l'Académie royale des sciences de Berlin, de l'Association Britannique, de l'Institution Smithsonnienne de Washington, aux discussions du *The Indian Archipelago*, du *Cosmos* de l'abbé Moigno, des *Mittheilungen* de Petermann, aux chroniques scientifiques des grands journaux de la France et de l'étranger" (p. 6). Verne's characterization of official science is as open and communicative, perhaps a parallel to diplomacy, because it distinguishes it from the inventors' science, which is secretive and bears no national allegiance.

More than a diplomatic representative of France, Aronnax is a representative of French science also in the sense that he possesses its knowledge and has mastered its methods. The author stresses that his ideas are in keeping with those of other French men of science, when the professor comments that "[n]i Cuvier, ni Lacépède, ni M. Dumeril, ni M. de Quatrefages n'eussent admis l'existence d'un tel monstre — à moins de l'avoir vu, ce qui s'appelle vu de leurs propres yeux de savants" (p. 2). This framing of his work justifies and valorizes his judgment, but at the same time reduces its originality, and indeed once in the Nautilus, Aronnax's primary scientific activity is to observe and classify creatures by applying Cuvier's method. His specialization is an indication that originality is not prized in official science, a characteristic which stands in the way of possible cooperation with the inventors' science.

Before the professor is shown at work, and the merits of this scientific method or Aronnax's particular excellence in its application, are revealed, Verne prepares the scene for such expertise to be perceived as essential to the novel: the plot is launched by a question of classification. All in the fictional universe, as well as the reader, desire to know what kind of creature has been attacking the ships. This question investigated by official, French science, puts Aronnax in a position to explain the unknown: when he identifies a new creature, he is able to

find its proper place in a schema that summarizes the relations of all living things. This is an attempt to rationalize nature, and prepares the reader to perceive the secrets of the natural world as scientific, not supernatural. In Le Château des Carpathes, Verne imagines that the *Voyages Extraordinaires* have helped make his a "pratique et positif XIXe siècle," "un temps où tout arrive, — on a presque le droit de dire où tout est arrivé" (p. 1). They give the reading public control over the rapid development of modern life. Because he appears best suited to answer this question, the professor is not only an expert, but a hero to the reader, who can now join the fictional public in idolizing him.

Classification as a method of official science is presented as accessible to anyone, its wide intelligibility being attributed to its logic. Before learning that the Nautilus is mechanical, the professor explains how he has compared the recorded abilities of the unknown animal to those of known creatures to Ned Land. The Canadian is skeptical because, being a *harponneur*, he too has practical knowledge of ocean life but cannot identify a creature that could cause the damage surveyed. The difference between Aronnax and Land is that the professor, who has both theoretical and practical knowledge, can hypothesize a creature he has not seen yet, whereas Land, who has only practical knowledge, cannot.

The conversation is not at a standstill however, as Aronnax is able to persuade Land, thereby demonstrating the didactic side of official science. From the information provided by reports on the creature, which he has Land confirm, the professor is able to conclude,

> cet animal appartenait à l'embranchement des vertébrés, à la classe des mammifères, au groupe des pisciformes, et finalement à l'ordre des cétacés. Quant à la famille dans laquelle il prenait rang, baleine, cachalot ou dauphin, quant au genre dont il faisait partie,

> quant à l'espèce dans laquelle il convenait de le ranger, c'était une question à élucider ultérieurement. (p. 40)

Aronnax walks Land through his argument, and its logic is as persuasive to this interlocutor as it would have been to a learned society. Because Land does not simply capitulate in front of the professor's exposition, the author implies that to various degrees, everyone has achieved facility with science. As this was an aspect of the *Voyages Extraordinaires*' educational mission, we can argue that in addition to presenting scientific information in an entertaining manner, the novels illustrate their place in its achievement. Verne gives clearer indications later, as he has some characters comment on the novels. In L'Ile mystérieuse, for example, we learn that Vingt mille lieues sous les mers is Prof. Aronnax's work, and the protagonist is able to recognize Nemo because of his familiarity with it.

To further exemplify the versatility of official science, Verne shows that classification can be learned by anyone: the professor's servant Conseil, a man Verne presents as devoted but simple, has been able to master it. He is, in fact, so proficient that and when creatures are visible from the Nautilus, or brought onboard, he is called to help identify them. Conseil has not studied classification, having instead acquired his knowledge by immersion in a scientific environment. Verne explains,

> A se frotter aux savants de notre petit monde du Jardin des Plantes, Conseil en était venu à savoir quelque chose. J'avais en lui un spécialiste, très ferré sur la classification en histoire naturelle, parcourant avec une agilité d'acrobate toute l'échelle des embranchements des groupes, des classes, des sous-classes, des ordres, des familles, des genres, des sous-genres, des espèces et des variétés. Mais sa science s'arrêtait là. Classer,

> c'était sa vie, et il n'en savait pas davantage. Très versé dans la théorie de la classification, peu dans la pratique, il n'eût pas distingué, je crois, un cachalot d'une baleine ! Et cependant, quel brave et digne garçon ! (p. 23)

Unlike Ned Land, who could identify creatures by inspection, Conseil only has theoretical knowledge. When faced with a newly collected specimen, the professor must name it, leaving it up to the servant to record its classification. The limits of Conseil's expertise are demonstrated, for example, when a 'sinister' shell is found. Verne explains it is one that spirals to the left when the species usually spirals to the right. To Conseil, it is not surprising at first glance, but he marvels at the shell when he is told the name of the animal.

The author's summary of the differences between Aronnax and Conseil's expertise, which has the latter "très versé dans la théorie de la classification, peu dans la pratique" is notable because it makes practice the professor's distinction. The reader however soon learns that the inventor's technology, another practical achievement, is far more advanced than any product official science has made possible. His work challenges the established view of the purpose and practice of this domain. Though it should be a very desirable device, as we see in the following section, Aronnax is only minimally interested in the submarine. His discovery of the inventor's library sheds some light on the theoretical aspects of his work, and allows us to conclude on the impossibility of official science to integrate the products or methods of the inventor's science.

Dr. Sarassin, Les Cinq cent millions de la Bégum (1879)

Les Cinq cent millions de la Bégum presents the greatest achievements of official science, which are also the most closely related to the national origin of the scientists. Set in 1871, Verne assigns to his protagonist, a French doctor, the responsibility of correcting the losses suffered in the Franco-Prussian war: Sarassin will establish a French utopian community in the United States, in which the inhabitants gain "la plénitude de la santé, l'habitude d'une vie pleine et régulière, la conscience de sa propre force" (p. 195). He is able to achieve such results through the sound management of the Begum's large fortune, which he shares with a German professor, Herr Schultze. Verne's description of this scientist and his work is much ampler and much of the novel is dedicated to the weapons-manufacturing facility he establishes in the vicinity of Sarassin's city. In this section, I analyze the characteristics and responsibilities of Sarassin as an official scientist, leaving the discussion of his rival for that dedicated to inventors.

The protagonist is introduced in flattering terms, with the author describing an intelligent, respectable man of science : "c'était un homme de cinquante ans, aux traits fins, aux yeux vifs et purs sous leurs lunettes d'acier, de physionomie à la fois grave et aimable, un de ces individus dont on se dit à première vue : voilà un brave homme. A cette heure matinale, bien que sa tenue ne trahît aucune recherche, le docteur était déjà rasé de frais et cravaté de blanc" (p. 1). Despite his merits, and though he is well known in France, Verne suggests that in the international community he is not as respected as he should be. His research is looked down upon because he has limited funds at his disposal. Sarassin imagines his British colleagues thinking as they greet him "Bonjour, monsieur l'homme de peu !... C'est vous qui, pour gagner votre petite vie, faites ces petits travaux sur de petites machinettes ?... Il faut que j'aie vraiment la vue bonne pour

apercevoir une créature aussi éloignée de moi dans l'échelle des êtres !... Mettez-vous à l'ombre de Ma Seigneurie, je vous le permets" (p. 35).

The lack of sufficient funding for the sciences, in particular for experiments and laboratory equipment is bemoaned in France both before, and much more so, after 1870.[140] That Sarassin would be faced with criticism from British scientists suggests that he, and by extension French science, does not have international support. Verne implies that if it is to fulfill its mission, ensure the safety and wellbeing of its citizens, France must help itself.[141] The award of the Begum's millions to Sarassin causes a great change in the behavior of Sarassin's colleagues toward him. They now greet him "avec les marques d'un respect extraordinaire" (p. 34). Through this change in attitude the author suggests that their interest in the funding of science goes beyond the belief that more money produces more results, intimating that those who are too quick to mark the funding of French science as insufficient think more of the funding than of the science. Verne's being critical of those who denigrate the French government's sponsorship of science suits his other novels' suspicion of private patronage (Le Château des Carpathes, Face au drapeau), private scientific enterprise (Vingt mille lieues sous les mers, Robur-le-conquérant, Maitre du monde) or even of unofficial scientific societies (Sans dessus dessous and L'Invasion de la mer).

[140] In 1868, Pasteur described the poor conditions in which French scientists labored in « Le Budget de la Science ». Fox identified the major issues as being the lack of financial support for experiments and rudimentary laboratories, suggesting that "the scientists of France were like soldiers without arms, sacrificing their health and personal fortune in their dedication to research" ("Scientific Enterprise and the Patronage of Research in France 1800-70" 442)

[141] This is very much the spirit of the new colony : « France-Ville avait bien les meilleures relations avec tous les Etats voisins, car elle avait saisi toutes les occasions de les obliger ; mais l'ingratitude parle si haut, dans les questions d'intérêt, que le docteur et ses amis n'avaient pas perdu de vue la maxime : Aide-toi, le Ciel t'aidera ! et ils ne voulaient compter que sur eux-mêmes. »

Sarassin's distinction from his colleagues at the *Congrès d'Hygiène*, his noble, generous spirit, is denoted by the author as not only a personal trait, but a consequence, or manifestation of being a French scientist. The doctor does not see the inheritance as his private property. He imagines himself "le fidéicommissaire de la science," explaining that "ce n'est pas à moi que ce capital appartient de droit, c'est à l'Humanité, c'est au Progrès !" (p. 40). In the case of Aronnax, his teaching at the Muséum and his publishing Vingt mille lieues sous les mers were Verne's way of showing the professor's science worked for the community. In this novel, the author has the official scientist explain that he feels responsible for the future wellbeing of his peers. Being a *fidéicommissaire*, Sarassin sees himself as part of a series of similarly-minded people who will use the fortune to benefit humanity and pass it on. The doctor's project is suitably forward-looking: he establishes an ideal community, France-ville, in which people live in modern, salubrious conditions, which are very different than those in the old European cities.[142]

The protagonist is motivated by a desire to help humanity, and his founding of a utopian community in America recalls Etienne Cabet's Icaria and the communities inspired by the writings of Charles Fourier.[143] To the readers, it would appear as a French endeavor, and in practice, Sarassin's city is, as the name indicates, an ideal France, populated by the French. This

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[142] Parmi les causes de maladie, de misère et de mort qui nous entourent, il faut en compter une à laquelle je crois rationnel d'attacher une grande importance : ce sont les conditions hygiéniques déplorables dans lesquelles la plupart des hommes sont placés. Ils s'entassent dans des villes, dans des demeures souvent privées d'air et de lumière, ces deux agents indispensables de la vie. Ces agglomérations humaines deviennent parfois de véritables foyers d'infection. Ceux qui n'y trouvent pas la mort sont au moins atteints dans leur santé ; leur force productive diminue, et la société perd ainsi de grandes sommes de travail qui pourraient être appliquées aux plus précieux usages. Pourquoi, messieurs, n'essaierions-nous pas du plus puissant des moyens de persuasion... de l'exemple ? Pourquoi ne réunirions-nous pas toutes les forces de notre imagination pour tracer le plan d'une cité modèle sur des données rigoureusement scientifiques ?

[143] In the 19th century several utopian Fourierist communities were established in the United States, making Sarassin's project a further gesture toward realism. Carl Guarneri demonstrates how Fourier's thought was adapted by their founders, and draws a distinction between the philosopher's French and American followers. From this point of view, France-ville is all the more ideal a space, being founded by the French in America.

is accepted by others in the fictional world, as when France-Ville is about to be attacked, the New York Herald issues a warning to "la cité d'origine française. Nous ne savons si les Etats-Unis pourront et devront intervenir dans cette lutte qui mettra encore aux prises les races latine et saxonne" (p. 188). Verne's desire to depict it as a new, better, vital French state is so strong in fact that it mirrors the obsession of Herr Schultze, Sarassin's German competitor, with racial purity. As I will discuss later, he builds his Stahlstadt in order to stop this attempt of the French to improve their population through hygienic living conditions. In the case of France-Ville, the author notes that though the city is built by Asian workers, they are not a welcome addition to the population. In order that they be paid, they promise in writing that they will leave when the work is finished. The papers report this is a "précaution indispensable pour se débarrasser d'une population jaune, qui n'aurait pas manqué de modifier d'une manière assez fâcheuse le type et le génie de la Cité nouvelle" (p. 165).

This unflattering parallel between the two scientists shows how strong the links between science and the nation are in the case of official scientists. In the section dedicated to inventors, I show that though Sarassin's ideas regarding the racial makeup of the utopian society may resemble those of the German scientist, Verne does not simply suggest that Sarassin is to be forgiven because he is French. Herr Schultze's vision involves the destruction of other races, and he is able to carry it out because he leaves his professorship, sets up a private research facility and becomes an inventor.

Section 1.2: ***Inventors***

Verne stages the presentation of the inventor's science through its encounter with the official scientist. In Vingt mille lieues sous les mers, Aronnax's discovery that the Nautilus is a machine renders the professor the 19th century's guide to Nemo's work. The professor is faced with the object most feared by his contemporaries and with the fact that his conjectures regarding the mysterious creature were incorrect. His training has prepared him to understand Nemo's technology, even though the Nautilus appears as such an advanced device, the professor is not interested in reporting on it too closely. Verne adopts this method of presentation in other novels as well, in order to demonstrate the incompatibility of the two versions of science. Because inventors pursue their work without regard for the needs of the community or the growth of the discipline, their results appear unreliable, or useless by the standards of official science.

Such a reading of the official scientists' interpretation of the inventor's science is generally overlooked by criticism. Paul Alkon, for example, reads the Nautilus simply as the tool of official science. He writes, "Verne makes this marvelous machine an emblem of human domination of nature and the instrument by which science is advanced as submarine exploration yields knowledge of regions hitherto denied to observation" (p. 70). Though the submarine does indeed allow the possibility to gather much new information about the Ocean, we must not forget that the 19th century reaps the benefits only because Prof. Aronnax has published his findings. Nemo too surveyed underwater geography, and kept records of the living organisms encountered, as his library and museum attest, but his studies do not benefit humanity. The inventor's private science amounts to as a study of the same natural environment that forms the

focus of official science, but refuses its categories: Nemo is versed in the arts and sciences, and his expertise includes also the practice official science reserves for engineers.

Theory

The theoretical aspects of Nemo's work are illustrated in the presentation of Aronnax's discovery of Nemo's library. The inventor is as versed as his interlocutor in official science: his vast library covers the history of modern and ancient science, featuring also Aronnax's works. This inclusion draws attention to the different responsibilities the two scientists imagine for themselves: Aronnax has been trained to work in a community, and publishing is essential, while Nemo does not share his knowledge. It is important to note however, that though Nemo's library contains twelve thousand volumes, the works are not rare or unpublished. Aronnax recognizes many of them, and is interested in consulting the others. The inventor does not possess the newest works, having last purchased a book when he broke with the modern world, a date which Aronnax estimates at 1865. This is the reader's first indication that Nemo processes the knowledge of his contemporaries differently than official science: from the same books, he derives results they find difficult to interpret.

More importantly, the arrangement of the books in Nemo's library suggests that the inventor's science is a distant relation to that of the professor as a practice. As Aronnax admires the collection, he notes that Nemo does not segregate his library by topic:

> Livres de science, de morale et de littérature, écrits en toute langue, y abondaient ; mais je ne vis pas un seul ouvrage d'économie politique ; ils semblaient être sévèrement

> proscrits du bord. Détail curieux, tous ces livres étaient indistinctement classés, en quelque langue qu'ils fussent écrits, et ce mélange prouvait que le capitaine du *Nautilus* devait lire couramment les volumes que sa main prenait au hasard. (p. 116)

To Alkon, the lack of recognizable order indicates that the books are to Nemo another of his collections, like the sculptures or paintings displayed in his study. As he writes in Science Fiction before 1900, "chance or aesthetics, not rational method governs the arrangement though not the acquisition of Nemo's treasures."[144] However, unlike the works of art, the scientific books are represented as functional, useful items, rather than treasures. Verne shows that Nemo consults them frequently, and he also invites Aronnax to use them to further his own research.[145]

The lack of "rational method" in their arrangement can be read as a reason justifying the great advancement of Nemo's science. Because his books are not rare, it could be that this particular selection has yielded the Nautilus: unlike official science then, the inventor's domain of expertise appears more loosely defined. As Nemo consults "Livres de science, de morale et de littérature, écrits en toute langue" (p. 115), Verne could be depicting invention as a creative practice. Evans' article broaches this subject in its comparison of the library Huysmans' Des Esseintes has built in A Rebours to that aboard the Nautilus. As he points out, both structures allow singular individuals to enjoy works of shared cultural objects in ways that are not accessible to their contemporaries. Phillipe Hamon suggests in "Le Musée et le texte" that their projects entail overly personal interpretation, and neither elicits a positive response from their

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[144] Paul Alkon, Science Fiction Before 1900 (New York : Routledge, 2013) 70.
[145] As further evidence of the difference in knowledge and specialization between the inventor and the official scientist, Verne has Nemo expect Aronnax to continue his work : « ces livres, monsieur le professeur, sont d'ailleurs à votre disposition, et vous pourrez en user librement » (p. 115). This renders the scientist's activity a subset of the inventor's.

contemporaries.[146] Aside from the collections they contain, the Nautilus and Fontenay are difficult to fit in predefined categories: Fontenay is conceived as a replacement of the ancestral home, but it is difficult to perceive as a house, nor is it a museum, church or hothouse, as one would assume given its décor; the Nautilus appears as a weapon, but it is also a laboratory, a home, and a museum. Invention then appears as a private relationship with public resources, which renders it difficult to interpret, reproduce or control from the outside.

Alkon goes on to read "Nemo's library and musem [as] an emblem – as indeed is Verne's entire oeuvre – of the positivist drive to acquire and organize knowledge," as does Evans who sees in the collection a manifestation of the "positivist conviction that valid knowledge of our universe can be achieved by science."[147] These aims of official science, which the critics see reflected in the Nemo's collections do not fit the purpose for which they have been gathered, or the use the inventor makes of them. The author however encourages this identification of the Nautilus library with the Muséum library through Aronnax's carrying out his work using Nemo's resources. Every time the inventor and official scientist are drawn together however, the gap between their understanding of their work becomes more evident, and their relationship is more akin to that Aronnax has with his servant.

The critic sees in Aronnax Nemo's "accidental acolyte," or "talent dangerously attracted into the orbit of genius."[148] The danger to which he refers is manifested in his being "too quick to seize the opportunities it affords him for solving those mysteries of the sea that he also takes for

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[146] Philippe Hamon, "Le Musée et le texte." *Revue d'histoire littéraire de la France.* 95.1 (1995).
[147] Paul Alkon, Science Fiction Before 1900 (New York : Routledge, 2013) 71.
Arthur Evans Jules Verne Rediscovered : Didacticism and the Scientific Novel (New York: Greenwood Press, 1988) 38.
[148] Paul Alkon, Science Fiction Before 1900 (New York : Routledge, 2013) 73-74.

his special area of investigation." Like Walton for Dr. Frankenstein, Aronnax is a "too approving observer" and could grow to pursue science for its own sake, like the inventor.[149] In the *Voyages Extraordinaires*, the mission of which is to educate, and whose official scientists work hand in hand with engineers to improve the standard of living of their contemporaries, this would make Aronnax's actions unethical. For the critic, such considerations are a foreshadowing of "the 20th ct deathcamps and weapons laboratories [which] have depended for their operation more on mediocrities like Walton and Aronnax than on those exercising the rare inventive capacities of Frankenstein and Nemo."[150] In the novel, Aronnax's training is too strong however, and he cannot divorce his work from its social context. The professor is equally pleased with the *retentissment* of his article and its assessment as a valuable contribution.

In L'Ile mystérieuse, the selection of Nemo's library is explained as developing from his aptitudes, as shaped by his European education. His formation mirrors that of Aronnax, and shows that the inventor is an alternative to specialized researchers or engineers, an unexpected result produced from the same methods. Verne's explanation entwines national origin and scientific education, a combination which mirrors the presentation of the official scientist. We learn, thus, that the capitan was formerly India's "prince Dakkar," whose father sent him to Europe, "afin qu'il y reçût une éducation complète et dans la secrète intention qu'il pût lutter un jour, à armes égales, avec ceux qu'il considérait comme les oppresseurs de son pays" (p. 566). Though the author does not expound upon what "lutter un jour, à armes égales" means, Dakkar's immersion in European culture and education is aimed at giving him a thorough understanding of "ceux qu'il considérait comme les oppresseurs de son pays". Later, the oppressors are identified

[149] Ibid. 74.
[150] Ibid. 75.

as the British Empire, but Dakkar travels around Europe and learns about its nations. He does not visit the United Kingdom, though Verne notes that he would have been welcome there, as it was "la seule nation dont il refusa constamment les avances: il haïssait l'Angleterre" (p. 567).

Those he encounters see him as a failed European, not because his understanding of the continent is incomplete, but because Dakkar does not choose a particular specialization or nation as his own. He is "supérieurement doué, grand de cœur et d'esprit," (p. 566) and becomes "un artiste que les merveilles de l'art impressionnaient noblement, un savant auquel rien des hautes sciences n'était étranger, un homme d'état qui se forma au milieu des cours européennes" (p. 567). His versatility is regarded by Europeans with admiration and interest, but no-one imagines that he will join a profession, and thereby, lend his aid to any nation. Being skilled in all disciplines, while also not needing, or desiring to practice in any of them, he remains a gifted outsider in Europe.[151] Dakkar is a subject of admiration, "aux yeux de ceux qui l'observaient incomplètement, il passait peut-être pour un de ces cosmopolites, curieux de savoir, mais dédaigneux d'agir, pour un de ces opulents voyageurs, esprits fiers et platoniques, qui courent incessamment le monde et ne sont d'aucun pays" (p. 567).[152]

Dakkar's public understands him incompletely because they are not familiar with the reasons behind his choice of an impermanent position in Europe, or why he does not choose a specialization. After praising his many talents, Verne answers both questions through Dakkar's

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[151] The 1874 English translation of L'Ile mystérieuse changes Nemo's story to make him appear an admirer of Europe. His father sends him to the continent to be educated "in the hopes that by his talents and knowledge he might one day take a leading part in raising his long degraded and heathen country to a level with the nations of Europe." In this version, his lack of specialization is associated with his desire to better his nation in as many areas as possible, which makes his stay in Europe very successful. This version would in fact show Nemo formed as an official scientist.

[152] As it is common at the time, this is a negative characteristic.

national origin: “il n'en était rien. Cet artiste, ce savant, cet homme était resté indien par le cœur, indien par le désir de la vengeance, indien par l' espoir qu'il nourrissait de pouvoir revendiquer un jour les droits de son pays, d'en chasser l'étranger, de lui rendre son indépendance” (p. 567). Being Indian competes with being an artist or a scientist, and his “implacable ressentiment rivé au cœur” (p. 566) comes in the way of Dakkar’s joining a profession. Pursuing any of the possibilities before him would mean failing at being a good Indian prince.[153] As Verne stresses, Dakkar shares his family and his nation’s anti-colonial sentiment, having been “élevé dans les idées de revendication et de vengeance, ayant l'inéluctable amour de son poétique pays chargé des chaînes anglaises” (p. 567).[154]

Nevertheless, for how easily Verne explains Dakkar through his nationality, when his family is killed by the British, instead of directing his ill feelings against the Empire, the prince develops “un immense dégoût contre tout ce qui portait le nom d'homme” (p. 569). He decides to leave forever the “monde civilisé” (p. 569), and disappears with a small crew, seeking “cette indépendance que lui refusait la terre habitée” (p. 569). This crisis erases the significance of his origin, together with its responsibilities, but Nemo remains sympathetic to the poor and enslaved of other nations. He decorates his study in the Nautilus with paintings of John Brown and

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[153] Adas shows that unlike other colonial territories, Indian science was recognized as having a long legacy. Europeans, however, found its current state to be in decline, in part because they appeared indifferent to new instruments and techniques (p. 106). In this context, Nemo’s education is set up as an ideal meeting of the two sides, which gives his tragedy all the greater significance.

[154] The first English edition changes Nemo’s story to imply that he was manipulated into hating the British : “Instigated by princes equally ambitious and less sagacious and more unscrupulous than he was, the people of India were persuaded that they might successfully rise against their English rulers, who had brought them out of a state of anarchy and constant warfare and misery, and had established peace and prosperity in their country. Their ignorance and gross superstition made them the facile tools of their designing chiefs.” He leaves the world, and becomes an inventor because he has failed in his educational mission. Though this is a misrepresentation of Verne’s character, Orfanik and Robur, two later inventors experience similar failures: both break with society because official science rejects their discoveries.

Abraham Lincoln.[155] Without national allegiance, Nemo is free to pursue his many passions, and because he has left the civilized world, he no longer needs to specialize, which explains his choice of works for the library.

Verne does not supply further information on the process through which the Nautilus was achieved, though in the following section, I discuss his account of its financing and labor. As soon as Nemo's pursuit of the arts and sciences becomes an individual effort, the author stops exploring it. It cannot be taught, unlike Aronnax's science, and Vingt mille lieues sous les mers is more concerned in tracing individuals' service to their nation in this domain. Official scientists are recommended for how well they embody set roles (teacher, researcher), and apply recognized methods (classification). Such actions ensure thorough results as well as the development of the discipline, whereas the meanders of Nemo's thoughts cannot be replicated.

Practice

The particular interest of the inventor novels is that they present instances in which official science fails in its educational or information-gathering mission. In Vingt mille lieues sous les mers, the professor's occupation on the expedition is to explain the creature damaging the European ships. When he learns that it is in fact a machine, Aronnax appears satisfied with the little information Nemo offers, and does not approach the Nautilus as a worthwhile research

[155] These paintings are displayed in Vingt mille lieues sous les mers. In L'Ile mystérieuse however, religious paintings are represented in the illustrations. In particular, above the couch where Nemo lies dying hangs a painting showing a penitent man.

subject. I argued earlier that the inventor's science does not recognize the same disciplines and responsibilities as official science, and this explains why the inventor's work does not appear apt for integration. In this section, I show that an engineer's assessment of the Nautilus is also to find it impossible to reproduce.

That Aronnax is little interested in the Nemo's technology is confirmed in L'Ile mystérieuse, where Verne provides information regarding how Vingt mille lieues sous les mers was read in the fictional universe: the novel was taken as Nemo's story.[156] As the engineer Cyrus Smith, protagonist of the later novel tells the capitan, "il a paru, sous le titre de *Vingt mille lieues sous les mers,* un ouvrage qui contient votre histoire" (p. 565). Such remarks are surprising in light of our finding that Aronnax privileges information about the natural world, and that Verne is reluctant to explain how Nemo built his submarine, or provide the reasons that drove him to attack European ships. The Capitan too objects to Smith's declaration, but not in the way we would expect. Nemo rejects that Aronnax would be able to present him based solely on their acquaintance aboard the Nautilus:

> -Mon histoire de quelques mois seulement, monsieur ! Répondit vivement le capitaine.
>
> -Il est vrai, reprit Cyrus Smith, mais quelques mois de cette vie étrange ont suffi à vous faire connaître..." (p. 565).

Verne's mission statement for the series suggested that the public's interest in the works should be scientific – they offer the opportunity to learn about geography, navigation and biology, but the fictional readers approach this novel as a historical account relating events from the life of an interesting character. In the fictional universe, the great revelation Vingt mille

[156] This is consistent with the contemporary reviewers' take on the novel.

lieues sous les mers brings is that the attacks had been carried out by a man who lived self-sufficiently under the Ocean. Nemo believes he would appear "comme un grand coupable […] oui, un révolté, mis peut-être au ban de l'humanité" (p. 565), in such an account, and Smith finds this a fair assessment, adding tactfully however "j'ignore, comme tout le monde, quels ont été les mobiles de cette étrange existence, et je ne puis juger des effets sans connaître les causes" (p. 566). The Nautilus does not enter into their conversation, though Smith mentions to his companions that upon seeing it, he had recognized it from Aronnax's description.

If it appeared strange that a professor granted access to such an advanced piece of technology would not endeavor to find out as much as possible about it, that an engineer would be more interested in the personal story of the man who built it is even more intriguing. I discuss the responsibilities of Verne's engineers later in this chapter, but I would like to emphasize that official science is uninterested in the submarine as such. The most reasonable explanation is offered by Butcher in his "Jules Verne: A Reappraisal". The critic argues that Verne does not wish to launch into technical explanations the details of which he cannot supply. He is reluctant to innovate and sets his novels in the years immediately preceding their date of publication, so the much desired information on the functioning of the submarine would appear discordant, had it been included.

Such an explanation however breaks the confines of the fictional domain in which the reader is asked to enter. In this context, Aronnax's reluctance to investigate the technology of the Nautilus beyond the basic information his host offers can still be explained reasonably. Aronnax could choose not to comment on the Nautilus out of respect for Nemo's rights to his intellectual property. The inventor has broken with the civilized world, and has not sought patent protection

of his work from any government, but Aronnax could be extending him a professional courtesy by not making public the secrets of his devices.[157] Presenting his discoveries in biology and geography is a different matter, as they are not legally protectable knowledge in the 19th century. Moreover, as Aronnax cites Nemo as the source of these discoveries, it can be said that he is treating him as a fellow scientist.

Though Verne's official scientists occupy the moral high ground, it could also be that Aronnax is quicker to evaluate the information on new species and navigation routes as usable by official science. The Nautilus, no matter how swiftly it can traverse the Oceans, appears very difficult to replicate. Moreover, it is a dangerous device, as Aronnax reasons before ever learning of its mechanical nature:

> seul un gouvernement pouvait posséder une pareille machine destructive, et, en ces temps désastreux où l'homme s'ingénie à multiplier la puissance des armes de guerre, il était possible qu'un État essayât à l'insu des autres ce formidable engin. Après les chassepots, les torpilles, après les torpilles, les béliers sous-marins, puis la réaction. Du moins, je l'espère. (p. 13)

We are interested in this comment because though the machine appears part of an arms race, to Aronnax, this situation, no matter how dangerous, is preferable to the remote possibility that an individual might have built it. As is usual for official scientists, because of their own association with their government, a confrontation with a person without national allegiance cannot be foreseen. To the professor, an inimical foreign government would have trouble keeping such a

[157] The 'punishment' of Verne's inventors (their destruction and that of their machines) can be linked to their failing to be 'proper' inventors, that is to say, inventors as imagined in the late 18th and mid-19th century patent laws. They prize the production of devices that can be marketed so as to benefit the French economy.

project secret, “certainement impossible pour un Etat dont tous les actes sont obstinément surveillés par les puissances rivales” (p. 14). Verne has Aronnax reason in an extrapolation from his own activity: because he works in a community where his peers review his work, and their results are positive, the best could also be obtained also in international relations, where governments survey each other.

The means by which the Nautilus was achieved describe Nemo as the competition of an European power. In L’Ile mystérieuse, following the rebellion in which his family perished, he was able to take refuge on “une île déserte du Pacifique.” There, he settled

> ses chantiers, et, là, un bateau sous-marin fut construit sur ses plans. L'électricité, dont, par des moyens qui seront connus un jour, il avait su utiliser l'incommensurable force mécanique, et qu'il puisait à d'intarissables sources, fut employée à toutes les nécessités de son appareil flottant, comme force motrice, force éclairante, force calorifique. La mer, avec ses trésors infinis, [et] tout ce que les hommes y avaient perdu, suffit amplement aux besoins du prince et de son équipage. (p. 570)

The explanation is remarkable because it, too, glosses over the technical details in the hope that they “seront connus un jour.” By showing Nemo dying, taking the secret to his grave, and his current interlocutor, the engineer Cyrus Smith not ask for details, Verne places the readers’ hope in the powers of French science to rediscover his advances. The author thus recommends official science again for its discipline-building which ensures continual progress.

However excellent Nemo’s knowledge and abilities might appear, the methods he uses to produce the Nautilus are perceived as inimitable and the knowledge itself is not transmitted. Not

only is Nemo intent on offering only a brief theoretical overview of how the submarine works, but Aronnax never presses him for information, nor does he attempt to learn more about the machine, whether through inspection or some other subterfuge. Nemo's science and results are inspected by official science the way new creatures are, since Aronnax's responsibility is to explain the world. In the following sections, a study of Verne's later inventors shows that the *Voyages Extraordinaires* are less concerned with achieving progress, than they are with portraying science as advancing in a particular way: advances must be transparent to the scientific community and as much as possible to the public.

Herr Schultze, Les Cinq cents millions de la Bégum (1879)

Through this character Verne illustrates a case of official science that becomes invention, using the references to Germany to render the figure of the inventor a danger more relevant to his reading public. "Schultze, de l'Université d'Iéna" is a professor of chemistry, whose work also focuses on genetics and biology. The reader first sees him at work on an article for *Annalen für Physiologie* entitled "Pourquoi tous les Français sont-ils atteints à des degrés différents de dégénérescence héréditaire?" (p. 48). His dislike of the French, and in general his attitude toward other nationalities, is not condemned on moral ground, but is portrayed as unscientific. Verne ridicules his interest in the purity of his race and the degeneration of the French by remarking that Schultze also found "si humiliant qu'il pût être pour un professeur à l'Université d'Iéna d'avoir des rapports de parenté avec des gens de race inférieure, il était évident qu'une aïeule française avait sa part de responsabilité dans la fabrication de ce produit humain sans égal" (p. 55). The

reader is meant to take Schulze's scientific ideas with a grain of salt, since they are self-serving: he is advertising his French relative only in order to gain access to the inheritance. Later we will learn that the result of his numerous "travaux comparatifs sur les différentes races humaines" are also undertaken with a conclusion already in mind: "la race germanique devait les absorber toutes" (p. 65).

When he is awarded his share of the inheritance, unlike Sarassin, his understanding of his purpose is that "il était particulièrement désigné par la grande force constamment créative et destructive de la nature, pour anéantir ces pygmées qui se rebellaient contre elle" (p. 65). He finds the doctor's community ridiculous, but he is still afraid he might reach his goal and "développer toutes les qualités de la race et à former de jeunes générations fortes et vaillantes" (p. 65). Schultze's doubts over the outcome of Sarassin's experiment show that he is not as certain that the French race is inferior as he would let his public believe. Despite his prejudice against the French and the strangeness of Sarassin's ideas then, he must trust in the same scientific hypotheses, or he would not fear his success. Verne thereby suggests that science is not pure, in the sense that its facts can be presented according to the prejudices of those who carry out experiments.

To stop Sarassin, Schultze founds a rival city in the vicinity of France-Ville, which he calls Stahlstadt. As the name indicates, it is an industrial city that specializes in steel production. Verne depicts its threat in terms that unite fiction and reality: Schultze will ultimately identify himself as an inventor, and Stahlstadt surpasses Krupp's achievements, to which its products are compared. The city recalls the Nautilus and the island where Robur works in that it is single-handedly run by Schultze, and the division of labor he enforces is extreme. This is a method to

preserve secrecy in the 19th century, employed when businesses do not wish to file patents or are using processes that cannot be patented, but as Verne reminds, "Herr Schultze avait encore un bien autre but que celui du gain."[158] As most of Verne's inventors then, Schultze is uninterested in financial gain for its own sake, through unlike them, he understands this is a useful excuse, and a way to maintain connections with the world outside the laboratory. This is nevertheless a negative trait, as Sarassin declared himself the *fidéicommissaire* of the fortune he was left, indicating that he was not interested in it for his own uses. Though before receiving the fortune Schultze was a German official scientist, he was quick to develop Stahlstadt into a profitable business, demonstrating an inventor's drive. As a consequence, his work is world-renowned, but the public is terrified of it. Verne explains that those who do not possess Schultze's new cannons are afraid of appearing vulnerable, and those who do, invest in them because they scare others. The reception of his work is then very close to that of Nemo, Robur or Orfanik.

Though the work of all of Verne's inventors is feared, in the case of Schultze and Robur the sentiment predominates, and is not outweighed by a sense of wonder at the technological possibilities it may open. Robur is a recurring character of the *Voyages Extraordinaires*, appearing both in Robur-le-conquérant (1886) and Maitre du monde (1904). He specializes in flying machines, the feasibility of which is a hotly contested scientific matter at the end of the 19th century. The first novel begins with coverage of such a debate, one which opposes the proponents of heavier-than-air devices with those of lighter-than-air devices in a learned society in the United States. The inventor's first and driving quest is similar to Schultze's: it is to demonstrate scientific superiority, testing the validity of a theory. He is on the side of heavier-

[158] Alain Beltran, Sophie Chauveau, and Gabriel Galvez-Behar. Des brevets et des marques: une histoire de la propriété industrielle (Paris : Fayard, 2001).

than-air, and though also endorsed by the author, its realization is the source of great fear. Robur kidnaps eminent American scientists to convince them of the legitimacy of his work, but as Verne's other scientists, they do not learn the secrets of the ship. The reader is made privy to details regarding its unique ways of using electricity, while the official experts refuse to engage in its exploration.

The inventor's death scene is spectacular, with only his resurgence producing more terror. As Verne explains, however, it is because this is the definitive, public demonstration of the new technology. Though the threat is similar to that posed by Schultze, Robur too has produced a device with clear military uses, he has also flown it under "son pavillon, l'étamine étoilée avec le soleil d'or de Robur-le-Conquérant" (p. 246). The rivalry between an individual and the nation, a theme developed in the background of the Nemo novels, becomes overt here, with the inventor embodying a threat to all. His last words add a further dimension to the terror that marks the fictional universe: his discoveries are shocking because they are futuristic:

> il ne faut rien prématurer, pas même le progrès. La science ne doit pas devancer les mœurs. Ce sont des évolutions, non des révolutions qu'il convient de faire. En un mot, il faut n'arriver qu'à son heure. J'arriverais trop tôt aujourd'hui pour avoir raison des intérêts contradictoires et divisés. Les nations ne sont pas encore mûres pour l'union.
>
> « Je pars donc, et j'emporte mon secret avec moi. Mais il ne sera pas perdu pour l'humanité. Il lui appartiendra le jour où elle sera assez instruite pour en tirer profit et assez sage pour n'en jamais abuser.» (p. 246-7)

Verne's concern with endorsing the practice of science as a transparent, communal, socially-minded activity over speed of progress is apparent in Robur's remarks. His reference to the future, a period he finds outside the scope of the *Voyages Extraordinaires*, engages the readers in speculation on how the present sets the direction for the 20th century.

This is equally visible in Les Cinq cents millions de la Bégum, where Schultze is particularly terrifying to a 19th century audience because he recalls Krupp. The reader learns that in Stahlstadt, "la coulée, elle s'opère suivant le procédé Krupp, mais avec une égalité de mouvements véritablement admirable" (p. 86). This factory is a rival for all those of Europe, and

> ce qu'aucun de ses concurrents ne peut faire, il arrive, lui, à le réaliser. En France, on obtient des lingots d'acier de quarante mille kilogrammes. En Angleterre, on a fabriqué un canon en fer forgé de cent tonnes. A Essen, M. Krupp est arrivé à fondre des blocs d'acier de cinq cent mille kilogrammes. (p. 72)

The author even supplies a terrifying list of clients who are using Stahlstadt : Schultze manufactures weapons "pour la Russie et pour la Turquie, pour la Roumanie et pour le Japon, pour l'Italie et pour la Chine, mais surtout pour l'Allemagne" (p. 71). This group is remarkable because it numbers not only Krupp's better-know clients, Russia and Turkey, but also countries who supplied themselves from French manufactures.[159] His business is thus an economic threat to France as well as a menace to the safety of France-Ville.

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[159] Jonathan Grant, Rulers, Guns, and Money: The Global Arms Trade in the Age of Imperialism. (Boston: Harvard University Press, 2007) 112.

It was not necessary to enter into the details of the plot before now, but a brief summary will help us to conclude on the strong negative connotation of being an inventor in this novel. When he learns of Schultze's plan to establish Stahlstadt, Sarassin's adopted son Marcel decides to become a worker in the factory and spy for his father. It is through him that Verne reveals the unsatisfactory conditions in which Schultze keeps his workers, and of the division of labor into boring, repetitive tasks so as not to have anyone too familiar with what was being manufactured. In time, Marcel advances through hard work and becomes Schultze's aid. When he finally gains access to the room in which the new, terrifying invention is kept, the last obstacle between him and the device is the German himself. Because his "faculté maîtresse était un égoïsme immense, omnivore, manifesté au-dehors par une vanité féroce" (p. 122), Marcel taunts him, "Mais au fond, … nous ne sommes que des plagiaires. Tenez, voulez-vous que je vous dise la vérité ? La faculté d'invention nous manque. Nous ne trouvons rien, et les Français trouvent, eux, soyez-en sûr !" (p. 127).

The unveiling of the cannon corresponds to the identification of Schultze as an inventor. It is only such a man who would claim this title for himself in the *Voyages Extraordinaires*. Fittingly, the gun Schultze has produced is horrifying,

> C'était la plus grosse pièce de siège que Marcel eût jamais vue. Elle devait peser au moins trois cent mille kilogrammes, et se chargeait par la culasse. Le diamètre de sa bouche mesurait un mètre et demi. Montée sur un affût d'acier et roulant sur des rubans de même métal, elle aurait pu être manoeuvrée par un enfant, tant les mouvements en étaient rendus faciles par un système de roues dentées. Un ressort compensateur, établi en arrière de l'affût, avait pour effet d'annuler le recul ou du moins de produire une réaction

rigoureusement égale, et de replacer automatiquement la pièce, après chaque coup, dans sa position première. (p. 130)

The cannon features characteristics representative of the inventor's work: it is superlative in size and power and it uses technology which is not yet available in the author's time. In this case, the new technology is the recoil mechanism, which makes Schultze's gun very accurate and fast-firing. Verne chooses this device because it is a much-anticipated, and much-feared improvement to Krupp's current well-selling cannons.[160] It is the perfect illustration of an inventor's work, both futuristic and frightening. The interest of this competition between a French and German city is not particularly that it opposes historical rivals, but that it uses them to illustrate the values of the *Voyages Extraordinaires*.

Section 1.3: *Engineers*

In reading Vingt mille lieues sous les mers, it appears that the interests and activities of the scientist and the inventor complement each other, and while their standards may compete, Verne does not suggest that Aronnax can accomplish anything Nemo can, nor that there is no need for his knowledge in the fictional 19th century. The message is rather that official science, because of its methods and discipline, can, in due time, replicate what the inventor has unofficially and secretly achieved. In this section, I show that Verne proposes a positive solution

[160] Ibid. 11, 130, 190.

to the uneasy comparison of inventors and official scientists through his engineers. In the *Voyages Extraordinaires*, they are charged with applying science to ensure the improvement of the community's standard of living.

Cyrus Smith, L'Ile mystérieuse (1875)

The protagonist of Verne's sequel to Vingt mille lieues sous les mers appears as an officially sanctioned version of Nemo, through his inventiveness and passion for science, both of which he pursues however in the interest of his community. Smith has ample opportunity to practice his trade as he and a small party escape from the Confederacy by balloon and crash on the titular island after a storm. The novel portrays their survival on the island, showing it is possible through Smith's resourcefulness and to a lesser extent through the aid of an unseen force, revealed in the second book to be Nemo himself. In the early chapters of the first book, the protagonist goes missing, his delayed arrival recalling the late introduction of the inventor in these novels. His absence allows the author to illustrates how difficult life without technology is for 19th century people: "Et si encore Cyrus Smith eût été avec eux, si l'ingénieur eût pu mettre sa science pratique, son esprit inventif, au service de cette situation, peut-être tout espoir n'eût-il pas été perdu ! Hélas !" (p. 44). Though his companions miss Smith, once the engineer starts his work to make the island hospitable, we can see that it is his education rather than inventiveness that ensures his success, "puisqu'ils devaient immédiatement subvenir aux besoins de leur existence, et si, profitant de l'expérience acquise, ils n'avaient rien à inventer, du moins avaient-

ils tout à fabriquer" (p. 114). Verne thus does his best to minimize the individual in the depiction of the engineer.

This character combines the traits of both the official scientist and the inventor in the guise of the engineer. As we read in the first chapter, "Cyrus Smith, originaire du Massachussets, était un ingénieur, un savant de premier ordre, auquel le gouvernement de l'Union avait confié, pendant la guerre, la direction des chemins de fer, dont le rôle stratégique fut si considérable" (p. 10). As it was true for Aronnax, in addition to his excellent education, Smith's qualities are recognized by his government. However, whereas the professor's science knew no practical applications, Smith is "très-instruit, très-pratique, 'très-débrouillard' " (p. 10). It might seem that Smith's nationality, American, would prevent a comparison with Verne's French scientists or engineers. However, Smith is so admirable to Verne that to him, it is as though the character were French, or trained in France. He possesses

> la physionomie d'un savant de l'école militante. C'était un de ces ingénieurs qui ont voulu commencer par manier le marteau et le pic, comme ces généraux qui ont voulu débuter simples soldats. Aussi, en même temps que l'ingéniosité de l'esprit, possédait-il la suprême habileté de main. (p. 10).

This is lavish praise from Verne, since it depicts Smith to be as competent as a graduate of the *Ecole polytechnique*. The author also implies that Smith's talent or intelligence makes it so that, in fact, he wouldn't have needed to undertake any training, but it was his wish to start humbly, as everyone else, "commencer par manier le marteau et le pic." The engineer's willingness to train separates him from the inventors, and humility is also an essential trait of Simon Hart, the engineer in Face au drapeau.

Through him, Verne illustrates the positive impact science has had on modern life, a central incentive to his support of its popularization.[161] The importance of Smith's training can be distinguished in the vast difference in the standard of living of his companions before and after his joining them. In his absence, they appear as primitive people because they are exclusively concerned with survival: they hunt and fish for this purpose, wondering of every creature they meet whether it is edible. Practical as they may be, such interests appear backward in comparison to Smith's. When he is found, despite being injured, his first thought is to ask whether they are currently on an island or a continent, so he is already concerned with either leaving or surveying the island. The engineer works to improve conditions, whereas his companions only try to survive without changing their situation in any significant way. Smith will eventually modernize the island, changing its landscape. Verne illustrates this civilizing process as "arracher à cette nature sauvage tout ce qui serait nécessaire à la vie de ses compagnons et à la sienne" (p. 113).

The ability Smith possesses, but which his companions lack, which characterizes them as primitive is that he can make fire without matches. Those stranded on the island are aware of the ways in which "les sauvages" accomplish that, for example, by rubbing sticks together, but they are not interested in attempting it. They are such thoroughly technological 19th century people that earlier technology is not accessible to them. This however is meant in criticism rather than praise, as Smith is commended for his versatility. Moreover, after using the sole remaining match, the party's sole concern becomes not allowing it to go out, so that they are paralyzed by their use of technology. It appears that instead of making their lives easier, using primitive

[161] Timothy Unwin, "Jules Verne: negotiating change in the nineteenth century." *Science Fiction Studies* (2005).

technology has made it worse, as it distracts them from the many other activities necessary for survival.

The great difference between Smith and his companions is that though they long for technology, such as matches and guns, they are unable to devise solutions that do not require them. They can also not imagine how these items might be obtained themselves, as is the case when they contemplate how Smith will make fire,

> Il trouvera bien le moyen de nous faire du feu, lui !
>
> - Et avec quoi ?
>
> - Avec rien. (p. 102)

Smith's expertise is valued in fictional universe, as the castaways are speaking metaphorically. They believe that he can reconstitute other items treasured by the civilized world because he is imaginative: "l'ingénieur saurait bien fabriquer de chaudes et solides étoffes... Comment ? il y songerait" (p. 258). His distinction is then a versatile way of thinking, which is not bound by tools or technology.

As Verne explains, the other characters admire Smith because "l'ingénieur était pour eux un microcosme, un composé de toute la science et de toute l'intelligence humaine !" (p. 102). The author had prepared an allegorical reading of the place of science in the modern world through the fire and shelter-making scenes, but this comment is a more direct invitation. It supports my reading of the value of official scientists being derived from their service to the community: it does not praise Smith for his innate qualities, but for his capacity to learn useful scientific information and apply it when necessary.

The distinction is not clear in the minds of his companions, but Verne's description demonstrates that what they appreciate in him, Smith is able to do because of his training. The author has Smith repeatedly note that his work does not reply on original inventions. Instead, he can think around existing technology to devise innovative solutions. For example, in the case of the fire, he makes a lens out of "les deux verres qu'il avait enlevés à la montre du reporter et à la sienne" (p. 118) and lights kindling using a focalized light ray. On other occasions, he stresses that the improvements he makes to the camp are not his inventions, and cites the source from which he has learned them: "cet engin n' est pas de mon invention, et il est fréquemment employé par les chasseurs aléoutiens dans l'Amérique russe" (p. 309).

Verne pushes Smith away from the inventors by making him so reluctant to innovate that he is unwilling to contemplate the future. As the others discuss whether coal reserves will last into the following centuries, or whether the climate of the planet will change, the engineer excuses himself from the conversation. Once he remarks

> Mais tout cela, mes amis, c'est le secret de l'Auteur de toutes choses, et, à propos du travail des infusoires, je me suis laissé entraîner un peu loin peut-être à scruter les secrets de l'avenir.
>
> - Mon cher Cyrus, répondit Gédéon Spilett, ces théories sont pour moi des prophéties, et elles s'accompliront un jour. (p. 272)

His reluctance to comment is then cast as his reluctance to engage in theory, which complements his characterization as a technical expert. Smith is moreover not allowed any innovations that, though known to Verne's readers, would appear to arrive early, given the timing of the fictional

universe. It is for this reason that he and the others mine using liquid nitroglycerine rather than dynamite – the events portrayed take place before Nobel unveils his compound (1867).

Like the official scientists, Smith understands his work as a service to the community: his purpose is to improve the conditions in which his companions live. Their survival depends on him, as does civilization, and Smith reproduces technology, if not yet culture. Like Aronnax, he expresses an interest in and works toward a soiety that is supported by the sciences and which encourages their growth "quand nous aurons largement éclairé l'intérieur de ce massif, quand nous aurons disposé nos chambres, nos magasins, nos offices dans sa partie gauche, il nous restera encore cette splendide caverne, dont nous ferons notre salle d'étude et notre musée !" (p.242). Thus, when modern living conditions have been achieved, a repository of knowledge or a place for research can be founded.[162]

Verne refers to the castaways as *colons*, perhaps because they spend little time devising a plan to leave the island. From their very arrival, he compares the plight of his characters to that of Defoe's hero. Unlike Crusoe, he writes, the inhabitants of the island are "absolument désarmés en face de la nature […] pas un instrument quelconque, pas un ustensile. De rien, il leur faudrait arriver à tout !" (p. 44). This desire to produce everything distinguishes them from castaways, whose purpose is merely to survive. Crusoe had indeed built up and cultivated his island, but in time, and as he found it necessary. Verne's characters are colonists from the

[162] Verne highlights Smith's devices in the chapter headings. Some of them are: *d'arcs et de flèches. — Une briqueterie. — Le four à poteries. — Divers ustensiles de cuisine. — Le premier pot-au-feu. d'arcs et de flèches. — Une briqueterie. — Le four à poteries. — Divers ustensiles de cuisine. — Le premier pot-au-feu. Emploi des pyrites schisteuses. — Le sulfate de fer. — Comment se fait la glycérine. — Le savon. — Le salpêtre. — Acide sulfurique. — Acide azotique. — La construction d'une pirogue. — Chaussures en cuir de phoque. — Fabrication du pyroxyle. — L'ascenseur hydraulique. — Fabrication de verre à vitres et de gobeletterie. — Construction du bateau. Foulage de la laine. — Le moulin. — Le télégraphe électrique. — Les fils. — La pile. — Photographie.*

beginning and imagine an impressive progression of developments : "La question des vêtements et des chaussures, - question grave assurément, - celle de l'éclairage pendant les nuits d'hiver, la mise en valeur des portions fertiles de l'île, la transformation de cette flore sauvage en une flore civilisée, tout lui paraissait facile, Cyrus Smith aidant, et tout se ferait en son temps" (p. 174). Verne's characters are determined to live where they are, and when they, as Crusoe, find seeds accidentally brought over from their place of origin, they plan their harvest four years into the future.[163]

The author envisions no limit to the development of the island, as resources, both material, and intellectual are not lacking. He however lets his readers understand that it will take time. As was suggested in the endorsement of Aronnax's science and in the condemnation of inventors, the pace of progress cannot be rushed. The sequence of developments that modernize the island includes "de rivières canalisées, facilitant le transport des richesses du sol, d'exploitations de carrières et de mines à entreprendre, de machines propres à toutes pratiques industrielles, de chemins de fer, oui, de chemins de fer ! dont le réseau couvrirait certainement un jour l'île Lincoln" (p. 174). Though the colonists do not spend enough time on the island to build all of these, Verne is interested in illustrating the engineer's thinking, impressive through its creative reach and knowledge base. He convinces the reader that Smith would also be able to produce suck key 19th century technology as industrial machinery and a railroad.

Smith's transformation of the island is undertaken both out of his sentiment that he has a duty to his fellow castaway and toward his nation or government. The engineer is explicit about his goals: one day, he hopes to be able to offer the island, with its natural riches and the

[163] Crusoe finds a few grains of corn in a bag, which he accidentally drops in a propitious place, while in Verne, one castaway finds wheat in his pocket.

improvements and modernization he has made to the United States. His ties to the nation are all the greater as at the time he left the US he was a prisoner of the Confederacy because he was a respected Northern engineer. Like the official scientists, Smith's training is politicized by Verne, and the engineer's devotion to the US is further attested as he names the geographical highlights of the island after American historical figures, rather than, as his companions suggested, themselves.

The engineer's civilizing efforts are met with great appreciation from his companions, but their appreciation recalls the terms in which recall the public's awe of the inventor. When life on the island is sufficiently comfortable to allow them to weather the winter without trouble, Verne notes that the colonists' "prières étaient maintenant des actions de grâces. Les colons de l'île Lincoln n'étaient plus les misérables naufragés jetés sur l'îlot. Ils ne demandaient plus, ils remerciaient" (p. 260). The colonists are thankful to God because Smith can provide them with a modern enough life on an island, but Verne does not stop before suggesting that they revered the engineer as a quasi-divine figure :

> Si, pour lui, Cyrus Smith n'était pas un dieu, c'était assurément plus qu'un homme. Enfin la parole lui revint, et il s'écria : Notez cela, monsieur Spilett, notez cela sur votre papier ! - C'est noté, répondit le reporter (p. 118).

We surmise that the engineer is so important in the fictional universe that his deeds must be recorded. The colonists are keeping a record of their stay on the island, but Smith's supernatural appearance makes the reporter a modern version of an apostle. The supernatural connotation often accompanies science in Verne's work. As we saw in Le Château des Carpathes, those who are less acquainted with science or are not familiar with technology, are all too ready to see it as

magic. As a consequence, those who make the technology, usually inventors, are described as supernatural. This side of Smith then brings him closer to the inventor, though he does not see himself as any deity, reserving the religious references for the inventor. The engineer joins the others in referring to the force helping them from off-scene, later revealed to be Nemo, as a *puissance occulte*, *le dieu de l'ile*, *le genie de l'ile*.

The colonial use of the island as an extension, or imitation of the nation by Smith and his companions opposes its use by the inventor. Nemo has taken refuge in this remote location, instead of landing there against his will. He is uninterested in its resources and its transformation: he spends his time under the island, in the Nautilus, and plans to die there. His revelation is a surprise both to the characters and to the reader, especially as the castaways had already met another character from the *Voyages Extraordinaires*, the man who betrayed Cpt. Grant in Verne's earlier novel (Les Enfants du Capitaine Grant, 1868). The encounter between Smith and Nemo allows us to see the engineer not only as a representative of official science but a sanctioned version of the inventor because he is recognized by Nemo as his equal. Proof that Nemo sees much of himself in Smith is that he submits to the engineer's judgment: as we have seen, the inventor explains to Smith his education and how he came to build the Nautilus. For his part, Smith blesses Nemo, as it were, suggesting that the help he has lent them erases the memory, if not necessarily makes up for, the attacks Nemo had led against the European ships:

> mais ce que je sais, c'est qu'une main bienfaisante s' est constamment étendue sur nous depuis notre arrivée à l' île Lincoln, c'est que tous nous devons la vie à un être bon, généreux, puissant, et que cet être puissant, généreux et bon, c' est vous, capitaine Nemo ! (p. 800-1)

Almost as important as his words is the indication that Smith is in part 'educated' through the *Voyages Extraordianires.* Not only is Verne allowing his public to revisit his most popular characters, but he is illustrating how important the novels are in the fictional universe: just as his public learns about the sciences, the fictional characters do too, and they are able to successfully apply that knowledge.

Thomas Roch and Simon Hart, Face au drapeau (1896)

The novel presents the singular case of a French inventor in the *Voyages Extraordinaires*. Verne modeled his protagonist Thomas Roch on the 19th century chemist Eugène Turpin, who is credited with inventing a smokeless explosive, melinite. He was the subject of controversy in the 1880s, as it was believed that after accepting money from the French government for the exclusive use of his invention, Turpin sold the secret to German manufacturers.[164] As a consequence, he was tried and imprisoned, but his innocence was proved in 1893. When released from prison, Turpin sued Verne for basing his dislikable character on him, but lost, despite the author's admitting in his correspondence to his brother that Roch is indeed "le Turpin." I am interested in this novel because the real-life reception of Turpin resembles the model of the inventor Verne had already developed in the *Voyages Extraordinares*. Unlike Villiers however, the author does not seek to illuminate reality, but to lend weight to ideas already fundamental to his work: his criticism of private patronage of science, his representation of the inventor as corruptible, and engineer as honorable characters. As in Les Cinq cents millions de la Bégum,

[164] Dominique Pinsolle, "Le Matin, les affaires et la politique, 1884-1897" *Le Mouvement Social* 3 (2010) : 102.

this novel explains how one type transitions to the other – when his machines are come to represent him, Roch the engineer steps into the inventor's role.

In Face au drapeau, Verne's recommendation of the engineer over the inventor is at its most overt. At first, Thomas Roch, "inventeur de genie," is paired with Simon Hart, a French engineer, whom the author makes Roch's intellectual equal. He is "très versé dans ces diverses questions auxquelles se rattachait le perfectionnement de l'armement moderne, ces inventions de nature à en modifier la valeur, Simon Hart connaissait tout ce qui s'était fait en matière d'explosifs, dont on comptait plus de onze cents à cette époque" (p. 16). Though Verne maintains that "il n'en était plus à apprécier un homme tel que Thomas Roch" (p. 16) because they possess the same knowledge and specialization, Roch's distinction is that he has produced innovative solutions to current scientific problems. As the author explains, "grâce à lui, des problèmes, de pure théorie jusqu'alors, avaient reçu une application pratique. Son nom était connu dans la science. Il occupait l'une des premières places du monde savant" (p. 8). His inventiveness places Roch ahead of establishment science, as the author weighs practice more heavily than theory in the description of a character who still represents official science as he is in the employ of the government.

Though Aronnax was also praised for his practical knowledge, Roch shares his achievements with Verne's other inventors, as translating theoretical problems into practical applications is the implicit conclusion to be drawn for their mastery of electricity. His domain however is more closely associated with chemistry, and Roch's latest device is the Fulgurateur, which "possédait, à l'en croire, une telle supériorité sur tous autres, que l'État qui s'en rendrait acquéreur serait le maître absolu des continents et des mers" (p. 8). Its power is proclaimed so

great that it is considered best it not be tested, and Verne does not present it to the reader until the last pages of the novel. This late revelation, as well as Roch's specialization in weapons, recalls Herr Schultze, comparison which draws this engineer closer to the inventor.

Despite the author's recommendation that it would be best not to test the Fulgurateur, when Roch refuses to demonstrate the device, his reluctance is taken as a sign of bad faith. He offers his device first to France, but demands too high a price, and is reluctant to offer a demonstration. The reader might conclude that Roch is implicitly threatening France, by suggesting that if they do not pay the billions he demands, he will sell the terrible weapon to another nation. Nevertheless, this is not true at this time, and Verne is staging a scene familiar to the reader from the stories of other inventors. With better reasons than Robur and Orfanik, many years' faithful and productive service, Roch is asking that his science be accepted by the establishment. He expects not to have to prove that the current device is efficient because all his previous work had been so successful. The fact that it is his work, he feels, should be sufficient, in a further illustration of the inventor's model of science as a private practice.

The high price Roch demands is also associated with his being an inventor, Verne implying that the French government's lack of support for the inventor makes him see the situation in those terms. The reasons he cites reference the "difficultés déplorables [auxquelles] se heurtent les inventeurs, quand il s'agit de leurs inventions, et surtout lorsqu'ils tentent de les faire adopter par les commissions ministérielles" (p. 8). The author does not criticize this part of the French scientific establishment or the ways in which it works, and goes on to stress that Roch is being unreasonable. Inventors might have a difficult time capitalizing on their inventions, but in this case, Roch had "des prétentions si excessives, il cotait la valeur de son nouvel engin à des

prix si inabordables qu'il devenait à peu près impossible de traiter avec lui" (p. 9). The inventor is thus placing too much emphasis, which translates in too high a cost, on his own work. To him, the value of the device appears too intimately tied with the individual who has produced it rather than being more reasonably derived from the use to which such a device could be placed. As we will see in the last part of this chapter, this judgment is drawn from the 19th century patent laws, which leave the value of an invention to be ascertained from its success on the French market.

Verne makes it seem Roch is asking billions for the Fulgurateur because he wishes to be rich, and this obsession causes him to become insane. He explains,

> N'ayant pu en retirer le bénéfice qu'il devait équitablement attendre, son humeur avait commencé à s'aigrir. Devenu défiant, il prétendait ne se livrer qu'à bon escient, imposer des conditions peut-être inacceptables, être cru sur parole, et, dans tous les cas, il demandait une somme d'argent si considérable, même avant toute expérience, que de telles exigences parurent inadmissibles (p. 9)

It is for these reasons that Roch is sent away to a rest home in America. After presenting his many symptoms, Verne concludes that the gravest consequence of this insanity is that it makes him forget his nation, "la corde du patriotisme, peu à peu détendue, eût fini par ne plus vibrer" (p. 11). The progression of the disease allows Verne to clearly express notions that had only been implicit in his portrayal of official scientists before Face au drapeau. He writes that for Roch, "les sentiments de patriotisme, qui sont de l'essence même du citoyen, — lequel avant de s'appartenir appartient à son pays, — ces sentiments s'éteignirent dans l'âme de l'inventeur déçu. Il songea aux autres nations, il franchit la frontière, il oublia l'inoubliable passé, il offrit le Fulgurateur à l'Allemagne" (p. 12). That the French belong to their nation before they belong to

themselves was not explicitly stated in the earlier novels, but as my discussion of official scientists shows, it is implicit in the author's depiction of their activity and character.

Roch becomes an inventor when he is abducted by a man who wants to be his patron. In Le Château des Carpathes, the dangers of private support of science are hinted to through the characterization of both inventor and his patron as eccentrics, but Verne had left it up to the reader to guess what any other sponsor would have made Orfanik produce. In Face au drapeau, he author is clearer on the dangers of private patronage, which in his vision is associated with the dangers of not owing allegiance to any country. The man who funds Roch's research is a pirate, thus the enemy of all nations. To signify the radical differences between such a man and civilization represented by the engineer, Verne describes him and his crew as having no discernible national origin or allegiance. The engineer Hart was abducted with Roch, and he describes the pirate as follows

> À mon avis, en effet, ce personnage énigmatique doit avoir un intérêt majeur à cacher son origine, et, je le crains, nul indice ne me permettra d'établir sa nationalité. […] Il n'a rien des hommes de l'Europe septentrionale, ni la physionomie calme, ni les cheveux blonds, ni ce doux regard qui s'échappe de leurs yeux d'un bleu pâle. (p. 128)

As a representative of official science, it should not surprise us that Hart seeks to understand the man through his origin. We have seen Aronnax do the same, and it is depicted as conventional wisdom in the *Voyages Extraordinaires* that people act in manners predictable by and representative of, their nation. Similarly, those employed by the patron are dangerous, because "Entre eux, je ne distingue aucune communauté d'origine, - - pas même ce lien qui en ferait soit des Américains du Nord, soit des Européens, soit des Asiatiques. La coloration de leur

peau va du blanc au cuivre et au noir, — le noir de l'Australasie plutôt que celui de l'Afrique" (p. 182). So engrained are these views in the engineer that Hart has trouble understanding how a community that does not share nationality can function. The explanation he gives reveals further details of the danger the patron armed with the Fulgurateur Roch represents: "Mais, si ces habitants de Back-Cup ne sont pas reliés par un lien de race, ils le sont certainement par celui des instincts et des appétits. Quelles inquiétantes physionomies, quelles figures farouches, quels types foncièrement sauvages! Ce sont des natures violentes, cela se voit, qui n'ont jamais su refréner leurs passions ni reculer devant aucun excès" (p. 183). Without national allegiance, these people can only be describe through their baser natures: their instincts and appetites draw them together. This assessment helps to clarify further Verne's suspicion of the inventor as an individual who pursues science outside society, and away from his, or any nation. As in the case of the pirates, the inventors lack all morals because they are developed in their interactions with their peers.

Roch appears all the more dangerous because he joins the pirates after being abducted precisely for their lack of national association. After being refused by France, foreign nations also find the price of the Fulgurateur unreasonable, and « la colère se doubla de haine, — une haine d'instinct contre l'humanité, — surtout après que ses démarches eurent échoué vis-à-vis du Conseil de l'Amirauté de la Grande- Bretagne" (p. 13). Were it not for Roch's interest in money, this story could well portray Nemo's break with society. However, it is important to remember that Roch is at first an official scientist, and in being an engineer, he is accustomed to participating in his country's economic life.

As Verne instructs the reader, Roch is developing the Fulgurateur for his private patron because he wants to exact revenge on Europe. He sees the continent as "ceux qui se sont faits ses ennemis, en le décourageant, en le rebutant, en le chassant, en le contraignant à mendier de pays en pays le prix d'une invention d'une si incontestable supériorité!" (p. 236). The cost of the device has become the measure of the governments' appreciation of Roch himself. It wasn't payment demanded to deter the threat the Fulgurateur represented, but a just reward for how advanced a device it was. Those who refused him are "des indifférents ou des envieux" and in not receiving the funds, Roch saw himself robbed of the "moyens d'expérimenter ses inventions." It is for this reason he feels he is no longer a French citizen, "Je n'ai plus de patrie … L'inventeur rebuté n'a plus de patrie!… Là où il a trouvé asile, là est son pays !" (p. 232).

Though Verne has little compassion for his inventors, and as we have seen, the real Turpin found Face au drapeau a very unflattering picture even though the novel did not intimate he had sold his invention to the Germans, the author does not abandon Roch. He depicts this inventor as one who accepts the cooperation between science and the government, which is a central value of the *Voyages Extraordinaires*. Even when he swears that he will "se venger de ceux qui l'ont méconnu… et même de l'humanité tout entière!… " Roch accuses "vraiment, vos gouvernements de l'Europe et de l'Amérique, monsieur Hart, sont injustifiables de n'avoir pas voulu payer à sa valeur le Fulgurateur Roch!" (p. 236). He recognized Hart as less of an individual than a representative of official science, much more astutely than Nemo had Aronnax.

Nevertheless, Roch's insanity permanently separates him from his engineer counterpart. Hart sees his demands as evident of a "dégénérescence mentale," (p. 25) finding the price of his invention as attesting to "prétentions hors de bon sens," (p. 26) and believes such claims attest to

a “nature ulcérée, cette âme inconsciente” (p. 320). As I have already indicated, Verne is quick to state that Hart is Roch’s equal in terms of scientific preparation, but Hart, like Cyrus Smith in L’Ile Mystérieuse, is socially minded in his pursuit of his work. He does not seek particular recognition for any advancements he produces, being happy instead to see his fellow French benefit from his work. It is this characteristic that drives him to change his name and become Turpin’s guardian in the asylum where he was confined. As the author notes, “cette résolution témoignait d'un dévouement rare, d'un noble patriotisme, car il s'agissait d'un service pénible pour un homme de la classe et de l'éducation de Simon Hart” (p. 17).

As speculated in the case of Aronnax’s apparent disinterest in the Nautilus, Hart too does not wish to steal Roch’s secrets. Verne writes, as soon as he introduces Hart as a man ready to sacrifice himself for the protection of France, “mais — qu'on ne l'oublie pas — l'ingénieur n'entendait en aucune façon dépouiller Thomas Roch, s'il parvenait à surprendre son invention, et celui- ci en aurait le légitime bénéfice” (p. 17). His intention is to guard against anyone overhearing the secret and then capitalizing on it. The knowledge, though unreasonably expensive to France, is still understood as Roch’s property, and Hart will later tell Roch

> Ce secret, Thomas Roch, je n'ai jamais songé à vous en enlever le bénéfice… Je n'aurais pas accepté une telle mission… Mais vous étiez malade… votre raison était atteinte… et il ne fallait pas qu'une telle invention fût perdue… Oui… si vous me l'aviez livrée dans une de vos crises, vous en eussiez conservé tout le bénéfice et tout l'honneur! (p. 316)

Hart’s actions attest to his magnanimity, a personal trait, since the idea of guarding Roch occurred to no other French engineer. However, the reasons he presents to the inventor, that he would reap all benefits and all honors from the development of his device, should it have been

made without him, are notions drawn from 19th century French patent law. As I mention in the conclusion of this chapter, inventor's rights to their inventions are considered natural, but they cannot be protected by the government if patents are not filed. Hart is thus taking the most honorable course for Roch and for France. By citing Roch as the source of the Fulgurateur, or any other device, he saves Roch's reputation, and he makes sure France takes advantage of the invention when someone else finishes his work.

Conclusion

Verne revisits the figure of the inventor throughout his career, and despite small variations, shapes this character as one who works reclusively, claims no nation, and is exclusively focused on the application of electricity, with little regard to the social impact of his work. This particular understanding of scientific work is not shared in the fictional universe, though it is marked by spectacular results that supersede 19th century technology. Inventors however appear as the undesirable members of fictional universe because their science is not productive in the sanctioned ways of the century, and it does not work to promote the discipline, not does it aim to achieve contemporary goals in any domain.

The condemnation of inventors is operated through their excision from the fictional universe in disasters in which they perish together with their machines. These are momentous, and in many cases, public events. In being witnessed, the deaths echo the novels' expositions, where the public is first confronted with the effects of their work. Both the initial and final encounters of the inventor with his contemporaries are marked by terror. Verne diffuses the

situation by having official government representatives, either scientists or the police intervene, rendering the inventors' threat a criminal divergence from sanctioned methods and purpose of science.

The *Voyages Extraordinaires* imagine the ideal place of science in society, and the reasons for which it has earned it through official scientists, those representing research institutions or learned societies. Science is an integral part of public life, benefitting from wide popular interest. It is able to explain the natural world and contributes to the elevation of the community's standard of living. In practice, this is achieved through the work of engineers, while the science of official scientists is pure, concerning itself with producing knowledge. Their work is a collective endeavor that reunites great minds and ensures progress: it fosters the growth of the discipline by training scientists and disseminating knowledge. When applied by engineers, it becomes the certain source of everything the community may require.

In Verne's inventor novels, the expert nature of official scientists is not in their individual merits, but in their service to the public and to their discipline. This however, does not detract from their importance in the fictional universe. Their scientific training assures that unlike their contemporaries, scientists can correctly identify the inventor's threat and attempt to combat it. When placed in the same situation as the public, that is to say, when confronted with the troubling phenomena the inventor's machines produce, the scientists are not a fearful public. Though as unaware of the technological nature of the menace as the other characters, they proceed to analyze the extraordinary occurrences using the methods recommended by official science.

This juxtaposition of official and inventors' science leaves unexplored the question of devices that might be desirable to society. The Nautilus and Robur's airplane are inspired by 19th century experiments or scientific debates, but their realization in the novel is also the mark of their uselessness. Verne's novels imply replicating the inventors' achievement is not an immediate task because the principles from which any particular machine was derived are familiar to the scientific community. The author means to reassures his public that in time, these achievements are inevitable and if left up to official science, they will not be threatening. Despite their emphasis on the rapid pace of scientific development, the *Voyages Extraordinaires* are more concerned with recommending the correct avenue for scientific advancement. As Cyrus Smith advises, progress in Verne's 19th century is inevitable and perpetual, but the novels insist that it be achieved transparently, and officially.

CHAPTER TWO: The Perils of High-Earning Science in Robida's La Vie électrique

Though presenting a 19th century vision of a hyper-techonological 20th century, the literary work of Albert Robida is receiving increasing critical and popular attention in the 21st century. New translations of his major novels, Saturnin Farandoul (1879), Le Vingtième siècle (1883) and La Vie électrique (1892) have recently been published in English by anticipation scholars.[165] His career as an illustrator is also becoming a point of reference in studies of 19th century journalism, while his work for *La Caricature*, the newspaper he edited for twelve years, is analyzed in studies on Zola and Naturalism by critics such as Catherine Dousteyssier-Khoze, Philippe Hamon and Agnès Sandras.[166] One reason Robida's satirical novels are being rediscoverd by the general public is because they not only portray many devices that technology greatly resemble currently existing ones, but his vision of the future proposes a relationship to technology which closely approximates our own.[167] Unlike Verne, Robida focuses on the social impact of machines, depicting a much accelerated pace of life, which requires multi-tasking and a never-ending workday. In his vision, technological innovators are idols of the new society, and a vast knowledge gap exists between users and developers in this field. Most importantly, he

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[165] Le Vingtieme siècle was translated into English by Philippe Willems in 2004, and Saturnin Farandoul by Brian Stableford in 2009.

[166] Catherine Dousteyssier-Khoze and Daniel Compère, Zola: réceptions comiques: le naturalisme parodié par ses contemporains: prose, poésie, théâtre (Paris : Eurédit, 2008).
Agnès Sandras, Quand Céard collectionnait Zola (Paris : Garnier, 2012).
Philippe Hamon, "Robida et Zola" and "Triomphe du naturalisme" *Téléphonoscope* 15 (2008).

[167] In addition to imagining airplanes, audio media storage devices, and trains that approximate the TGV and subway, Robida's trademark invention, the *téléphonoscope*, resembles Skype.

places equal weight on the production of technology as he does on its marketing, making the inventor's public a faithful consumer.

This is best noted in La Vie électrique, the second novel of Robida's Le Vingtième siècle trilogy, which is set in Paris, and takes place in a fictional 1955, three years after the first volume, Le Vingtième siècle. Like Verne, Robida builds a continuous fictional universe, but relies much more heavily on the reader's familiarity with it. I focus primarily on the second novel, and reference the first, since some characters are recurring, and because the fictional universe, though given the same temporal and geographic parameters, is presented with a vastly different tone. Robida does not revisit the lighthearted satire of the first novel, choosing instead to focus on the many difficulties and inconveniences, as well as the dangers faced by the inhabitants of the future, which he links to technological advancement. This trend is characterized as excessive in the sense that it goes beyond even the fanciful satisfaction of the many needs of Parisians, which had been a central theme in Le Vingtième siècle.

The impact of technology on society is profoundly negative, and the author links it directly to the inventors' engagement in the economy of their period. The harmful effects and pace of scientific progress are intentionally sustained by the inventors, against the better interest of their, albeit complicit, public. His reflection on the role of science in the fictional universe is thus much more complex than Verne's, but Robida adopts the evident knowledge gap between the public and the inventor as a motif. If in the first novel of the trilogy progress was expressed through an accumulation of machines, in La Vie électrique, the public is no longer at ease manipulating them. The 20th century Parisians are overwhelmed by the new devices and find them unintelligible.

The innovation over Verne's model is to have inventors, still the primary source of technological advancement, have much to gain from the disparity in knowledge between themselves and their public. In Le Vingtième siècle, it was suggested that technology was developed in response to public demand, and that it fulfilled a need, be it real or capricious – Robida doesn't carefully distinguish between the two, indicating only that progress is grounded in the desires of the majority. Unlike in Verne, however, it speaks for itself, through its purchases, and is not spoken for by official scientists. In the second novel, however, the need for new technology is manufactured by the inventors, in a hyperbolic reading of the patent laws that emphasize marketability as the utility of an invention. As a consequence, their machines are designed to be increasingly complex, less comprehensible, and render them wealthy industrialists. The many negative aspects of modern life are thus direct effects of the business and research practices of the inventors of the future.

If in Le Vingtième siècle the reader was shown the consequences of a wide-scale application of science in modern life, in this sequel, we see the inner workings of the scientific society, which entails various degrees of access to its new source of power and authority. The novel focuses on an expert community, the highest representative of which is Philoxène Lorris, an inventor modeled on Thomas Edison. This is Robida's representative inventor figure through which the perils of uncontrolled, but highly-profitable, private science are illustrated. He is extrapolated from the 19th century scientist, and represents the unexpectedly dark future growing from the period's hopes and dreams. Lorris appears to follow Edison's path but his is no longer a tale of long but successful experimentation: the inventor capitalizes on the side effects of his discoveries without sufficient research, and repackages old inventions in response to new demands. Suspicion is cast on his discoveries and his scientific assertions are undermined by

events. This trend ends with the failure of science to address the most pressing problem, which is that of degeneration, a 19th century preoccupation.

A further significant dimension of Robida's development of an electric universe is that the inventors' reach touches also into politics. Lorris, as the most prominent inventor of the future, works closely with the French government. He however also sells weapons to foreign powers, dealing with them from a troubling position of equality, much like Verne's Robur. In the most significant scientific matter of this future, Lorris is placed in competition with the *Faculté des sciences*, the almost powerless official scientific authority of this 20th century, and triumph through questionable research practices. These considerations were already visible in the background of Verne's work, but Robida makes them his subject, illustrating the dangers of science as private enterprise operating outside government oversight.[168] Though driving the economy, the inventors' work does not sustain the future's primary purpose as shown in Le Vingtième siècle, that of advancing to an even farther future. In this, Robida joins the central notion of Verne's characterization of the inventor, that he seeks progress for the sake of progress.

Robida's vision of future is not pessimistic. He does not condemn it, but suggests that a return to a less 'electric' way of life will be able to combat the negative effects of science and industrialization. Far from offering a simple Luddite ending, leaving *la vie électrique* represents a return to the author's ideal France, a modern time that values the environment, its history and literature. In the text, this period is identified both with the 19th century and with the Middle Ages, through a logic that considers both peaceful and as such, indistinguishable, by the 20th

[168] Verne openly sets up his inventors in competition with the *Académie*, but kills them, leaving the last word either to a professor or calling on the police to analyze the wreck of the inventor's machine and explain to the public that they hadn't witnessed a supernatural occurrence.

century standards. Placing this in the context of Robida's work outside anticipation, texts engaging with French history and Paris architecture and city life before Haussmann, it is the coexistence of the two that is valorized by the author, rather than a return to either one. His novels urge the 19th century to revisit its past, reassessing its enthusiasm for science by viewing it in wider French historical and cultural context. The hyperbole of his satire incites to moderation in the pursuit of modern drives.

Section 2.1: ***Technological development as offence***

The frontispiece of La Vie électrique (following page) provides the first indication that the technological development of the future is excessive and ill-gotten. The illustration adopts certain standards of the representation of electricity in late 19th century graphic art, such as the personification as a woman, but instead of picturing her as a muse, Electricity is unflatteringly portrayed in an allegory as the *Grande Esclave*.[169] The charactre appears enraged and perhaps vengeful, though hard at work, her many applications offered in the very busy illustration as evidence of her enslavement. Her hair is spun into telephone and telegraph wires, and to symbolize the devices she powers, she is also turning a large crank to provide the *force motrice* (see label of *Force* to the right of the crank) for industrial machinery.

[169] At the end of the 19th century, allegorical representations of electricity are a popular illustration, using a woman in classical robes as the principal figure, surrounded by various electrical devices. Electricity is, however, not unhappy. Cordulack suggests that the character's expression is generally serene and welcoming, or at least aloof. Beltran and Carré also show that the personification of electricity as a woman, *la fée électricité*, is positive, especially when associated with the marvels of the 1881 Paris Electrical Exposition and subsequent World's Fairs.

This illustration suits other 19th century graphics, which also present Electricity surrounded by the devices that uses it. The 1899 poster advertising the Canal de Jonage (left), for example, shows a feminine personification of Electricity next to various devices she powers. Similarly, Robida's image announces the many applications of electricity in the 20th century, though it uses, as this poster, 19th centurymachines.[170] The telephone, telegraph, phonograph and light bulb date from Robida's time, and more particularly, are American inventions and devices primarily associated with Edison.[171] The choice of machines pictured appears thus to reflect on the advances in the science and technology of the 19th century, and to focus on the American leadership in the electrical race of this period. The first image of the future thus already draws the reader's attention to the past, technique which the author will employ also in the discussion of the scientific ideas of the fictional 20th century.

The early association of this future with Edison, like that of Villiers, takes advantage of the popular knowledge of the readers, suggesting that the science of the future draws on the work of this inventor. It relies as much on research and experimentation as on the commercial promotion of its results. When Robida is writing La Vie électrique, Edison is seen to embody both a technical ability and great business sense, and is perceived as an accomplished rather than

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[170] The most futurist aspect of the illustration is that of an implicit means of electric delivery of messages, perhaps an allusion to the téléphonoscope, already celebrated as the greatest invention of the future in Le Vingtième siècle. Lightning is used as a symbol for the speed of delivery of messages, who are carried by young winged creatures. To show what a great improvement the technology of the future represents over the technology of the past, paper mail is represented as an old man at the bottom right, crawling toward Electricity.

[171] Though several 19th century inventors claim to have been the first to imagine the telephone, Scotsman Alexander Graham Bell was granted the first patent for it, in the US (1876). American Samuel Morse is credited with inventing the electric telegraph, but Edison holds a patent for duplex telegraphy, and also developed quadruplex telegraphy (1874), which was his first great financial success. He had become one of the best known people of the 19th century through the incandescent light bulb (1879) and his phonograph (1878).

promising man, as he was when Villiers began drafting L'Eve future. He has also built the first system of distribution of electric power, using the Pearl Street Station in lower Manhattan, and has also electrified the first private home.[172] In the early 1890s, Edison is at the height of his popularity on both continents, and has just visited France for the 1889 International Exposition to a great popular reception.[173]

The personification of Electricity in the frontispiece equally notable because it imagines her in a similar classical context to that of the Jonage poster, but instead of being a muse, she appears as Prometheus, suffering and chained to a rock, while an aquiline man behind her watches and profits from her struggle. In this respect, Robida's frontispiece is reversing a topos of the representation of inventors in late 19th century anticipation: he makes Electricity play Prometheus. Usually it is the inventors who are represented as audacious, and thus promethean, because they challenge natural and social order by mastering electricity outside of the academy. In the frontispiece, Electricity appears therefore unjustly punished, at the inventor's hands. Though the reader would not be able to come to this conclusion from the inspection of the frontispiece alone, I show that the skeletal figure holding a light bulb (hiding behind and to the right of Electricity, pictured left), is a caricature of the inventor. He is surrounded by his representative devices, in a manner similar to the classical depiction of deities with their symbolic objects.[174]

Cordulack's article on the "Franco-American Battle of Beams" identifies this figure as the Statue of Liberty, which could be supported by the origin of the devices also included in the

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[172] J.P. Morgan's Madison Av. mansion.
[173] William Simonds, A Boy with Edison (New York: Doubleday, 1931) 256-9.
[174] Idealized figures of the gods show, for example, Apollo with the lyre, Zeus with the thunderbolt, and Dionysus with the thyrsus.

illustration.[175] She agrees that this is an atypical representation of the statue, which in the French graphic art of the late 19th century appears as a beautiful woman, and exemplifies French technological ability. In particular, the beams irradiating from Liberty's crown were appropriated by many French commercial artists and became assimilated to the representation of Paris as the "city of light," although its lighting never worked as intended, and its electrical components were ultimately American.[176] A study of Robida's other caricatures of inventors, however, indicates that Liberty possesses many of their characteristics. Upon inspection, we note that this is a skeletal man with pointed eyebrows, and a large bald head, wearing mustaches, as do the inventors represented in the novel (following page). The age's inventors have developed this physique as a consequence of their work, being "generations de plus en plus débilités par le travail cérébral excessif" (p. 68), and they suffer *plus de muscles*, *plus d'estomac* (p. 144). It is even speculated that eventually, their atrophied bodies will be topped by "un énorme cerveau sous un crane semblable à un dôme" (p. 144). Such a depiction of the inventor as a type, in Robida's terms, *une race*, is the culmination of Verne's tendency to condemn inventors, having them suffer a recurring fate.[177] Robida's version, however, first experience Edison's success and thereby negatively impact their customers' lives.

With the inventor thus identified, Robida stresses not only the close relationship of the scientist to electricity, but the high degree to which the future has come to rely on it: the inventor bears in his eyes the sockets of the light bulb's wires. His expression is of intense concentration,

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[175] Shelley Wood Cordulack, "A Franco-American Battle of Beams: Electricity and the Selling of Modernity" *Journal of Design History* 18.2 (2005): 147-166.
[176] As Cordulak also recounts, Bartholdi's plan was for Liberty's crown to radiate light and thus function as a lighthouse in New York Harbor. Instead, once in place, it was only possible for her torch to be faintly illuminated.
[177] Robida depicts, both in the narrative and pictorially, the inventors as exhibiting many similar traits, so it is not surprising that characters would refer to them as belonging to a *race*, being an "ensemble de personnes ayant entre elles des caractères communs importants." (ATILF)

the sockets making it appear he is glaring at the reader, much like Electricity: the pupils of both characters are reduced to points under the intensity of their gaze. The author is suggesting that there is a dependency between the two, and that it is established through their electrical nature. However, though their expression is similar, the skeletal figure appears angry and determined, while Electricity's eyes and downturned mouth show she is upset, perhaps on the verge of tears. The precise relation of the two figures is difficult to define, but because the man is powering the light bulb, he is using Electricity, profiting from her enslavement. As the caption identifies Electricity as a slave, it could be that the man is her master, forcing her to power the inventions represented. Most importantly, despite the difference in standing in the hierarchy of power introduced by the caption, the illustration suggests that both parties are hurt by their interaction. The inventor is aged and does not seem in good health, while Electricity is unhappy and overworked. This echoes the principal concern of the novel, further indicating that the 20th century's way of life is overdependent on technology, and too stressful for its inhabitants.

Before Robida's reader has the information necessary to interpret the frontispiece, the author offers a misleading explanation for the unjust enslavement of Electricity. In the first chapter, he repeats the caption of the frontispiece in a discussion of the 20th century's premiere achievement, its control of weather. He remarks that modern science has rendered "L'Electricité […] la Grande Esclave…. L'Electricité a été saisie, enchainée et domptée" (p. 3). This reiteration of the main characteristics of the illustration is accompanied by the author stressing the magnitude of this achievement by setting it in a mythological context, and by describing it as 'unnatural' in the sense that it signifies man's victory over nature.

Weather control is the outcome of a contest between man and nature, in which man has turned science, and thus electricity against it: "la science moderne a mis tout récemment aux mains de l'homme de puissants moyens d'action pour l'aider dans sa lutte contre les éléments… Nos électriciens dirigent les courants d'air" (p. 2). The elements no longer threaten man, but the mythological dimension of mastering them does not revisit the myth of Prometheus, as does the illustration, preferring instead a Christian frame: "c'est la conquête définitive de l'Electricité, du moteur mystérieux des mondes qui a permis à l'homme de changer ce qui paraissait immutable, de toucher à l'antique ordre de choses, de rependre en sous-œuvre la Création, de modifier ce que l'on croyait devoir rester éternellement en dehors et au-dessus de la Main humaine!" (p. 3).

Mastering electricity provides access to the *moteur mysterieux des mondes*, and lets man upset or challenge the *antique ordre des choses*. *La Création* is now man's subject, which in turn elevates the *Main humaine* to the divine rank, which the author underlines through the use of the capital. A similar relation of the mastery of electricity and the divine is identified by Beltran and Carré in the Abbé Moigno's 1883 work, Les splendeurs de la foi, montrant le parfait accord de la revelation et de la Science. The author seeks argues that through science, man is humbly imitating God. 19th century literature sees less humility in the contemporary scientific enterprise than an attempt to equal or outperform God. They focus on L'Eve future, but the passage they cite from Moigno, "si le soleil est l'œuvre de Dieu, la lumière électrique est un peu l'œuvre de l'homme ; or, puisque l'homme est fait à l'image de Dieu, qu'il imite de son mieux les procedes du Createur" (p.174), resembles Robida's. However, in capitalizing *la Main humaine*, La Vie électrique diverges from this message, indicating that the 20th century's scientific progress is satanic, because of the desire to equal God in a Christian frame – man takes over *La Création*.

The future's offence against Electricity is thus compounded by its offence against nature and divine order, prompting the reader to see in the conflicts depicted punishment for these wrongs.

Though the control of weather is the only evidence explicitly cited by the author to explain the frontispiece, and it is characterized as the future's greatest achievement, this innovation will not be addressed again in the novel. The negative consequences of the development, as Carré explains, are "la catastrophe écologique et les risques permanentes […], une rançon de la technique."[178] However, it is not the degeneration of modern people under the stresses of modern life that is the punishment, but the inventors' mechanical application of their precepts. Such exclusive focus on 20th century ideas prevents them from identifying what the author recommends as lasting solutions because they are not obtained through modern science. This ensures that their *race* does not propagate, while others return to a less technological, and less stressful life. Though the future's faith in its way of life and its lack of regard for the wisdom of previous ages was already addressed by Robida's Le Vingtième siècle, these notions are reiterated in La Vie électrique through the inventor's development: as his age, the figure is fiercely independent, more so than his 19th century model. As a corollary to this characterization and the purpose of science espoused, the inventor sees his contemporaries only as a market for his inventions.

[178] Patrice Carré, « Robida et Christophe. Les cabrioles de l'objet technique : de la science mythifiée à la science mystifiée » *Téléphonoscope* 13 (2010) : 5.

Section 2.2: ***The inventor as self-made man***

In her note on "Images de savants chez Robida, entre divertissement et inquietude," Sandrine Doré argues that Philloxène Lorris, the premier inventor of La Vie électrique, is the prototype of the scientist of the future because he is an electrical engineer who wants to aid his contemporaries, but who is also intent on making a fortune.[179] To Doré, this self-made man recalls Thomas Edison, Gaston Tissandier and Louis Pasteur.[180] Though she does not go into details regarding the areas in which the influence of these men on Lorris' characterization is apparent, one could say they are reflected in his expertise. His inventions greatly outdo the achievements of these scientists in the domains of electricity, chemistry and microbiology, and Robida could well want the reader to reflect on these prominent 19th century scientists when imagining Lorris. Doré, however, leaves Lorris in too excellent company, missing Robida's defining him as a modern inventor not only in deriving him from an accumulation of 19th century scientists, but by showing him to be an unethical researcher and businessman.[181] Lorris' other distinction is that his renown in his time is not necessarily, or no longer, deserved, as his theories and assertions are undermined by the plot. Though he is successful in the fictional 20th century, Lorris relies on improper and unethical research or clever repurposing and marketing of accidental results.

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[179] Sandrine Doré, "Images de savants chez Robida, entre divertissement et inquiétude" *Téléphonoscope* 13 (2006) : 6.
[180] Gaston Tissandier is a French scientist best known for his experiments with electric motors for balloons. Some of his exploits are recounted in the American journal *Science* 3.54 (1884): 196-199.
[181] As we have seen in Le Vingtième siècle, the future is often shown to be better than the 19th century through accumulation: it has more means of transport, Paris has more *arrondissements*, and so on.

In the novel's exposition, where his background as a scientist and businessman is presented, Robida constructs Lorris as an even greater self-made man than Edison.[182] Lorris achieves an empire greater than the American's, at an even younger age. Again, futurism is denoted as the outperformance of the past in the speed with which the new age accomplishes a particular task, and in the magnitude of the result. The very story of Lorris' success however attests to the primacy of his desire for financial gain over any other motivation. His activity is fruitful because he is aware of the importance of his relation to the public as the market for his inventions. This is a distinction of Robida's 20th century, as Verne's inventors do not possess this characteristic, and which Villiers' Edison masters. Lorris' evolution and professional activity are used to represent the threat of unsupervised capitalism and science empowering individuals to positions that rival the state. A subsequent danger is that their practices could damage the public while ensuring large profits for themselves.

Lorris' background introduces him as an eminent, respected scientist, who has worked hard to rise above his humble beginnings. "Lorris, le grand inventeur, l'illustre et universel savant, le plus gros bonnet de tous les gros bonnets des industries scientifiques" (p. 6) is a modern success story, as Doré notes, because he is a self-made man, whose parents were poor *petits bourgeois*. He is then a more modern scientist than Verne's protagonists because he does not rely on his family's wealth, which marks a break with the gentleman scientist model.[183] In this respect Lorris is modeled on Edison, and the inventor is likened to the American in an illustration (p. 206, and next page, top) and by being called, similarly to "le sorcier de Menlo

[182] He uses the funds raise from the shares to immediately establish a factory, "pour l'expoitation d'une affaire importante, etudiée et mijotée par lui avec amour" (p. 7). He is able to use the profits to buy back the shares in four years.
[183] The Dictionary of Modern Medicine defines a gentleman scientist as "a financially independent gentleman who had the luxury of studying scientific phenomena as a hobby."

Park," "le grand magicien moderne" (p. 213). Robida's sketch pictures him with a machine, the right side of which has a light bulb, and the left a crank and reel which the inventor turns. It is reminiscent of a much circulated 1888 photograph of Edison in front of the phonograph (next page, middle), which Robida also seems to adopt for the cover of La Vie électrique (next page, bottom). There, the author depicts a typical inventor of the future – an older, bald man, with pointed features and large skull. Though representations of inventors even before photography often included their devices, those with which both Lorris and the scientist on the cover are depicted resemble the Edison phonograph, which would also be known to the public.

The choice of the American as a reference is not surprising, given that it is mostly his inventions that are included in the frontispiece of the novel. However, the association of Lorris with Edison as a self-made man reflects the more accurate information about the American that was disseminated in France after his visit to the 1889 Exposition. When Villiers was preparing L'Eve future, it was not known in France that Edison was self-educated, and the papers bestowed upon him academic degrees he did not possess. At the occasion of the Exposition, when Edison meets the French president Sadi Carnot, Louis Pasteur and Gustave Eiffel[184], his life's story becomes of greater interest, though accounts of his inventiveness and the many applications ofhis current and future inventions are still the most popular. Press coverage also features details about Edison's modern laboratory at Menlo Park, which finds an echo in Lorris' facility.

This inventor's excellence, unlike that of Verne's inventors, is first shown in the academic domain, which is a sign of his French and futuristic success. Lorris graduates first from

[184] William Simonds, A Boy with Edison (New York: Doubleday, 1931) 256-9.

the *Ecole polytéchnique*, then studies at the *International scientific industrie Institut* [sic].[185] The first institution appears to be the modern incarnation of the 19th century French establishment, which at that time provides "the elite of scientific apprentices."[186] The author offers few details on the international institution, but the reader can surmise that it is of excellent reputation. As its graduate, Lorris is offered investments to continue his work. It would thus appear that the scientific education of the future has a practical, as well as academic side. Promising scientists are not only trained in the methods and theories of their chosen fields, they are also given access to patrons. The futurism of Lorris' training is reflected in his immediate access to funding, but also in his being a synthesis of the two inimical sides of scientific research in Verne's works. He profits both from scholarly training, incarnated in Verne's official scientists, and which was the contemporary French understanding of success in science, and the freedom to work independently that the ill-fated inventors claimed for themselves. The combination is only possible because of Lorris' Edison-like business sense.

Robida blurs the line between scientific education and business. Despite the generous offers made to Lorris and his lack of personal funds, "il refusa d'accepter les offres d'un group de financiers qui lui proposaient de *l'entreprendre* – suivant le terme consacré" (p. 7). The novelty of offering graduates such patronage is surprising, but the implications of this bid are equally informative about the future's understanding of the scientific establishment. The reader can conclude that in the 20th century news travels rapidly and that not only are people very well informed, they can also process information very efficiently. In these conditions, Lorris'

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[185] The name of the *Institut* is rendered in the 'salade-langage' of Western European languages which Robida has replace national languages in the future as a result of their constant interaction. (Le Vingtième siècle, p. 116)
[186] Robert Fox "The Institutional Basis of French Science in the Nineteenth Century", in The Organisation of Science and Technology in France 1808-1914 (Cambridge: Cambridge University Press, 1980) 31.

education and performance at the *Institut* can be rewarded so quickly with such high offers of private funding.[187] As there is already a *terme consacré* for this action, we can also conclude that this society, as part of its general high efficiency, can evaluate a scientist's potential very reliably. If funds were offered to an inventor but yielded little return, the practice would fall out of use, and thus not require a particular idiom.

This practice is the opposite of the private investment in science in 19th century America, where financiers supported Edison's research. Lorris' success is futuristic – where it was difficult even for Edison to gather funds, and he recruited people especially to present him and his works to the layperson, often very theatrically, the fictional inventor's supporters find him.[188] By all accounts, Edison's team constructed his own potential as unlimited, but Lorris does not need to engage similar representation.[189] In Robida's future, there is greater transparency in the marketing of science (for example, no inventions are represented as magical), because the public is more educated in this domain. The condemnation of the inventor entails showing that the public's trust in Lorris, based on their understanding of his work, is misplaced: the inventor's knowledge far surpasses that of the public, and he can still manipulate them. Despite its popularity with the public, the idea of private science is still threatening.

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[187] The same idea surfaces in Verne's Paris au XXe siècle, in which the stock market is affected by the exam results of the graduating class, and graduates' job placement is immediate and dependent on their academic performance.
[188] This will become a growing concern for Edison in the late 1890s and require increasingly provocative measures as Tesla's competing current gains popularity because of its lower cost and greater ease of transmission over long distances.
[189] John Wasik, The Merchant of Power: Sam Insull, Thomas Edison, and the Creation of the Modern Metropolis (New York: Palgrave Macmillan, 2006).
Randall Stross, The Wizard of Menlo Park: How Thomas Alva Edison Invented the Modern World (New York: Random House, 2007).

In France, the patronage of science primarily came from the government and was accorded in the form of prizes for solving current, pressing problems. Even under Napoléon's rule, when French science flourished, its success was not linked to particularly generous funding. Instead, scholars credit its results to the vision of leading scientists, Laplace and Berthollet whose program set a wide scope for the study of the sciences in the universities. Fox writes that the two sought "the explanation of all physical and chemical phenomena in terms of attractive and repulsive forces."[190] These two independently wealthy professors would support their students' research rather than patronizing independent inventors. It was also their responsibility to set the questions for the allocation of government prizes, and the choices made it easier for their students to be rewarded. As Wood notes, scientists working in private could die in poverty, as was the case of Jean-François Champollion, in whose case the papers asked the government to institute a pension.[191] The families of Antoine-Laurent de Jussieu and of Baron Cuvier also received such pensions, though Wood notes these rewards were not common.

In discussing Lorris' financial support, Robida's choice of *l'entreprendre* could have been made because with a person as the direct object, the verb can also mean 'to try to seduce.'[192] From this point of view, in setting Lorris up in business, the investors are tempting him into a deal from which they stand to benefit more than the inventor himself.[193] Working for a company he does not own, Lorris could also have to pursue research that does not necessarily interest him, or relinquish his rights to his inventions in communicating his findings to his employers. Once he establishes his own laboratory, Lorris employs other inventors, and his

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[190] Fox, 14.
[191] Derek Wood, "A State Pension for LJM Daguerre for the Secret of his Daguerreotype Technique." *Annals of Science* 54.5 (1997).
[192] ATILF
[193] This is a familiar notion in the 19th century, as Flaubert notes in his *Dictionnaire des idées reçues*.

treatment of them gives the reader an idea as to what the inventor is avoiding in working for himself. His associate Adrien La Heronnière is the character through which Robida gives an example of the expoitation of scientists. He never becomes rich in Lorris' employ though the inventor is one of the wealthiest people in the fictional France, and despite his never taking any time off. His research interests are never mentioned, because he lacks the opportunity to conduct his own experiments. We thus note that when it becomes the rule, when it is sanctioned by the fictional universe, Verne's model of invention is no more egalitarian or beneficial to inventors than its real-life counterpart.

In the background of La Vie électrique is Robida's reflection on 19th century protection of intellectual property. Because Lorris starts work on his inventions immediately after graduating, he would quickly require funding for patent applications. However, in accepting it from his supporters, he might have to relinquish his rights, which goes against the rationale behind intellectual property protection in France. The 19th century imagined an inventor's right to his work as natural, the first patent law passed in 1791 finding that "toute idée nouvelle, dont la manifestation ou le développement peut devenir utile à la société, appartient primitivement à celui qui l'a conçue, & que ce seroit attaquer les droits de l'homme dans leur essence, que de ne pas regarder une découverte industrielle comme la propriété de son auteur."[194] The second patent law of 1791 guarantees the inventor's rights for a period of 5, 10 or 15 years, and neither law requires a scientific examination of the process or device produced.[195]

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[194] Chateigner, J. Ed. Recueil des proclamations et arrêtés des représentans du peuple français 13.37 (Brussels : G. Huyghe, 1795).

[195] The *Loi du 25 mai 1791* provides the following costs table:
N° 4 - Tarif des droits à payer au Directoire d'invention.
Taxe d'un brevet pour cinq ans 300 Livres

The fees for securing a patent are considered prohibitively high[196], and protecting one from infringement through litigation was a difficult and costly process.[197] Placing Lorris in this context, Robida suggests that as a young scientist he could not afford to protect his inventions or might have to give his rights away in agreeing to be sponsored. If an inventor required patronage to protect his invention, though he retained the rights, he could then be unable to protect it once share with the patrons. Daguerre, for example, tried to profit from the chemical process he had devised and patented by sharing his discoveries with a number of patrons. He realized however that once the formulas left his possession, they were as are public. The daguerreotype allowed him a modest living only through the intervention of the French government, who in exchange for his rights to the invention offered him a state pension.[198]

Robida does not provide Lorris' reasons for refusing support, but his alternative funding source, and his future development shed some light on his motivations : "[il] se mit carrément de lui-même pour dix ans en quatre milles actions de 5000 francs chacune, lesquelles, sur sa réputation, furent toutes enlevées le jour même de l'émission" (p. 7). In one day he thus manages

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Taxe d'un brevet pour dix ans	800
Taxe d'un brevet pour quinze ans	1.500
Droit d'expédition des brevets.	50
Certificat de perfectionnement, changement & addition	24
Droit de prolongation d'un brevet	600
Enregistrement du brevet de prolongation	12
Enregistrement d'une cession de brevet en totalité ou en partie.	18
Pour la recherche & la communication d'une description	12

Tarif des droits à payer au Secrétariat du Département.

Pour le procès-verbal de remise d'une description ou de quelque perfectionnement, changement & addition, & des pièces relatives, tous frais compris 12

Pour l'enregistrement d'une cession de brevet en totalité ou en partie, tous frais compris 12

Pour la communication du catalogue des inventions & droits de recherches 3

[196] Gabriel Galvez-Behar's article "Was the French Patent System Democratic ?" discusses the difficulty of paying for a patent in 19th century France and links it to the slow adoption of this type of legal protection by inventors. In his book, La République des Inventeurs, he also mentions that a new 1844 law reduced the patent cost, and the amount of patents granted doubled.

[197] In a 2009 publication, the French Institute of Patent & Trademark Attorneys finds that French companies are still mistrustful of this type of legal protection, as they find patents "too slow, with insufficient sanctions."

[198] Derek Wood, "A State Pension for Daguerre," *Annals of Science* 54.5 (1997): 489-506.

to amass enough capital to most likely rival the investors' offer and secures the independence of his research. In four years, his business is so profitable that he is able to buy back all his shares. The further benefit he draws is that of no oversight of his activity. Being funded by a large, non-specialist public, Lorris is unrestricted in the research he pursues as long as his shares are profitable.

The sale moreover emphasizes the importance of public opinion with regard to science, which is, as in the Le Vingtième siècle, overwhelmingly positive. This discipline employs many in the future and it is the main subject of education, and has rendered transport and communication fast and reliable. It no longer enchants or terrifies, as it does in Verne and Villiers, but it has won over the public through its even greater promises regarding the improvement of the standard of living and of the commercial opportunities it will create. Robida moreover suggests the public approves of the developments of science because it makes their shares profitable. They now participate in science by providing funds for research and development and then by buying the products, implying that science works for the public and the public works to fund science. By presenting the negative effects of *la vie électrique* on the public, the inventors, and the environment, the author however proves this is a vicious circle that ensures financial gain for the inventors.

Self-funding has an additional benefit for the inventor: it leaves Lorris independent of associations specializing in his domain, which means his work is not subject to peer review. He uses this freedom to experiment as he sees fit, which sometimes is unethically, since he is motivated by financial gain. As evidence, Robida offers the inventor's poorly conducted scientific experiments, showing that Lorris' results are not supported by sufficient testing, and

are consequently unreliable. Because of his financial independence, Lorris also does not feel responsible for the dissemination of knowledge. Similarly to Verne's Nemo and Robur, Lorris does not hesitate to threaten governments: he makes it a point to stress that his secret knowledge will always give him the upper hand even when he sells weapons. He advises the governments, his clients, that they may have bought weapons, but the Lorris company detains the secrets of their mechanism: "vous avez assisté aux essais de nos produits nouveaux, vous avez entrevu -- de loin -- les engins dont nous gardons le secret, et vous désirez acquérir engins et produits… Certains de la supériorité de nos produits sur tout ce qui s'est fait jusqu'à ce jour, nous n'abaisserons pas nos prétentions" (p. 140).[199] In La Vie électrique however, because Lorris is only superficially affiliated with France (he was educated there and works there), the threat he represents to foreign governments can well be seen to also loom over this nation.

Verne's inventor novels are displaced from France (except his Paris au XXe siècle (1994)), but the country's science is referenced admiringly. The only French inventor of the *Voyages Extraordinaires*, Thomas Roch, appears after La Vie électrique, and further attests to the author's reluctance to directly criticize the development of French science. Roch prefers to kill himself rather than use his invention against his country. In presenting Lorris as an unscrupulous businessman, Robida goes much further: he styles his character in part on Alfred Krupp, the German arms maker.

In the late 19th century, arms manufacture and sales are a thriving sector of private enterprise in Europe. British, French and German steel producers interested in selling their goods abroad moved on from rail to more specialized products. One reason cited by Grant is that rail is

[199] When making this remark, Lorris is dealing with Costa Rica.

difficult to export – domestic manufacturers in other countries can offer lower prices as they pay fewer taxes and less for transport. Aside from arms being more exportable, these companies look abroad because home government purchases of weapons are not sufficiently profitable. For example, there is such great foreign demand for Krupp's artillery that by 1871, exports represent double their sales to the German Empire. This firm is of particular interest because in the period covering Robida's Le Vingtième siècle and La Vie électrique they dominate sales of weapons among the European manufacturers, following a period of American prominence. Krupp's two main customers of the 1870s, the Ottoman and Russian Empires are engaged in the Russo-Turkish war of 1877-1878, which is used by the businessman to advertise the exceptional performance of their guns.[200] For example, his boasting, with facts and figures in support, of the performance of the Krupp guns in this conflict to the Beligan director general of artillery motivates this country to also order the new steel weapons.[201]

We can see Krupp in Lorris' methods and circumstances, particularly as Robida is a satirist in whose paper the German firm has already been ridiculed, and since France's 19th century weapon production lags behind that of its European competitors until 1896.[202] At that time, the technological breakthrough of a quick-firing hydraulic recoil gun (Grant, p. 27) beings to attract Krupp's clients to French industry. Before 1871 however, France imports weapons from the UK, and after the defeat, the French provisional president Thiers asks steel expert

[200] Alfred Krupp, Wilhelm Berdrow, and Ernest Walter Dickes. Krupp, a Great Business Man Seen through his Letters (New York: The Dial Press, 1930).
[201] Jonathan Grant, Rulers, Guns, and Money: The Global Arms Trade in the Age of Imperialism (Boston: Harvard University Press, 2007) 28.
[202] *La Caricature*, 1884/ 07/ 26 and 1885 / 10/ 31.

Eugène Schneider to transform his plant into a gun and artillery manufacture.[203] In the following years, the Schneider factories in Le Creusot and St. Chamond are profitable, specializing fully in armament after 1886. France however sells weapons to the smaller markets, such as Eastern Europe, and competes with Britain for sales in Africa. Lorris' large distribution and his practice of selling weapons to warring sides thus reflects 19th century arms manufacturing traits popularly associated with Germany. The passage cited above, in which the inventor was advertising the novelty of his weapons but stressed that the customer (Costa Rica) would not be purchasing the manufacturing secrets, is followed by his also selling to their enemy, La Danubie. Later, the reader learns that Lorris desires to sell his biological weapons to both sides of future conflicts, as well as eventually offering them the necessary antigens to combat them.

Lorris' good relationship with the French government in the domain of weapons manufacture is due to their benefitting from his renown, and buying his weapons and vaccines.[204] Lorris is called to help with the *artillerie chimique* of the *corps medical offensif* (p. 96-97). In this capacity, his products help the government's planning and leading its biological and chemical warfare, or *la guerre médicale* in the novel's terms. This type of warfare is not an invention of Robida's, though he takes full advantage of Pasteur's germ theory of disease, expressing the danger in terms of microbes, "bacilles, vibrions et bacteries" (p. 153).[205] The unfortunate side effect of this type of war is explained by a member of the government who notes, "Lorsqu'on a cherché à susciter à des microbes dangereux des microbes ennemis charges

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[203] Claude Beaud, « Les Schneider marchands de canons (1870-1914) » *Histoire, économie & société* 14.1 (1995): 107-131.
[204] I will refer to this government as the French government though unlike in other anti-utopias, Robida does not dwell on the political organization of France or Europe. It is my assumption that Lorris is cooperating with the French, rather than European, government when he interacts with official representatives.
[205] Before biological pathogens were identified as such, dead animals or plague victims, as well as clothing or other items known to transmit disease, were used as biological weapons.

de les détruire, ces microbes développés sont devenus à leur tour des ennemis pour la pauvre race humaine" (p. 144). Lorris develops a *médicament national* in response, to protect the French population from biological attacks, which allows him to sell his disease agents to foreign nations (p. 143).

Though war is not extensively depicted in La Vie électrique, the author notes "notre organisation militaire d'aujourd'hui est un chef d'œuvre de mécanique qui semble du aux génies combinés de Vaucanson, de Napoléon et d'Edison" (p. 102).[206] Villiers also pairs Vaucanson and Edison, having the 19th century inventor cite him as one of his forefathers. In Villiers, Vaucanson is chosen because his name evokes two opposing images, which suit the conversation the American is having with his decadent interlocutor: Edison mentions Vaucanson because he admires his technological ability, while the other character, preoccupied with the magical and otherworldly, remembers the illusion and showmanship of his automata. Similarly, by joining Vaucanson and Edison, Robida appeals to the technological, while Napoléon is referenced for his French, military genius.

This use of Napoléon, though it might appear unsurprising, is uncharacteristic of Robida's fiction, but typical of contemporary "future-war" novels.[207] Scholars regard his depictions of future-war as innovative because he imagines it to be highly mechanized and involve military strategies that evolve from the use of new technologies.[208] In this novel, the reader learns of the French *artillerie miasmatique*, *bombardes roulantes*, *escadre aerienne* and the *blockhaus*, though there is limited presentation of their strategic use. Clarke indicates

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[206] The middle novel of his trilogy, La Guerre au vingtieme siecle (1887), focuses on this subject, and later Robida collaborates with Pierre Giffard on a serial graphic novel entitled La Guerre infernale (1908).
[207] I.F. Clarke's term.
[208] Philippe Willems, "Introduction" The Twentieth Century (Middletown: Wesleyan University Press, 2004).

however that other future-war novels of the late 19th century, though displacing the conflicts on which they focus to the centuries to come, often replay past battles, and draw visibly on Napoléon's strategies.[209] Robida's reference to the historical figure then appears to color future French military excellence in resoundingly French colors, after the mention of Edison. It also reminds the reader of threats that might arise against France in the future, which are the subject of the much contemporary future-war fiction.[210]

Lorris' success, which is justified through this picture of future war strategy as depending on Edison, Vaucanson and Napoléon, represents the fruition of a 19th century dream – French excellence in a domain in which Germany excelled and against a German threat. Like many similar dreams fulfilled in La Vie électrique, it is a perversion of what was envisioned in the past. Ernest Renan had already remarked that the German military victory at Sadowa was due to better science, and after 1871 Pasteur and other scientists also agreed, resulting in a renewed push for France to emulate certain German educational trends, particularly in the way the sciences were taught at university.[211] Change however was slow to come, and the latter part of the 19th century knew French advances in medicine and in the abstract, rather than applied, sciences. The progresses presented in this novel represent a change supported in Robida's time, but this area of Lorris' activity as an inventor casts future France in a bad light. Because the author links Lorris' performance to his cooperation with the government, the reader is faced with a reflection of future French militarism, rather than merely the eccentric and repressible behavior of an individual without a community, which was the case for Verne's inventors. In giving so

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[209] Clarke, I.F, "Future War Fiction: The First Main Phase, 1871-1900" and Introduction to The Tale of the Next Great War

[210] Between 1888 and 1913, Commandant Driant alone is the author of over 7600pp of future-war fiction (Versins).

[211] Ernest Renan, Questions contemporaines (Paris : Calmann Lévy, 1876) vii.

much of 19th century German weapons-dealing success to Lorris, a French businessman, Robida describes a negative change to his contemporaries. Better science does not act as a deterrent against international aggression, or serve to bring about peace. La Vie électrique brings about an efficient, weapon-exporting, heavily industrialized France, a German France, which replaces a 19th century France Robida repeatedly describes as 'peaceful'.[212]

Such activity draws La Vie électrique further away from Le Vingtième siècle, where inventors were mostly responsible for consumer goods. Lorris' specialization in weapons is presented as a contradiction of 19th century expectations for the future resulting from the advancement of science: the author advises, "le Progrès, qui, d'après les suppositions de nos bons rêveurs des siècles passés, devait, dans sa marche triomphale à travers les civilisations, tout améliorer, hommes et institutions, et faire à jamais régner la Paix universelle, le Progrès ayant multiplié les contacts entre les nations, ainsi que les conflits d'intérêt, a multiplié de même les causes et les occasions de guerre" (p. 98). Science is thus condemned for its progress in general, but Robida's presentation of Lorris as an unscrupulous weapons developer and dealer shows that he, and by extension, inventors in general, are to blame. In the following section I argue that the author is holding inventors more accountable for the state of the future than their contemporaries, who are nevertheless thought to collaborate with them. Though the population of the future is described as decadent, inventors are more seriously affected and cannot recover because of their excusive focus on identifying scientific solutions.

[212] Nye shows that France had come to associate its 'degeneration' with German progress, so the situation Robida illustrates here is in fact the realization of a contemporary dream, but as all aspects of the future, it does not live up to expectations.

Section 2.3: ***The question of decadence and its scientific answer***

The inventors' decadence

Though Lorris' inventions and business sense are his defining characteristics, Robida also stresses that he is healthy of mind and body, though not particularly well mannered. He emerges as a masculine man, "grand, gros, rougeaud, barbu … un homme aux allures décidées, au geste prompt et net, à la voix rude" (p. 7), who recalls Verne's Robur, Nemo and Hatteras. In this respect, he is again a success of the age, as the other scientists of the 20th century are withered, infantilized old men. The best example is Lorris' longtime associate Adrien La Heronnière, "un grand industriel" (p. 63), and an older scientist who has spent the latter part of his career in Lorris' lab. La Heronnière is "l'image parfaite, c'est-à-dire poussée jusqu'à une exagération idéale, de l'homme de notre époque anémiée, énervée ; c'est l'homme d'à présent " (p. 66). He suffers under "l'outrance vraiment électrique de notre existence haletante" (p. 66). We later learn his state is representative of a line of scientists, "générations de plus en plus débilités par le travail cérébral excessif" (p. 70). It is Lorris' projection that if this trend continues, future generations will sport, atop skeletal bodies, "un énorme cerveau sous un crane semblable à un dôme" (p. 144).

If in the late 19th century decadence was the mal du siècle, Robida's 20th century is experiencing it anew, and looking for a modern, scientific solution. Fifty years into the 20th century, inventors have become "comme une larve humaine" (p. 198). We can see from the passages above that all in the future suffer, as the *époque* is "anémiée, énervée," and modern people are worn down by "notre existence haletante". The speed of modern life is addressed in

the following section, *The public's decadence*, where the future's failing health is also be linked to the poor state of the environment as a consequence of heavy industrialization. In this section, I focus on the plight of the inventors, for whom the general suffering of the future is exacerbated by the ill effects of scientific work, "le travail cérébral excessif," which Robida insists debilitates inventors and accounts for their peculiar physique.

The hardships of being a scientist were already related to poor health in the 19th century. As Fox relates, Pasteur and Claude Bernard complained about the dilapidated state of the labs where they worked throughout the latter decades of the century. Pasteur's 1868 *Le budget de la science* stressed the lack of funding for experiments, and the rudimentary lab setup.[213] Fox cites his dissatisfaction with the 'little closet, a few meters square' at the Collège de France where François Magendie performed his experiments for twenty five years.[214] According to Claude Bernard, the research facility he eventually took over was so damp and unhealthy that even the rats died, prompting him to describe French laboratories as the graves of scientists. The state of Robida's inventors appears thus drawn from the 19th century, but is integrated into the future through the justification the author offers for their decadence: though inventors now work in more professional, Edison-inspired labs, La Heronnière has ruined his health through overwork in the pursuit of fortune. He has never taken a holiday, but emboldened himself to work by repeating "plus tard! … quand j'aurais fait fortune" (p. 70). Inventors thus suffer not due to the 19th century dedication to science as an inquiry into nature, but because they view it as an opportunity for financial gain.

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[213] Louis Pasteur, "Le budget de la science" *Revue des cours scientifiques* V (1868) : 137-139.
[214] Robert Fox, "Scientific Enterprise and the Patronage of Research in France 1800-70" *Minerva* 11.4 (1973): 459.

A side effect of this schedule, which most inventors keep is that the *race* of inventors is threatened not only by the stresses of the profession and of modern life, but by their inclination to leave marriage, and thus children, until they are very old. Such concerns mirror the late 19th century anxieties over the rate of reproduction of the French. Klein explains that after "les guerres de la Révolution et de l'Empire … la France qui en sort est un pays de survivants et de vieux, certainement pas un pays d'entrepreneurs," and depopulation is occurring at a faster rate and earlier than in other European states.[215] In the 19th century, a popular explanation for what is perceived as the French decline is *dégénérescence héréditaire*, Bénédict Morel's theory purporting that environmental stresses and unhealthy behaviors accentuate poor qualities passed on from ancestors, resulting eventually in sterility. Nye shows that in the late 19th century the stresses thought to exacerbate undesirable traits included poor environment, alcoholism, tobacco use and extramarital sex.[216] Robida's inventors are, like the late 19th century French population, aging, and engaging in work that is destroying their bodies while leaving their brains intact. This deformation is presented as hereditary and as already having started generations before the period depicted in the novel (particularly, in the mid-19th century). The stresses aggravating it however, as we have seen, are much more futuristic – excessive scientific work damages the inventors' health and diminishes their chances of passing on their genes.

The feminist movement is also popularly blamed for the low birth rate of late 19th century France. Menon suggests that newspapers and magazines were active in popularizing the idea that women's emancipation adversely affected depopulation.[217] The dangers, she comments, are

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[215] Gérard Klein, "Robida l'anticipateur, entre Science-Fiction et prospective" *Le Téléphonoscope* 11(2004) : 3-6.
[216] Robert Nye, Masculinity and Male Codes of Honor in Modern France (Cary: Oxford University Press, 1993).
[217] Elizabeth Menon, "Anatomy of a Motif: The Fetus in Late 19th-Century Graphic Art," *Nineteenth Century Art Worldwide* 3.1 (2004) n.p.

summed up in an illustration from the January 1883 *Paris s'amuse,* entitled "L'Emancipation de la femme."[218] There, women's many new activities lead to ignored children, a lack of children, or to the abortion of children, and, as a corollary to women's masculinization, to the feminization of men. The author cites as well G. Vacher de Lapouge, who charges that feminism was to blame for the intellectual degeneration of the population – feminists tended to be intelligent women, which meant that lower-class women were left to procreate.

This correlation of women's emancipation to low births is satirically reversed in Robida's future.[219] In La Vie électrique, the author primarily blames men in linking the decadence of the race of inventors to their profession. It would have been difficult for Robida to revisit the 19th century arguments because he had already declared the equality of the sexes and shown women's full integration of in the workforce in Le Vingtième siècle. In the first novel, he shows that as part of the future's great efficiency, women could both have political or academic careers and be mothers, as is still the case in La Vie électrique. The women scientists depicted there, though fewer than the men, are happy to marry, even though they too are older. They excel in the Academy and in the experimental sciences, but the author makes no mention of women inventors. The future has thus answered a 19th century question, but it is not an unmitigated success – the period faces the same problems as the past, decadence, and like the 19th century, has a difficult time inspecting its way of life to determine the causes.

In categorizing the inventors as a *race*, here afflicted by degeneration that is different from that of their contemporaries, Robida's novel revisits the gap Verne envisioned as

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[218] Ibid. np.
[219] Robida is perhaps also enjoying taking the opposite course to Zola, who appeals to women to combat depopulation, and had recently addressed lower income, working women in "Aux mères heureuses" (*Le Figaro*, 18 April 1891, p. 1).

fundamental between these scientists and their public. Like his predecessor, he does not allow scientists to progress to a farther future, despite their technological supremacy. This enables him to assign different fates to the two groups. The author condemns the inventors to decadence, and allows their contemporaries to be restored back to health. I have already discussed the separation of the inventors from their public of technology consumers, showing that it goes against the homogeneity of society from the point of view of its technical knowledge as shown in Le Vingtième siècle, but Lorris also explains to his son the distinction of the *race des inventeurs* by remarking "Nous sommes, aujourd'hui, nous autres, une aristocratie, l'aristocratie de la science !" (p 51). The distinction of this aristocracy is given by the inventor's superior scientific knowledge and their economic power. Such a type is new in literature, as Klein notes "dans la société évoquée par Stendhal, Balzac, Dumas, et aussi Féval et Sue, les propriétaires terriens tiennent le haut du pavé et les entrepreneurs industriels innovateurs sont inexistants ou excentriques".[220] For this reason, Lorris has to explain his distinction in antiquated terms: the inventors are different than the nobles of the past because they are an industrial power, and do not derive their wealth from landholdings. Such an origin of social and economic status has been superseded in the future, and the "vieille aristocratie territoriale est morte d'inanition" (p. 116).

Though Lorris is primarily interested in stressing the new class system of the future, where industrious, inventive, self-made men are the most powerful, the reader could see the comparison as doubly relevant because the race of inventors is declining. The author shows that the inventors' reign is ending as the future can no longer sustain them. The environmental catastrophe brought on by the relentless and unscrupulous pursuit of financial gain at the expense

[220]Gérard Klein, "Robida l'anticipateur, entre Science-Fiction et prospective" *Le Téléphonoscope* 11 (2004): 4

of all other considerations is harming the inventors most of all. As we have seen from La Heronnière's case, the inventors are reduced to *larves humaines*. Robida emphasizes the poor state of the environment through his illustrations, but he also notes that "notre atmosphère est souillée et poluée" and that "le poisson d'eau douce ne se rencontre plus" (p. 146). He advises the reader, whom he considers surprised by the new Paris, "ne cherchez pas d'autres feuillées à Paris… le sol de paris ne peut guère produire, puis qu'il n'existe plus … remplacée par un lacis embrouille de tunnels" (p. 126).

The inventors are alike also in their financial motivation for the pursuit of science. As both Lorris and La Heronnière share it, we can generalize from their example and conclude that in this 20th century, the purpose of science is to make the scientist rich. If Verne sought fanciful explanations to justify why the inventors were at odds with the public, Robida has chosen to provide them with a very practical reason.[221] Their former opposition to their public however remains in the back ground of such motivation. The reader perceives the veiled threat that if an inventor's primary interest is financial gain, then the scientist who also makes weapons could easily become the enemy of his nation by being the ally of the highest foreign bidder, especially as the inventor's ties to their country are only practical and convenient. The relation of the inventor to the public is not merely complicit and mutually beneficial. The French have to keep investing in Lorris because he is more threatening as an enemy than he is expensive a friend. Robida does depict the scenario explicitly, but illustrates the inventors' misuse of their science

[221] Though some inventors terrorize people in order to champion their scientific theory (as is the case of Robur and whether heavier-than-air devices could fly), others have very complex justifications for their hatred of the world at large: Nemo, for example, was an Indian prince who started out only avenging himself on the UK, but decided to use his submarine to right other wrongs.

by having them produce too many devices, advancing technology to a level where it makes life unlivable.

The public's decadence

The speed of modern life, already a principal feature of the Vingtième siècle is taken up again as a subject, with the author emphasizing its many negative consequences. La Heronnière's first affliction, and one he shares with all people in the future is termed by the author "l'affaissement national" (p. 75). Modern people are "les énervés, les surmenés de la vie électrique" (p. 75) and suffer from "le névrosisme général produit par l'électricité ambiante" (p. 144). *Son Excellence le ministre de l'Hygiene publique* explains to Lorris that "l'état morbide de la nation [a été] bien démontré, l'ennemi signalé, l'anémie et la déchéance physique" (p. 153). "Les médecins, effrayes par cette dégénérescence impossible à enrager" (p. 68) cannot combat its many symptoms, including, "surexcitation cérébrale" (p. 144) and "dangeureuse epidemie de migranite" (p. 147).

When Lorris discusses the decadence of the 20th century with the Minister, they do not stop to explain the causal relation between diminishing health and the pace of modern life because they are in agreement on its existence. In understatement, they find that "la science moderne est quelque peu responsible." The reader is left to understand how stressful the 20th century is through aspects already presented which characterized it as busy and overtaxing. Among the inconveniences of the future are the agglomeration of means of transport, which have sped up all areas of life as they increased the efficiency of the future. The many Parisian

attractions, the shops and restaurants featured in Le Vingtième siècle are illustrated again, though now overrun with power lines, the author stressing the close quarters they all occupy. The impression that modern life is an "existence hâtive, enflammée, horriblement occupée and énervée" (p. 143) is created through overcrowding of technological devices supposed to make life easier.

Though the reader could well have perceived the life of the future as too busy already in Le Vingtième siècle, La Vie électrique suggests that technology is intrusive and advances too quickly. Robida calls "notre industrie … trop savante" (p. 144), and the "grand mouvement scientifique et industriel" has as effect to "bouleverser si rapidement et à transformer radicalement la surface de la terre, les mœurs, les caractères et les besoins, les habitudes et la vie de la fourmilière humaine " (p. 75). The overdevelopment of technology is negatively depicted in scenes where the characters' apprehension is underlined. In the beginning of the novel, he announces that modern people now have to navigate "A travers les extrêmes complications de notre civilisation ultra-scientifique" (p. 6). Later the author offers several vignettes in which characters have trouble manipulating the newest devices, or have their conversations jarringly interrupted by technology.[222] One of these incidents involves Lorris' door answering- and message recording device, which one character cannot understand or operate (p. 40-45). Nevertheless, in leaving, she decides to invest in the same device for her daughter, as she interprets it as a status symbol. This incident indicates that the difference between the inventor and the public's understanding of technology, which is a staple of both Verne and Villiers, is reinstated in La Vie électrique. There, technology advances faster than the public can adapt,

[222] On several occasions, the téléphonoscope's ring, an irritating "Drin! Drin!" appears between the dialogue lines of the characters, and the author comments "Cette sonnerie électrique … fit lever la tête à tout le monde" (p. 162)

which pushes the inventors into a distinct category based on their superior knowledge. This development is notable because it allows the reader to infer that technology's too rapid growth is perpetual because it benefits the inventors.

Inventors profit from the divide that leaves the general public in their wake because it is interested in purchasing even more difficult to use technology, as we have seen from the woman's experience with the door answering device. The author also offers three other reasons that ensure the inventor's continued success. The culture of science of this 20th century is ever stronger than that of the 19th, and inventors and their products appear sacrosanct. Because there is no self-regulation of science, or government oversight, inventors can set the pace of progress they desire. Based on their characterization in the novel, this implies they will seek a course that maximizes their profits despite the grave consequences their contemporaries suffer.

In the conversation Lorris leads with the Health minister, the author presents the prevailing positive opinion of science in the future. It functions as further evidence suggesting that inventors lead the overproduction of technology, but their contemporaries are complicit. Despite the negative effects evident to all, modern society still unerringly believes in scientific progress. Even as they discuss the hardships of *la vie électrique*, the government representatives in attendance do not tolerate negative comments against science. Various members of the assembly intervene to censor each other, observing, for example:

– Les méfaits de la chimie sont pour beaucoup dans notre triste état de santé.

– Comment les méfaits ?

– Disons, pour ne pas offenser la science, les inconvénients (p. 144)

Later in the same conversation, impugning science gains a religious dimension: "Au risque de paraitre blasphémer, je me permettrai de déplorer ces incessants et désolants progrès de la science," and Lorris replies, "Ne blasphémez pas ! La science poursuit toujours sa marche en avant" (p. 148-9), stressing the inventor's interest in pursuing technological overdevelopment.

The collusion of the government with the inventors is evident in its reluctance to interfere with technological production, even when Lorris makes the proposal of a scientific solution to the problems caused by too much technology. Instead of curbing production to more realistically fit the needs of the future, Lorris offers to devise a *médicament national* that will make the French withstand the poisoned environment and make them more resilient against attacks of *guerre médicale* by foreign nations. Not only can he exploit this vaccine in France, but it allows him to sell biological and chemical agents to other nations, and subsequently to provide them with cures or preventative inoculations against them. As Robida concludes "si l'affaire de fourniture des engins perfectionnes et produits chimiques nouveaux aux deux belligérants actuels et dans l'avenir à tous les belligérants quelconques pendant un certain temps était d'une colossale importance, la seconde affaire, d'un caractère absolument différent, n'avait pas de moins gigantesques proportions…. Il s'agit de l'affaire des médicaments nouveaux" (p. 143).

Robida's universe grants inventors complete control over their society, but despite this, he arrives at Verne's conclusion: private science must be excised. For Lorris, there is no curbing technological production, because he manufactures the need for his products singlehandedly – his industry poisons the environment, hurts the health of his contemporaries, and he devises a cure. It is for this reason that to solve the future's problems, inventors' vision of science must lose prominence. In Robida's hyperbolic universe, this is only possible if the inventors disappear.

The author separates them by defining them as a race, and an aristocracy, afflicting them with a condition that depends entirely on their profession. He also shows that the rest of the population, though suffering as well, can indeed be saved, but not by modern science.

Bad science and the *médicament national*

Robida's satire of science gains a new dimension in the section dedicated to the *médicament national*, one of Lorris' greatest successes. Meant to solve the modern problem of decadence, the presentation of his research and experimentation in the development of this vaccine shows it is not in fact a solution. Robida's portrayal of Lorris' research and marketing of this vaccine revisits the conflict between private scientific enterprise and governmental scientific authority, and reveals the dangers of reduced oversight of private research. Lorris' experiments are depicted not only as unethical, offending the mores of the fictional 20th century, but as scientifically poor, in being unverifiable as the result of insufficient and improperly conducted research. The inventor's popular acclaim endures, and is explained by his many shareholders' increased profits, in a final statement of the links between science and the economy of the future. The author condemns the inventor, suggesting that left in private hands science loses its integrity as a discipline.

The *médicament national* is a very lucrative economic venture for Lorris. As a reward, he is offered a perpetual monopoly on the distribution and manufacture of the vaccine, as well as a

"une recompense nationale" (p. 215).[223] Lorris only accepts a gold medal depicting him as Hercules battling Hydras representing germs, but out of false modesty. He rejects the offer because, as we have seen, the wealth and industrial power of his company already offers him the protection one would expect from the government. The inventor can defend his rights and ensure his monopoly because only his company detains the formula of the *médicament*, as was the case for the *engins perfectionnés* he sells abroad. The author leaves it to be understood that Lorris will earn from its sale more than the government offered through the recompense.

This invention is key to Robida's severing this future, the 20th century, from its source, the 19th century. The *médicament national* is unbelievable as a solution to decadence firstly because Lorris had already begun to develop it in order to fortify the French against possible attacks by foreign enemies. The inoculation is said to cure modern life, and Lorris presents as evidence of its correct functioning La Heronnière's greatly improved condition. Such an accomplishment is meant to show how far the future has advanced, since it can produce a panacea for all its ills. However, this characteristic also makes the inoculation appear suspicious because already in the 19th century, similar products were being advertised. In Les Français et leur médecine au XIXe siècle, Faure credits the improved sales of all pharmaceutics products to their heavy advertisement, both in public spaces and in the French press, noting that already in the 1870s, the fourth page of newspapers was dedicated to "produits miraculeux."[224] Medical journals also sell advertisement space, which many in the profession decry. It is known that often, the pharmaceutical products advertised are not the result of any research, and that they are

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[223] This reward fits the 19th century patronage of science in France: the government identified current problems requiring a scientific solution and offered a prize to the best proposal. A *recompense nationale* was any such prize, and the term was also used to denote a pension, as shows Arago's use of the expression in seeking some form of governmental monetary recognition of Daguerre's contribution to science. (Fox, Wood)

[224] Olivier Faure, Les Français et leur médecine au XIXe siècle (Paris : Belin, 1993) 216.

sold without testing. The author concludes that the great competition in this field makes it necessary for companies to lower quality to such an extent that even the first pharmaceutical product to become popular in France, mineral water, is counterfeit by the end of the 19th century.[225]

Faure further remarks that greater use of technology and advances in the industrial sciences helped shape the success of pharmaceutical products. For example, he offers the fortune Rigollot succeeded to accumulate from the otherwise moderately well selling mustard plaster. The great increase in revenues followed the development of a new chemical product that allowed the mustard powder to be fixed onto paper, which made the mass-manufacture of the plaster cheap. He concludes that the French pharmaceutical industry of this period "naît plus de préoccupations commerciales, que de préoccupations scientifiques."[226] Lorris' business has similar commercial goals, and relies on the influence it is able to exert on the public because of the inventor's reputation, at the expense of proper research and testing of its products.

The development of the *medicament national* is used by Robida to show the unfair advantage accorded Lorris by working on science in a private business rather than in the *Faculté des sciences*, and illustrate his improper methods. Though the author does not state that this is an official body, its name suggests it is a scientifically trained organization academic organization, as it was in the 19th century. The *Faculté* is most likely operating under different rules than Lorris, which are put in place to ensure the validity of its findings. Work in such an institution would be subject to peer review, and have its progress depend on the availability of funding, both of which could slow its advancement, causing it to lose the race against Lorris. When he has

[225] Ibid 219.
[226] Ibid. 211.

results, "la Faculté continuait à se perdre dans les plus contradictoires hypothèses et à développer les plus bizarre théories."[227] Though offered as criticism, this comment indicates that the *Faculté* is taking longer because it is following the scientific method, formulating hypotheses and testing them, and subjecting them to judgment by several scientists who must approve of their validity. Lorris' efficiency is cast as suspicious, perhaps poorly conducted. It is later confirmed unethical because he proceeds directly to testing on humans.

There are two human experiments undertaken by Lorris, the first of which is on La Heronnière, and the second, being accidental, on a number of his guests who are infected with a disease agent during the course of a *soirée scientifique* (Part II, Chapter 3).[228] The practice is not regulated in 19th century France, and though it is ongoing, it is not as public an issue as animal experimentation and vivisection. Though the author presents Lorris' experiment on La Heronnière as unethical by fictional 20th century standards, I inform my reading by looking at both practices in the 19th century. I show that Lorris' conduct after the accidental experiment on the dinner guests resembles the treatment of the subject in other 19th century works, and show that his experiment on La Heronnière echoes findings on human experimentation presented in Pierre-Charles Bongrand's 1905 dissertation, De l'Experimentation sur l'homme, sa valeur scientifique et sa legitimité.[229] The inventor's impunity is comparable to the resiliency of prominent French vivisectionists when faced with public criticism in the last decades of the 19th century.

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[227] Ibid. 211.
[228] The guests include M. and Mme. Ponto and their son Philippe, Hélène's husband.
[229] 83 years later, these precepts were incorporated into "loi n°88-1138 relative à la *protection des personnes qui se prêtent à des recherches biomédicales*, dite loi Huriet-Sérusclat… En 1998, le Comité Consultatif National d'Ethique (CCNE) a salué le fait que cette loi avait fait « *sortir la recherche de la clandestinité* »" (Hommage à PC Bongrand)

Bongrand's work has come to be regarded as the first modern document prescribing rules for experimenting on humans.[230] The author surveyed years of professional literature containing accounts of human experimentation and presented data based on more than one hundred cases openly discussed.[231] He evaluates the state of this research practice and prevailing attitudes toward it in France in the beginning of the 20th century. The analysis of his data is presented in chapters focusing on the perceived and demonstrated scientific value of human experiments, on their legality, and on their moral value. This last chapter is of particular interest, as Bongrand surveys physicians, theologians, philosophers and novelists, among whom Alphonse Daudet and Emile Zola. He concludes his study with thoughts on whether such experiments should be undertaken and whether only therapeutic experiments should instead be carried out. He also outlines conditions for their continuation, which are of interest to us as they strongly diverge from Lorris' treatment of his subject.

Bongrand's findings show that 19th century medical research like Lorris' primarily took place in hospitals and prisons without the participants' consent. Doctors would seek out prostitutes or soldiers on whom to experiment, but also sometimes administered the medications they had developed to themselves, or to members of their family. This is what Lorris does, after noting La Heronnière's immunity, and hypothesizing that it is due to the success of the *médicament national*: "il s'inocula lui-même pour essayer… il se garda bien de rien dire à la commission de médecins… il inocula tous ses malades" (p. 211). Similarly, Mlle la doctoresse

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[230] The first internationally recognized set of principles for ethical human experimentation is the Nuremberg Code (1947).

[231] Etienne Lepicard, "The Construction of Human Experimentation Ethics: Catholic Voices in Context," Twentieth century ethics of human subjects research: historical perspectives on values, practices, and regulations (Stuttgart: F. Steiner, 2004).

Bardoz, another scientist who becomes ill in Lorris' lab exhibits the same spirit. Her irritation passes quickly because "elle fut en état d'étudier la maladie sur elle-même d'abord " (p. 211).

Bongrand terms experimentation without consent "expériences occultes," nothing that "rien ne les régit," which results in "abus fâcheux, en particulier dans la façon dont sont recrutés les sujets."[232] The absence of consent and information about the risks of the experiment fit well Lorris' treatment of La Heronnière.[233] The inventor is informed of being an experimental subject only after all present at the dinner are sick and his immunity is apparent. Lorris' aide and his caretaker, Sulfatin, then informs La Heronnière that he had already been administered several vaccines without his knowledge (p. 265). The inventor later confirms these included the *médicament national*, and as the reader already knows, he had informed the Health minister of his work on La Heronière.

Robida shows that Lorris' experiment offends the ethics of the fictional 20th century. La Heronière threatens to sue, "pour avoir essayé sur moi des médicaments sur le bon effet desquels vous ne pouviez être fixé" (p. 199). The illustrations and the descriptions show La Heronière as old and weak, and having trouble understanding others and communicating with them, which Bongrand has also remarked was the case for many test subjects in late 19th century France, such as children and very ill people.[234] According to Ferreira and Hammer few doctors were indeed sued at the time over human experimentation, and then only over causing grave harm, such as in the case of a doctor who injected orphan children with syphilis, or who caused the death of their

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[232] P. C. Bongrand, De l'expérimentation sur l'homme, sa valeur scientifique et sa légitimité (Villejuif : Inst. Gustave Roussy 2011) 121.
[233]La Heronnière is « restauré de la plus complète façon au physique comme au moral, réparé physiquement et intellectuellement. » (p. 166)
[234] Chamayou, Grégoire. Les Corps Vils: Expérimenter sur les êtres humains au XVIIIe et XIXe Siècles (Paris : La Découverte, 2008).

patients.[235] This choice of such human test subjects is seen by Bongrand as bespeaking the lesser worth of these people in the eyes of the doctors, and he advises that "ces experiences sont immorales."[236]

At the same time, La Heronière's objection to the experimentation itself offends 20th century mores in that it goes against its understanding of science as a source of financial gain. He is asked to pay for his upkeep during the experimentation, because the efforts to restore his health must turn a profit for Lorris. It is a mark of his disease, since once he recovers, La Heronnière's understanding of the modern world returns and he asks for his share. He recognizes how valuable he is to Lorris as evidence because he is a famous inventor, and assesses that his cure will being much more revenue than that of another man.

La Heronnière's argument, with which Lorris and Sulfatin agree, that the cured test subject is entitled to remuneration because he has been cured, implies that if he had not been cured, he would not have been given a reward. Bongrand advised that all human test subjects be both informed and rewarded for their participation in experiments as part of his recommendations. In this 20th century, however, the criteria for remuneration resemble a business a contract, in which payment depends on results. Moreover, the person taking the risk depends entirely on how the scientist runs the experiment. The test subject's complete subordination is stressed in Sulfatin threatening La Heronnière that if he continues to ask for money, he will be given other medications that will make him helpless again. The author thus

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[235] C. Ferreira, and R. Hammer, "Entre Droit et Médecine : la régulation des corps » *Carnets de bord* 16 (2009) : 3-8.
[236] P. C. Bongrand, De l'expérimentation sur l'homme, sa valeur scientifique et sa légitimité (Villejuif : Inst. Gustave Roussy, 2011) 125.

implies that if remuneration is dependent on the experiment's success, those running it could arrange for the patient not to get better so that they could avoid payment.

Bongrand asks that human experiments follow rigorous scientific protocols, so that "leurs résultats soient indiscutables," because of the high human cost. This is an area in which Lorris fails, because he relies on poorly conducted science: he attempts several treatments on La Heronnière in close succession, if not concurrently, so his results are not conclusive.[237] They include a *cure* devised by Lorris' aide Sulfatin, a stay in the Parc National d'Armorique, Lorris' inoculation for the medicament national, as well as assorted other inoculations.[238] The first treatment consists of handling La Heronnière as though he were an infant - he is bottle fed, and under the supervision of a governess he is taken out for walks in a large pram. The second treatment, and the one Robida marks as successful, is the vacation in the Parc national. This is an ideal place, "barré à l'industrie et interdit aux innovations de la science" (p. 74), and thus set up as the opposite of the modern city.

At the end of his stay in the *Parc*, La Heronnière is able to walk again, formulate and communicate thoughts, and function in society: he can accurately tell by Sulfatin's behavior that he is interested in usurping Lorris' son's spot in the line of succession. These beneficial effects of the vacation thus show that the cure for the future's ills is to be found in the abandonment of the future's way of life for a return to the past. To this end, the author references both the Middle Ages and the 19th century in describing this privileged location: "A quelques lieues des villes ou règne et triomphe notre civilisation scientifique, nous nous trouvons reportés en plein Moyen

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[237] Ibid. 125.
[238] National parks are not another of Robida's correct anticipations, though they are a relatively recent development in his time -- Yellowstone National Park was established in 1872.

âge, au tranquille et somnolent 19e siècle." (p. 75). The conflation of the 19th century with the Middle Ages was common in Le Vingtième siècle, and was made to show how far the future had advanced over the author's own times, which purported themselves to be scientifically advanced. However, in La Vie électrique both periods are referenced for their more peaceful life, which alone is shown to be able to combat the stresses of modern life.

The culture of science is so strong in the future that this solution is not acceptable to Lorris. He could thus be misinterpreting or misrepresenting his results. It is in his interest to advertise the beneficial effects of the *médicament national* had on La Heronnière, because they are of greater perceived value than those offered by the success of the inoculation on the dinner guests. He was in a poorer state than the guests, and the betterment of his condition gives hope to decadent inventors everywhere. Robida lets the reader understand that if he is returned to a youthful state, inventors can survive into the future: not only can the atrophy of their bodies be reversed, but they can also be rejuvenated and reproduce, passing on their desirable, scientific genes. To test this hypothesis, La Heronnière is made to marry at the end of the novel, though the author does not indicate whether the experiment is destined for success. In not acknowledging the correct, though unscientific, solution to modern decadence, Lorris is privileging his modern, professional goals (financial gain from science). His priorities however endanger the survival of the *race des inventeurs* – the author shows that modern science cannot fend off decadence.

Because of the poor science presented as producing La Heronnière's cure, his rejuvenation renders him Faust-like, and casts Lorris as another Mephistophelean inventor. The association is offered as further evidence of his culpability as an inventor in bringing about this unfortunate future. Though for different reasons than Faust, who sought sufficient knowledge,

the old inventor has spent his life in a lab, and has experienced very little of 'life.' Similarly to the medieval doctor, the inventor grows younger through a mysterious cure, in the sense that La Heronnière's youthful state is achieved in a manner difficult to explain scientifically. Because such treatment does not make the most of modern science, and because, like Faust, after being shown back to society, he goes on to marry, the La Heronnière's story appears to be inspired from the legend.

The similarities direct the reader's attention once again to La Heronnière's deal with Lorris following his treatment. We can say that, like Faust, the old inventor receives that which had been missing in his life, in his case, fortune. The prominent inventor then plays Mephistopheles, a character associated with Edison in Villiers' modern rendition of the Faust myth. There, the inventor is Mephistophelian when he elaborates his own *pacte* with Lord Ewald. La Heronnière's deal with Lorris follows more closely the devil's terms. The old inventor's service to Lorris, though not made in the next world, is eternal: he has worked for Lorris' company his entire life, and once rejuvenated, continues to be in Lorris' employ, presumably until he dies. What is particularly futuristic about this take on the pact is that it arrives after the lifetime of service.[239] Lorris only gives La Heronnière that which had been missing because he is rejuvenated, implying that the modern Mephisto could have reaped the benefits of the contract without satisfying its conditions.

[239] Immediately upon recovering his new job is to advertise the *médicament national*.

Section 2.4: ***Solutions in the failure of science***

Atavism and the decline of the Lorris family

Robida's 20th century is threatened by decadence in that modern people are weakened by the pace of their life, and inventors suffer their own *affaiblissement* as they are too old and atrophied to perpetuate their *race*. The leading inventor also believes that his own family is afflicted with a peculiar form of degeneration. He interprets his son George's lack of interest in science as the manifestation of atavistic traits. Lorris takes a scientific approach to this problem, which he perceives as both damaging to his legacy and shameful: by selecting an appropriate wife for his son, he attempts to breed these traits out of the family. Georges however, and the author, do not agree with this scientific assessment: the son's behavior and beliefs make him one of the 'healthy' people of the future. Lorris' diagnosis of his son gives Robida the opportunity to show how scientism can be used to define the future as backward rather than progressive.

Lorris' negative evaluation of his son is centered on Georges' lack of interest in science, which he demonstrates by being a "simple lieutenant dans l'artillerie chimique" (p. 10). The father consequently judges him not apt to "diriger mon grand laboratoire, le laboratoire Philox Lorris" (p. 10). He believes Georges' attitude to be inherited from his wife's side, who has "à trois generations en arrière… une mauvaise note, un vice, une tare" (p. 10-11). Her great-grandfather had been a painter of the 1840s, "un artiste idéaliste, nébuleux, romantique, comme ils disaient alors, un rêveur, un futiliste, un éplucheur de fadaises" (p. 11). The ancestor's brain, Lorris narrates, was "légère et vaporeuse … dépourvue de circonvolutions sérieuses" (p. 11)

adding that as such, it must resemble Georges'. He explains how this poor heritage could manifest itself after many generations, informing his son that "il y a comme un capital spiritual dans une race, un réservoir pour la descendance, et la nature puise au hasard dans ce capital pour remplir ce petit crâne qui nait" (p. 50). To compensate for this disadvantage, Lorris offers to send Georges to rehabilitation in the *Intensive scientific Institut* [sic]. Greatly upset at his son's obstinance, he concludes by exclaiming " O atavisme! Voila de tes coups!" (p. 12). Later he cites a hundred years' worth of research on atavism, which is photographically documented and supports his assertion that familial types are repeated through the generations. This was a contemporary concern for Robida's age, as Galton's later work emphasizes the importance of the family album for documenting heredity.[240]

The son's plight features a combination of popular 19th century medical theories of heredity and degeneration. The inventor's many comments attest to his belief in a theory of trait transmission from generation to generation, of which the *tare* is a trait not preferred. Bénédict Morel's theory suggested this very pattern, and doctors in the 19th century used it to give advice to their patients on selecting suitable mates.[241] The inventor also believes there is a causal relation between the structure of the brain and personality, as shows his reasoning that a light brain, lacking sufficient circumvolutions is not good for science. This, however, serves to undermine his credibility as a scientist, as the beliefs are outdated in the late 19th century. Robida's times were a period of intense study of the brain, which focused on cerebral localization. Though Franz Joseph Gall, the founder of phrenology, is credited with this concept,

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[240] S.M. Smith, " 'Baby's Picture is Always Treasured': Eugenics and the Reproduction of Whiteness in the Family Photograph Album" *The Yale Journal of Criticism* 11.1 (1998): 197-220.
[241] Robert Nye Masculinity and Male Codes of Honor in Modern France (Berkeley: Univ of California Press, 1998) 76.

that is to say the idea that certain parts of the brain have specific functions, by the end of the century, scientists had showed the functions were not descriptive of personality, or related to mental abilities or skills, which is what Lorris' comment implies.[242] In France, a highlight in this field is Paul Broca's 1861 identification of a lesion on an aphasic's brain, which helped him to hypothesize where the speech function was localized. This discovery followed by more than 15 years Pierre Flourens' experiments showing that motor function and perception as well as respiration and circulation were affected by removing parts of animals' brains (Sabbatini). By the 1870s, Gustav Theodor Fritsch and Julius Eduard Hitzig used electrical stimulation of animals' brains to more clearly identify what is now termed the motor cortex.

Lorris' assessment of Georges' brain marks a return to Gall's phrenology, which had been discredited by the late 19th century though it remained popular in literature, and to some extent with the lay public.[243] As the title of his major work, Anatomie et physiologie du système nerveux en général, et du cerveau en particulier, avec des observations sur la possibilité de reconnaitre plusieurs dispositions intellectuelles et morales de l'homme et des animaux, par la configuration de leur têtes (1810) suggests, Gall believed that the surface of a person's cranium reflects the topography of their brain. In turn, the particular dimensions of different areas of the skull provided information about a person's abilities. Before phrenology, Gall was an anatomist, but his contribution to brain science is limited to a study of brain stem anatomy, where "by

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[242] S. Zola-Morgan, "Localization of Brain Function: The Legacy of Franz Joseph Gall (1758-1828)" *Annual Review of Neuroscience* 18 (1995): 359-383.

[243] The Institut de France rejected Gall's 1808 *mémoire*, and he was never elected to the Académie, receiving only one vote, that of Geoffroy Saint-Hilaire. Flourens' experiments were undertaken to verify Gall's claims. (Dallenbach, "Phrenology versus Psychoanalysis." *The American Journal of Psychology* (1955): 517) Renato Sabbatini, Phrenology: The History of Brain Localization."*Brain and mind* (1997)

means of blunt dissection he was the first to describe the origins of several cranial nerves".[244] In the development of the new science, he used no direct examination of the brain. Since Lorris is associating aptitudes with the structure and weight or density of the brain, but does not have first-hand access to either his son's or his ancestor's brain, while making judgments regarding their physical properties, he must be reading external signs and inferring the size of the underlying portions of the cerebral hemispheres, as Gall did.[245] Though Robida could be suggesting that the future's superior knowledge or science has lent new support to phrenology, and thus discredited subsequent 19th century discoveries, it is more likely that he is using this anachronism to further discredit Lorris.

The inventor also remarks that the manifestation of such traits in Georges attests to his atavism. In the 19th century, atavism refers to the reappearance of a trait in an individual after it had not manifested for several generations. This is also the sense in which Lorris uses the term, as he points out that there hadn't been an artist in their family for three generations. The idea of progress is implicit to such a consideration, both in the 19th century and in Lorris' 20th, subsequent generations being thought better than earlier generations, the poorer characteristics reappear in the atavistic individual. It is moreover not surprising to see art associated with atavism because in Le Vingtième siècle it was shown that the future's understanding of art limits it to a decorative commodity, while new artists are exclusively photo-peintres. Art is reliant on technology, and its merits rest in the mastery of the chemical processes associated with the photographic devices, more than on aesthetic considerations.

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[244] Rawlings Charles E. and Rossitch Eugene, "Franz Josef Gall and His Contribution to Neuroanatomy with Emphasis on the Brain Stem." *Surgical Neurology*, Vol. 42, No 3, September 1994, p. 272-275.
[245] RM Young Mind, Brain, and Adaptation in the Nineteenth Century: Cerebral Localization and its Biological Context from Gall to Ferrier (Oxford: Oxford University Press, 1970).

In the 1870s and 1880s, Cesare Lombroso's studies associate atavism with criminals, terming some 'degenerate criminals' based on a number of physical characteristics he identifies in them which he believes to be both primitive and explain their behavior. However, the mention of atavism in connection with artists also brings to mind Lombroso's relation of the two (artists and criminals) in Genius and Madness (1889). Among the geniuses Lombroso counts those who excel in literature and the arts as well as brilliant scientists, but he considers both ends of the intelligence spectrum to be degenerate and morbid, seeing both as signs of the *fin de race*. Though there is no explicit allusion to the scientific precepts of this work, it suits well the decadence of inventors in La Vie électrique. The overly intelligent scientists are disappearing because of their work, while artists have already disappeared. As a corollary however, Georges who is neither, appears instead destined for the future. He possesses the traits that will, and in Robida's vision should, be passed on to future generations: Georges is instinctively drawn to the *Parc*.

Lorris' plan to combat his son's atavism, meant to ensure future generations of inventors, is to marry Georges to a scientist. The father seeks "une vraie cervelle scientifique, assez mure" (p. 12), and narrows down selection to women who are 15-20 years older, and thus more accomplished than Georges. The inventor hopes their children will compensate for this generation, which he finds "une non-valeur, un reste pour compte" (p. 12). These opinions echo Francis Galton's recently developed theory of eugenics, which appears in his 1869 book, Hereditary Genius. The naturalist studies the reoccurrence of personality traits in families, positing that genius and talent are hereditary. In bringing scientific traits from the side of Georges' wife into the family, Lorris hopes to obtain grandchildren who can become "un chimiste, un naturaliste, un médecin, un mécanicien" (p. 12). This practice has since been termed

positive eugenics, in which gifted people are encouraged to have children together to improve the race, as opposed to negative eugenics which will be the main manifestation of the practice in the early and middle 20th century in the US, Scandinavia and Germany through sterilization of those considered unfit.[246]

The emphasis on grandchildren follows logically, given Lorris' disconsideration of his son, but also scientifically. Lorris reminds Georges of the importance of selection, accusing "tu méconnais la grande loi de la sélection… ce n'est pas pourtant aujourd'hui que la science a donné raison aux vieilles idées d'autrefois et reconnu que la sélection était la base de toutes les aristocraties" (p. 50). Natural and aristocratic selection conflated attest to the beliefs of Lorris' 20th century: because they see all aspects of their lives as ruled by science, they anachronistically read the primacy of science back into history. We have already noted that Lorris sees the inventors as an aristocracy of the future, but he also means that in selecting mates according to the characteristics decided as 'preferable' by the 20th century, future generations will be an improvement over the current. According to Darwin, subsequent generations are more successful in that they are better adapted to their environment, which is the great problem of the 20th century. Lorris' plan, once again, attests to greater faith in science, than knowledge thereof.

Conclusion

Robida's satire of the 19th century interest in science is based on presenting the future as the extreme manifestation of popular theories of the period and his contemporary public's

[246] Elof Carlson, The Unfit: a History of a Bad Idea (Cold Spring Harbor: CSHL, 2001): 10.

reaction to them. He relies on hyperbole and accumulation in both the plot and the illustrations of the novel. In this respect, the author is very different than Verne, who sought to include accurate and up-to-date scientific information, and demystify the magical or terrifying aura of the discipline. The predominant model of the inventor in the Vingtième siècle trilogy is that of a successful public figure who is able to amass a large fortune thanks to his excellence in the development of technology and keen business sense. The character is finely attuned to the market for science, and pursues the promotion of his inventions with little concern for the safety of his consumers. Robida's final condemnation of the extreme technological capitalism of this fictional 20th century is to have it bring about the same degeneration thought to be ruining France in the 19th.

He imbues the opinions and knowledge of the future's scientists with 19th century theories of degeneration, atavism, and eugenics. The author revisits end of the century debates on declining births, and echoes contemporary attitudes and practices of medical research, as well as the 19th century's idolization of prominent doctors and scientists. This indicates that the ideal period is already in the past by the writing of Vingtième siècle, and to stress this, the author implies that Haussmann's erasure of Medieval and Renaissance Paris is in fact the first step toward the future. This loss, accompanied by the exclusive pursuit of science is found responsible for rendering future France less French. Robida's criticism of the fictional age's efficiency and industry implies that his country has learned too well from Germany and the United States: in overcoming its 19th century scientific limitations, it has only become a poor copy of those nations.

To condemn them, the inventors' high social position is associated with the aristocracy of the past. In addition to prominence, a further aspect in which this is true is in that the inventors suffer an aristocratic decline. Selection based on aristocratic marriage was related to worse offspring rather than better, to adopt Lorris' terms. It is helpful to remember here Darwin's botanical sense of decadence, which is used to describe a generation whose mutation (the trait that separates it from its ancestors, its innovation) is not transmitted to the descendants. This is very much the position of inventors in the fictional universe – they are a type that will not survive into the future. Through them, the author shows the *grande loi de la selection* acting in the 20th century: Lorris is presented as a self-made man, a model which presupposes a break with previous generations. This implies that his heritage is as much a threat to the future as the denigrated 'artistic' traits of Georges' mother.

Lorris' own knowledge is an 'acquired characteristic,' which Lamarck believed to be inherited from generation to generation, but which was not necessarily the path to evolutionary success according to Darwin. The eugenic approach and self-made man distinction cannot coexist in the same frame, leaving Lorris torn between two models of success. By his understanding of himself and of his son, the inventor is an extraordinary man in Vernian terms, which coincides in fact with Darwinian decadence: he leaves no progeny of the same type as himself, and no-one inherits his knowledge. The inventor is thus disinherited in both measures which matter to him, aristocratic and scientific.

In counterpoint to this successful, public inventor, the author also revisits Verne's model, bringing it to a nightmarish realization. He uses this adaptation of Verne to further denounce the 20th century's devotion to progress. Lorris' aide, Sulfatin, is wholeheartedly dedicated to science,

secretive, and uninterested in either money or education. At the same time, he is introduced as1 the most 'futuristic' scientist, starting with his unusual birth. This event is depicted on the title page of La Vie électrique, where Sulfatin is being produced from a beaker by a 19th century scientist (left). Robida opens with this in an attempt to build up the reader's expectations regarding the scientific developments of the future. Once explained, however, the author disappoints by informing that this experiment is a unique occurrence rather than the future's preferred method of reproduction. Sulfatin is an "échantillon produit artificiellement de l'homme naturel, primordial, exempt des déformations intellectuelles amenées au cours d'une longue suite de générations" (p. 65). His health is explained as a complete lack of "physiologie atavique" (p. 66), which, as we have seen, marked Georges. His pure genes accord him immunity from the environmental stresses of the 20th century.

Robida's characterization is part of his reflection on the ways in which the best intentions and practices of his century brought forth this future. Robida's characterization shows that Sulfatin is naturally of the 20th century, stating with his "yeux vifs, perçants, d'un éclat de lumière électrique" (p. 64). At the same time, we find in him a strong expression of the traits describing Verne's inventors. The exclusive interest in science comes at the expense of an understanding of his contemporaries. Attesting to his being more at ease with technology than people is an incident from his stay in that national park, to which he accompanied Georges. Sulfatin perceives this stay as exile from the modern world, and finds the separation from technology impossible to bear, so he steals away to the nearest town to interact with it. Robida makes it a consequence of such focus on science that the character lacks compassion and his scientific methods are unscrupulous. Sulfatin has no qualms about administering treatment without consent, and wants to deny remuneration to human research subjects.

The author's message that this dystopia has its roots in the past is echoed in the story of Sulfatin's father. This scientist was born and educated in the 19th century, and references to his work come accompanied, as in the works of Verne and Villiers, by magic, one of which is to call the inventor a *docteur fantastique*.[247] A Romantic figure, he is animated by passion for his work, as attests his *cerveau enflamé*, and is the opposite of the 20th century scientists who are practical and emotionless. Following the 19th century model, Sulfatin's creator is a gentleman scientist, like Verne's inventors, and wastes his own fortune in working on his experiments which focus on much greater goals than the immediate result driven experiments of the 20th century. It is not surprising then that his aims are much less likely to be attained -- they involve *les grandes problèmes de la nature*. Such a goal, coupled with his extensive experimentation, represents a traditional understanding of the pursuit of science, dating back to Francis Bacon.[248] It is, however, not descriptive of the purpose of science in Robida's La Vie électrique, which focuses on technological commodities.

"L'immense génie sombre" (p. 64) who produced Sulfatin is both a Promethean and Faustian figure, like other 19th century inventors depicted in literature, starting with Frankenstein. His Promethean side is revealed in his understanding of his work and attempting to make a human being. Because his efforts, as all 19th century science, are belittled by the 20th century, and Robida associates his times with the Middle Ages, Sulfatin's maker is depicted as engaged in an alchemical pursuit. The instruments with which he appears serve to further this impression, as they do not seem particularly scientific: the inventor is using a ladle to remove

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[247] Sulfatin's inventor is thin, and has a hairstyle resembling that of many other scientists of the future in Robida's illustrations in the novels of this trilogy.
[248] Peter Pesic, "Wrestling with Proteus: Francis Bacon and the "Torture" of Nature" *Isis* (1999): 81-94.

Sulfatin from a beaker resembling a cooking pot. The alchemical interpretation renders him a homunculus and reminds the reader of Faust. Though not investing as much as Villiers in the allusion to Faust, Robida nevertheless finds this figure relevant to La Vie électrique. In addition to the illustrations, the mythological origin of scientists is referenced through the opera of the same name, which plays repeatedly in the novels, including in the Lorris home. In L'Ingénieur von Satanas (1919), Robida's last inventor novel, the conflation of Faust and the devil is fully operated, through the engineer's description and Germanic origin and his appearance in medieval times.

Like La Vie électrique, this novel argues that if left up to inventors, progress is harmful and self-perpetuating. The author revisits his representative scientists through the prism of the First World War. Robida focuses on future international, armed conflicts, which he represents as stemming from the pursuit of science and the advancement of technology not moderated by concern for the practical or realistic needs of the community. Satanas is a typical scientist, whose representativeness is denoted by his reappearance under the same form from one age to the next to diffuse increasingly complex weapons plans. The ensuing arms race ends in a devastating war during which the few remaining resources and people are invested in the manufacture of the next wave of advanced technology.

CHAPTER THREE: Edison's Modern Legend in Villiers' L'Eve future

Moi, je représente la science avec la toute-puissance de ses mirages.
Thomas Edison, L'Eve future

After being unsuccessfully serialized in three separate publications, L'Eve future, Villiers de l'Isle-Adam's only novel, was finally published in a volume in 1886. In preparation, the author drafted an *Avis au lecteur* meant to challenge certain received ideas with which the public, already aware that the novel's protagonist is Thomas Edison, might approach the work. He tried to steer their reading of this character away from the historical figure of the same name by distinguishing between the American and "*une* LÉGENDE [qui] *s'est ... éveillée, dans l'imagination de la foule*" (p. 766). [249] He recapitulated the notions making up the inventor's image in the popular imagination, reminding that Edison is "*le* MAGICIEN DU SIÈCLE, *le* SORCIER DE MENLO PARK, *le* PAPA DU PHONOGRAPHE" (p. 766), and stresses that L'Eve future will feature "*le* PERSONNAGE *de cette légende*" (p. 766). Instead of the historical figure who demonstrated wide-ranging technical prowess in the 1870s, the novel then borrowed the corresponding character from popular culture. In referencing the 19th century reader's opinion of Edison's character, however, Villiers does not seek to further his understanding of the protagonist: the American's press coverage in France at the time was far from uniform, and contradictory accounts of his scientific background, personality and beliefs abound. The conclusion of the *Avis* strikes the final blow to the reader's notion of familiarity

[249] All italics and capitalization are Villiers' emphasis.

with the character, by noting that the author has conceived him from Edison's *légende moderne*, which Villiers claims he will *"interprète ... au mieux de l'œuvre d'Art-métaphysique dont j'ai conçu l'idée*" (p. 766).

The idea of the novel as *œuvre d'Art-métaphysique*, rather than Villiers' protestations as to the identity of his protagonist, has fueled much scholarship on L'Eve future. Marie Lathers, Jacques Noiray and Collion-Diérick foreground the metaphysical aspects of the novel in their discussion of Edison's achievement, Eve, an android which passes for a living creature.[250] They read this character as an embodiment of masculine ideas of femininity, an avatar of the artificial ideal of decadence, or as an alchemical success. Most importantly, they do not separate Edison's designs for the machine from its final form, which is that of a machine possessed by a disembodied soul. Eve's destruction, which occurs in a fire, is offered as proof that only this form matters, and that the meaning of the novel is to be found in understanding this incident's implications for Edison. As Raitt hypothesisez, "la loi divine aura le dernier mot, avec l'anéantissement final du Grand Œuvre.[251] The inventor appears then to be a latter-day magician, at home in a decadent novel.

Villiers' choice of protagonist, an inventor, however, points to another context in which L'Eve future can be read. In the 1880s, inventors already have a place in French literature through Jules Verne's *littérature d'anticipation.*[252] These novels already boast a number of

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[250] Chantal Collion-Diérickx, La femme, la parole et la mort, and Lathers, Aesthetics of Artifice, evaluate Eve in the context of 19th century ideas of femininity, the first in greater relation to Villiers' other works. Noiray's L'Eve future ou le laboratoire de l'idéal sees the android as a modern-day alchemical Grad-Oeuvre.
[251] A. W. Raitt, Villiers de L'Isle-Adam, Exorciste du réel (France: Corti, 1987) : 380.
[252] The year Villiers starts writing, Verne publishes Les Cinq cents millions de la Bégum (1879) and La Maison à vapeur (1879). The first novel presents a contest between a German and French inventor, and the second features a steam-powered mechanical elephant. Verne's earlier notable works with inventor protagonists are L'Île mystérieuse

characters who build revolutionary technological devices which appear magical to their uninformed contemporaries. Though praised for many qualities at the time of their publication, such as excellent documentation and entertaining relation of scientific knowledge, these novels are not known for literariness, so it is not surprising they would not be read alongside L'Eve future.[253] As many have noted, starting with Mallarmé, it is an eminently literary text. These novels and their fictional inventors, however, suggest a productive approach to Villiers' protagonist and provide an insight into the purpose of his work on the novel. Thinking back on Verne, Edison appears as a unique technician, whose work is interpreted as supernatural by his contemporaries because they lack the knowledge which would allow them to see it for technology.

My approach to L'Eve future, to read the novel through Edison, is supported by the centrality Villiers accords the character in all drafts he prepares.[254] As they were elaborated over ten years, the re-use and adaptation of the inventor in subsequent versions of the text, even as the other characters change, suggests Villiers is shaping the novel around Thomas Edison. He is represented in the text in a manner which attests to Villiers' familiarity with his presence in the press that goes beyond the Wizard of Menlo Park. The author makes his inventor a hard-working technology developer who is thoroughly familiar with his fin-de-siècle audience. By analyzing the inventor's conversation with Lord Ewald, his primary audience in the novel, I show that Edison does not obscure the scientific roots of the android, though his presentation relies equally

(1875), the sequel to Vingt mille lieues sous les mers (1870) and Autour de la lune (1870), the sequel to De la terre à la lune (1865).

[253]A significant number of Verne's reviews are collected in Jules Verne en son temps. Already in 1865 we read praise of his "sérieuse et profonde étude des lieux, des choses et des caractères, encadrée de la manière la plus heureuse dans un récit qui devient vrai à force de naturel" (p. 19).

[254] The first fragments he prepares for a short story on the topic of androids (at this point called "sosie"), "Miss Hadaly Habal" (1877), his other short story "L'Andréïde Paradoxale d'Edison" (1878), as well as the serialized early versions of the novel, L'Eve nouvelle (1880 in *Le Gaulois*, then 1880-1 in *L'Etoile française*).

on a spectacle designed to interest a man controlled by his emotions. This is the legendary aspect of Edison: his story is a fiction of the present.

The modernity of Edison's legend is expressed both through the choice of contemporary subject and as novelty. Villiers' inventor is without literary peer or precedent. The author frequently alludes to Faust and Prometheus in characterizing the protagonist, but I show that the passages in which they are invoked reveal the figure to be the opposite of his possible models. Edison also stands out from Verne's inventors through his triumphant survival. Such success is due to his purposefully presenting his research as an occult endeavor to his contemporaries. In being able to sell his work, Edison no longer embodies the threat of Verne's inventors and escapes their fate. The inventor's knowledge of his contemporaries leaves him peerless in his fictional universe. Villiers makes Edison aware of, and has him exploit to his advantage the differences in worldview between himself and his interlocutor. This is evident in their conversation, and is replicated at the level of their development. Edison's story is unique, while Lord Ewald is assigned an unsurprising narrative: dissatisfied with his lover, he takes an audacious risk, meets his ideal, and when she soon thereafter dies, he commits suicide.

Ewald is of interest to this study because he has been read as the inventor's better, with the novel's subject and meaning being derived from his quest. The task he sets before Edison is to copy the body of his beloved Alicia and replace her vulgar soul, so in many ways he demands an *oeuvre d'Art métaphysique*. The character is to Noiray a latter-day Romantic standing for the unknowable and the poetic, with both qualities being positively valued through their resemblance with Villiers' own interests and aspirations. Though Villiers has the character repeatedly discuss this difference from his contemporaries, Ewald does not live up to this image. Most notably, he

insists on nobility of spirit being derived from a nobility of birth, and stresses that this is a quality he seeks in his lover. The soul he accepts, however, is that of an obedient bourgeoise. This reading makes Ewald recede into the larger cast of characters, whom he now resembles. Considered alongside Villiers' exposing his friendship with Edison as a business relationship, Ewald appears as another of the inventor's customers, only as significant as the investment he is willing to make.

Section 3.1: ***Edison's decadent audience, Lord Ewald***

In reading Lord Ewald, scholars have taken Villiers at his word, affording the character the height and nobility of spirit which the author states he possesses. Despite references to his contemporary Des Esseintes substantiated through his interest in the arts and love of the artificial, these traits are seen as defining a unique character, a dreamer whose metaphysical quest is positively valued in the text.[255] Noiray, for example, writes "Lord Ewald, c'est l'aspiration à l'idéal, le dépassement des bornes du monde sensible," which in his view approximates Villiers' work : the novel is concerned with the limits of science, which are otherwise too little investigated in that positivist century. As the critic puts it, "c'est l'élan de ce désir [de *passer outre*], autant que les merveilles de la science, qui donne au roman sa force

[255] Felicia Miller-Frank comments on his resemblance to Huysmans' des Esseintes, his literary contemporary, while Jacques Noiray sees him as the epitome of the noble dandy Going to his interest in artificiality, Desmarets identifies him as a modern Adam, Eve's perfect match. He suggests the Lord is named after Johannes Ewald, "auteur d'une tragédie française en alexandrins intitulée *Adam et Eve* (1786)" (Desmarets, 1999, p. 37)

dramatique et sa beauté. C'est particulièrement vrai dans le cas de Lord Ewald, plus riche, plus humain, plus intéressant comme personnage que Sowana, qui reste une entité abstraite, réduite à la seule présence de sa voix."[256] Though Miller-Frank disagrees, finding Sowana's eventual possession of the android as doing the novel's work of realizing "a material record of the voice," a "particularly 19th century endeavor with its passion for documentation and analysis," she holds that this is only accomplished by the characters in the metaphysical realm.[257] Despite Edison's extensive presentation, the novel maintains "an atmosphere of mystery not meant to be dispelled by the disclosure of the electrical apparatus."[258] Lathers agrees, finding the novel "a fin de siècle sequel to or rewriting of Frankenstein, with Hadaly as the female whom Dr. Frankenstein and Mary Shelley were unable to complete."[259] She also notes that L'Eve future is "at times [a] highly sarcastic text," the purpose of which is to produce "a biting criticism of his positivist society, a society on the road to believing that modern inventions can cure all ills."[260] Ewald then appears to be exempt from the author's criticism, serving rather as the author's avatar, and symbolizing opposition to the times' unsubstantiated faith in science.[261]

What is remarkable about the ills wrongly sought to be cured in Ewald's case, however, is that they are problems with a long literary history, and those suffering them in the novel are standards of 19th century fiction. This is easiest to see in considering the circumstances in which

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[256]Sowana is the name of the spirit that animates the android. It is the name taken by Mrs. Anderson's soul when it leaves her body.
[257] Felicia Miller-Frank, Mechanical Song: Women, Voice, and the Artificial in Nineteenth-Century French Narrative (Stanford: Stanford University Press, 1995) 145.
[258] Ibid. 143.
[259] Hadaly is the name given to the android when possessed. 'Eve' is used to refer to the finished android as imagined by Edison: a machine not possessed by any spirit.
[260] Felicia Miller-Frank, Mechanical Song: Women, Voice, and the Artificial in Nineteenth-Century French Narrative (Stanford: Stanford University Press, 1995) 19.
[261] Noiray and Raitt are very informative on Villiers' biography and the stories he cultivated about himself, and point out the resemblances with Ewald.

Edison has imagined the android. He began his work after hearing the sad story of an unfaithful husband who could not stop cheating on his longsuffering wife with a dissolute dancer. The problem thus summed up could be drawn from Nana or La Cousine Bette. In this section I show that Ewald himself is not exempt from Villiers' irony. The author's sarcasm, commonplace in criticism of L'Eve future, and discussed by Raitt, Noiray and Radix has been seen as the defining trait of his conception and description of Edison. I show that the author derides Ewald by having him lack the courage of his convictions. When pressed, his conception of a noble soul is derived from social class, and when tested, he accepts a woman who promises complete devotion and subservience as possessing it. I take a first step toward proving that L'Eve future is a modern legend by showing the Villiers' innovation is not in Ewald's design as a Romantic, or his quest, but in his undoing. Though Ewald dictates the characters' principal activity, Villiers undermines his importance in order to isolate Edison.

Lord Ewald's exemption from Villiers' sarcastic description has been substantiated in scholarship through the interpretation of the novel's motto, "aux rêveurs, aux railleurs," as opposing two discrete camps. He is imagined as one of the *rêveurs*, because it is a term he uses to describe himself, and the qualities it comes to denote are those of a melancholic aristocrat with an interest in the otherworldly. In this spirit, Noiray entitles the chapter dedicated to Ewald in L'Eve future ou le laboratoire de l'idéal 'Le rêveur puni,' and asserts that " Le mot qui définirait le mieux le personnage de Lord Ewald aux yeux de Villiers, c'est celui de noblesse."[262] Though the meaning he gives nobility appears to refer to a number of intrinsic characteristics of Ewald, being "la naissance, […] une qualité naturelle qu'on appelait encore à l'époque de L'Ève future la

[262] Jacques Noiray, L'Ève Future ou le laboratoire de lidéal (Paris : Belin, 1999) : 75.

«race»", he will go on to judge it by a number of outwardly markers.[263] The evidence he cites is Villiers' presentation of the character's appearance, pointing out "[son] physique [qui] respecte les canons de la race anglo-saxonne,"[264] his fashion sense, which exhibits "l'élégance d'un parfait dandy,"[265] his possession of a suitable domain, Athelowold, in a suitably rainy and grim part of England, which complements his desire for "le refuge qui convient à sa nature rêveuse et solitaire."[266]

What is remarkable about this definition of nobility is that it follows the lines along which Ewald judges his lover, Alicia. He loves her because she is beautiful, and though he appears unhappy about her interest in these, she wears the most fashionable clothes and expensive jewelry. He, however, finds her far from noble. Noiray's version of nobility is a very good assessment of what the term means to Ewald: it is exclusively what he is. As we will see, Ewald comes to believe this in part because of his education – being from old nobility he thinks newly ennobled families, such as Alicia's are not really 'noble'—but to him this equivalence refers also to his more particular preoccupations. He will accept Sowana as Alicia's opposite because she shares his captivation with death and the otherworldly and his disinterest in science.

After offering this view of nobility, instead of concluding that Ewald fulfills every expectation of a British aristocrat, Noiray goes on to stress that his castle in particular, in its medieval architectural details and furnishings, "renvoie donc à une temporalité originelle, à une

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[263] Ibid. 76.
[264] "Les lignes de sa personne laissaient deviner des muscles d'une exceptionnelle solidité, tels que les exercices et les régates de Cambridge ou d'Oxford savent les rendre. Son visage un peu froid, mais d'un tour gracieux et sympathique, s'éclairait d'un sourire empreint de cette sorte de tristesse élevée qui décèle l'aristocratie d'un caractère." (p. 790).
[265] Il était vêtu avec une si profonde élégance qu'il eût été impossible de dire en quoi elle consistait. (p. 790)
[266] Jacques Noiray, L'Ève Future ou le laboratoire de lidéal (Paris : Belin, 1999) : 81.

pureté des commencements, radicalement opposée à la modernité dégradée et changeante de la société contemporaine."[267] Though Lord Ewald might stand out among his contemporaries through the multitude of his possessions, the castle decor does not unequivocally point to his radical originality. The reader would most likely associate him with the late 19th century interest in medieval times. As Emery and Morowitz comment in Consuming the Past, "the fascination with medieval objects had permeated both the private dwellings and the public spaces" and that "by the turn of the century bourgeois Parisians were well-acquainted with medieval art."[268]

Further going to Ewald's being a *rêveur*, and thus exempt from irony, is his remark that he is unlike his laughing contemporaries: "quand toute la race humaine devrait en sourire, je prétends garder l'originalité DE ME PRENDRE AU SÉRIEUX, ayant, d'ailleurs, pour devise familiale: *Etiamsi omnes, ego non*" (p. 968). To Noiray "[l]e *sérieux* de l'homme authentique, fondé sur des valeurs originelles" and "s'oppose ici au rire de l'humanité moderne, signe de dégradation et de dénaturation."[269] Radix agrees with this picture of Ewald's contemporaries, but finds that his seriousness draws him nearer Edison, "[c]es deux hommes souffrent de leur rattachement à la terre et à la bassesse de leurs contemporains et aspirent sans cesse à l'élévation, à l'Idéal."[270] Her grouping of Edison and Ewald based on their mutual flight from their contemporaries is later used to build a parallel between their quests, "l'un onirique, idéal voire archétypal et l'autre réel, scientifique."[271] It is notable because it reads Ewald's dedication to his purpose as being serious, and does not sugest, as Noiray holds, that "c'est au nom de valeurs

[267] Ibid. 81.
[268] Ibid. 61.
[269] Ibid. 80.
[270] Elise Radix, Le déclin du prométhéisme dans la littérature fin-de-siècle (Paris: L'Harmattan, 2006) 78.
[271] Ibid. 82.

ancestrales reniées par le commun des hommes, que Lord Ewald proclame sa difference."[272] Instead, as Villiers purposefully stresses (in capitals), the character takes himself seriously.

The distinction is important because it approximates the way in which Edison treats Ewald: the inventor recognizes the importance Ewald gives to his predicament, but does not accept it indiscriminately. Though he takes chapter after chapter to listen to his complaints, seemingly because he is his friend, Villiers' description of their relationship suggests Edison is doing so in order to sell him a machine, or at least conceives of their understanding as a business transaction. In Chapter VII, Ewald's visit is announced, and the inventor refers to him as "le cher, le noble ami" (p. 779). We quickly learn that "cet admirable adolescent […] me porta secours, il y a des années, déjà! lorsque, mourant de misère, j'étais tombé sur cette route, là-bas, près de Boston" (p. 779). From Edison's musings it would appear that Lord Ewald distinguishes himself through his compassion, as he recounts, "Tous avaient passé auprès de moi en disant: «Pauvre garçon!» Lui, l'excellent, le charmant samaritain, sans tant de doléances, sut mettre pied à terre pour me relever" (p. 779). The help accorded, however, is revealed to have been of a very practical nature, rendering Edison's relation of the incident metaphorical: he needed funding, and Ewald gave him "une poignée d'or" (p. 779). [273] Avoiding the direct mention of funds, Villiers stresses the magnitude of Ewald's help by having Edison exclaim "Tout mon coeur le recevra! Ne lui dois-je pas la gloire--et le reste!" (p. 779). Once Ewald arrives, this latter debt, "le reste," is acknowledged to be of a monetary nature. Greeting his guest, Edison remarks "--Mon cher sauveur! Que de fois j'ai pensé à ce... providentiel jeune homme de la route de Boston, auquel je

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[272] Elise Radix, Le déclin du prométhéisme dans la littérature fin-de-siècle (Paris: L'Harmattan, 2006) 80.
[273] Villiers never makes clear in what circumstances Edison had come to need money, and calls our attention to it by marking Ewald's reference to the events in Boston in italics. This is a secret shared by the two characters, and serves also as an appeal to the reader's imagination to fill in details describing the Edison they prefer, as the author had indicated in the *Avis*.

devais la gloire, la vie et la fortune!" (p. 791). The expensive machine Edison later offers Ewald is one of the products achieved from his help, and that the inventor sees in this the satisfaction of the debt is evidenced by his remarks when Ewald is set to leave with the android:

> --L'acceptez-vous? demanda l'Électricien.
>
> --Je serais un insensé, vraiment, si je refusais!
>
> --QUITTES!--dit Edison, gravement, et en lui tendant les mains, que lord Ewald pressa de même. (p. 998)

The difference between who Ewald recommends himself to be and the function Villiers assigns him can be found in the interpretation of the family motto the young man cites in clarification of his seriousness: "je prétends garder l'originalité DE ME PRENDRE AU SÉRIEUX, ayant, d'ailleurs, pour devise familiale: *Etiamsi omnes, ego non*" (p. 968). Noiray and Raitt indicate that a possible source of the motto is the devise of the Clermont-Tonnerre families, one of the noble families from which Villiers claimed to be descended, with Noiray referencing its origin in the New Testament. Both scholars mention that the author most likely found it in the *Grand Larousse du XIXe siècle*, but do not go into detail as to which volume. Consulting the dictionary, one notes that the expressions appears in three different volumes: in Tome 1, it is listed as one of many Latin phrases "[qui] ont enrichi notre langue et notre littérature," in Tome 4 it appears as a noble family devise and in Tome 7 it is explained and a very different modern usage is given in example.

In the first substantive entry where it appears, the devise is spoken by a prominent member of the Clermont-Tonnerre family, Anne-Antoine-Jules, in a spirit very similar to that

which Noiray assigns it in L'Eve future. The dictionary explains that in 1828, while Archbishop of Toulouse, Jules de Clermont-Tonnerre "fit une vive opposition à l'ordonnance relative à l'instruction publique, réclama les droits de l'épiscopat sur les écoles et les petits séminaires" (p. 440). [274] When asked by the ministre Feurtier to follow the decree, the Archbishop indicated he could not, in good conscience, do so, and concluded by quoting his devise, "Monseigneur, la devise de ma famille, qui lui a été donnée en 1120, par Calixte II, est celle-ci: *Etiamsi omnes, ego non*; c'est aussi celle de la conscience" (p. 440). The declaration fits Noiray's reading of Ewald's invocation in that the Archbishop justifies his opposition to his times by appealing to his long and noble family history, and indicating that in so doing he is following a higher moral standard than that of his contemporaries.

In Tome 7, however, the expression itself is the title of an entry and the example given for its usage is more current, relating to an incident from 1860, with the volume being published in 1870, and contrary to the spirit of the devise and the example of the archbishop.[275] I am interested in this entry because it is concerned with the modern reception of the motto, despite its purpose being to explain the Latin expression. As opposed to the previous entry, here the devise is translated, and its origin in the New Testament is explained, "ETIAMSI OMNES, EGO NON. Mots latins qui signifient : *Quand même tous, moi non*. «Quand tout le monde vous renierait, je

[274] L'ordonnance du 4 janvier 1828 décida qu'à l'avenir l'instruction publique ne relèverait plus du ministère des affaires ecclésiastiques, qui restait confié à Mgr Frayssinous ; une seconde ordonnance (10 février 1828) établit que l'instruction publique serait dirigée par un ministre secrétaire d'Etat, qui exercerait les fonctions de grand-maître de l'Université de France : le ministre de l'instruction publique fut M. de Vatimesnil. Les actes les plus importants de l'administration de M. de Vatimesnil sont l'ordonnance du 21 avril 1828, qui remit en vigueur, avec quelques modifications, celle du 19 février 1816, et les deux ordonnances du 16 juin 1828, concernant les écoles secondaires ecclésiastiques. (Institut Français de l'Education)

[275] Villiers could well have referenced this entry because it is the main one on the expression. It is all the more remarkable because it shares the page with the end of a lengthy discussion of organic compounds (ethyl-), which are reminiscent of the formulae cited by Villiers in the *Avis*.

ne vous renierais point. » Paroles de Saint Pierre à Jésus Christ, dans le Jardin des Oliviers. (Saint Matthieu, ch. xxxvi, v.35)." The sample usage, which occupies most of the explanation is

> En voici une application: *L'Univers* a la primeur d'un pamphlet dont l'auteur ressasse assez pesamment des banalités en faveur du pouvoir temporel du Pape ; cet auteur est un Piémontais, le comte Solar de Marguerite. Triste condition que celle des hommes qui vont toujours au rebours des idées de leur temps, des progrès de leur pays, et qui refusent de se rendre à l'évidence, en disant par vanité : *etiamsi omnes, ego non* ! (p. 1049)

In this instance, Peter's declaration is appended to the author's criticism of Count Clemente Solaro della Margherita in order to mock his religious fervor and support of the Pope's temporal power, a stance which appears backward to the author.[276] Through this, the author means to suggest that the Count has no justification for his position and is protesting what the author believes to be the will of the majority out of self-interest (vanity).

In this light, Villiers' use of the *devise* for Ewald becomes less earnest, and the biblical provenance of the motto itself can be read in support of the view that Villiers is not taking Ewald as seriously as the character indicates he takes himself. Following Peter's declaration, Jesus contradicts him, "Verily I say unto thee, That this night, before the cock crow, thou shalt deny me thrice" (KJV Matt. 26: 35), which is indeed what the apostle does. The difference in knowledge between Peter's conduct and his ideas is similar to the between how Ewald is presented by Villiers – a man who takes himself seriously – and the role assigned to him in the

[276] He is the author of Réponse du comte Solar de la Marguerite, Ancien Ministre des Affaires Etrangères de Sardaigne et Députe à l'Opuscule 'Le Pape et le Congrès' (1860).

novel. The author shows him betraying his ambitions, and proves false his pretension of being able to identify a 'noble soul.' His conversation with Edison, in which Ewald presents his unhappiness with Alicia, shows that he is unable to define this characteristic, and his interaction with Sowana indicates he was less interested in his lover's soul than in finding an obedient female echo of himself.[277]

Ewald's unhappiness with Alicia is introduced as a dissatisfaction with her inability to appreciate art, but attests in fact to his desire to have a lover who shares his interests. Summing Alicia up in one image, Ewald tells Edison she is "à New York, au théâtre, dans notre loge, où elle fait miroiter les pierres de ses oreilles en paraissant écouter le *Freyschütz*" (p. 793). What he appears to dislike is her not enjoying, or being moved by the music, which could imply a lack of education, intelligence or depth of reflection on her part. However, Carl Maria von Weber's 1821 Romantic opera's plot and supernatural themes very closely match Ewald's interests. It illustrates the lengths to which a man would go for a worthy beloved – the title ranger makes a deal with the devil in exchange for victory in a shooting contest which would allow him to win the hand of the woman he loves. It is easy to see how this would appeal to Ewald. The otherworldly is a subject he contemplates in his solitary reveries, and the depth of his feelings for Alicia is much professed. The subject is moreover noteworthy because it foreshadows the novel's plot, at least from Ewald's point of view. It prepares the reception of Edison by Ewald as a dark magician, which is echoed in the Faustian / Mephistophaelian representation of the inventor, and the suggestive title of the chapter in which he and Ewald reach an agreement: *Le*

[277] In the following section, I will discuss his being convinced by Edison that the android, provided with six hours of recorded material, would in fact prove a better interlocutor than Alicia.

Pacte. Alicia's not appreciating the *Freyschütz* then becomes a complaint that she does not understand Ewald[278]: she does not share his interests, nor can she see how he developed them[279].

Alicia is of interest to this study because she is the center of the novel's problem (Ewald asks Edison to produce a copy of Alicia, but replace her soul), and she is the most transparently inauthentic character. The basis of Ewald's complaint, a disconnect between her appearance, "une très-belle personne," "*la plus belle personne du monde*, je crois!" (p. 793), and her spirit is a first indication of her literary roots. His expectation that an extraordinary exterior should be complemented by a noble spirit is a common literary fallacy. That the contrast would not be jarring in the non-literary world Edison and Ewald inhabit in the novel is pointed out by the inventor, who advises the young man that "cette femme *serait l'Idéal féminin pour les trois quarts de l'Humanité moderne*!--Ah! quelle bonne existence des millions d'individus mèneraient avec une telle maîtresse, étant riches, beaux et jeunes comme vous!" Furthermore, the expression Villiers gives to the characteristics at the heart of Ewald's complaint is borrowed from 19th century literature: Alicia's beauty is that of Masoch's Wanda in Venus in Furs, and her vulgarity ("*Sottise*") is borrowed from Emma Bovary. Looking at how the text deconstructs Alicia's fictional personhood into literary types allows us to understand Villiers' development of Ewald, and make sense of the meeting he orchestrates between decadence and anticipation. Like Alicia, the novel is a copy – in its case, of decadent literature – but with a novel, scientific soul, and it embodies, rather than narrates, Edison's modern legend.

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[278]« D'ailleurs, cet opéra-là, murmura miss Alicia Clary, c'est du *fantastique*, tout cela. »
[279] The android possessed by Sowana, however, will, and this is key to his embracing it as a suitable mate: she will understand that he suffers because of her and she will be keen to hear what he has to say about his feelings.

One of the terms of comparison Ewald prefers for Alicia is, unsurprisingly, Venus, and though he references other images of the deity, he prefers *Vénus Victrix* the best. He is so taken with the association that he confronts Alicia with it in the form of the eponymous statue. As he tells Edison,

> Une fois, à Paris, il s'est passé ce fait extraordinaire. Doutant de mes yeux, doutant de ma raison, l'idée sacrilège!--folle, je l'avoue!--me prit d'une confrontation de cette morne vivante, avec la grande pierre, qui est, vous dis-je, son image, avec la VÉNUS VICTRIX. Oui, je voulus savoir ce que cette accablante femme répondrait à cette présence. (p. 814)

Alicia's response is expectedly displeasing to him: she sees herself in the statue, feels superior to it, but is otherwise unimpressed. Again, she is incapable of appreciating objects of art as anything other than objects, since her comments focus on the material -- she points out that the statue's arms are missing. Thus far, the relation of this story appears superfluous to that of Alicia's reaction to the opera, since it attests to the same intellectual and emotional shortcomings. What is important to note, however, are her comments following the recognition: she feels cold and wishes to leave,

> Puis elle eut comme un frisson: sa main, qui avait quitté mon bras pour s'appuyer à la balustrade, le reprit, et elle me dit tout bas:
>
> --Ces pierres... ces murs... Il fait froid, ici. Allons-nous-en. (p. 816)

More than the imagining of both women as the *Vénus Victrix,* this detail indicates that Alicia's beauty has literary sources. When we first meet Masoch's Venus, she is sneezing and complaining of the cold climate. It is an integral part of Severin's fantasy of her, and he

reconstitutes the story of their meeting to include her walking in the garden naked, hiding behind the statue she resembles. Wanda's furs serve as a reminder of this scene, and enforce in this mind the identification of the woman with the statue. This happy confusion is an ideal that Ewald also desires, but which he cannot achieve. He explains that he cannot enjoy the physical perfection of Alicia, "ma passion d'abord ardente pour les lignes, la voix, le parfum et le charme EXTÉRIEUR de cette femme" (p. 817), because everything she does attests to her vulgarity, spoiling the illusion. As he tells Edison, "contempler morte miss Alicia serait mon désir, si la mort n'entraînait pas le triste effacement des traits humains!" (p. 817). A statue of Alicia, which the android approximates, would then realize Ewald's dream. We see thus that not only does Alicia's description draw on Wanda's, but Ewald's quest resembles Severin's.

Completing the picture of Alicia as a composite of literary characters is Ewald's take on her spirit. When pushed to explain her shortcoming, he summarizes that "loin d'être *bête*, n'est que *sotte*" (p. 808). He finds that like many other mediocre intellects, she has a habit of repeating certain expressions embraced by the majority as intelligent, "des mots d'un aspect «important» et qui leur semble donner, *par leur seul énoncé*, du «poids» à la vie" (p. 809). He concludes that "La Sottise [sic] (poussée ainsi jusqu'aux cieux!) me parut comme une damnation" (p. 816). Recalling that in the full version of the *Avis*, Villiers mentioned the similarities between his work and that of Flaubert, one can read this insistence on *sottise* as borrowing from his depiction of Emma Bovary.[280] The games she plays with her lovers rely on the repetition of certain phrases they have learned from literature, though in her limitation she does not see that is all they are.

[280] Villiers submitted a much longer *Avis* to his publisher, but it was abridged in 1886 to its first 28 lines.

For example, she suffers because she believes Rodolphe's declarations to carry the emotion accompanying them in their fictional sources, when he assumes the opposite.[281]

The examples of phrases Alicia repeats are themselves notable because they call into question the view of Ewald himself as a noble, or distinguished intellect: they are "*sérieux*!--*positif*!--*bon sens* !" (p. 808). Though in commenting on others' use of these terms, Ewald is excluding himself, the reader will note that in the novel, he is overly concerned with seriousness. As we have seen, he claims this characteristic for himself, but never explains how he lives up to it, and repeats that his contemporaries lack it. It is equally important to note that Ewald's dislike of Alicia's vocabulary is influenced by his aversion to her, and to the impression she is trying to achieve. He tells Edison Alicia speaks like this in an effort to be seen as a «femme d'esprit», which he finds most distasteful : "Quoi de plus attristant, de plus dissolvant que l'abominable être qu'on nomme une «femme d'*esprit*»" (p. 808). As Pascal Rollet, Miller-Frank and Lathers comment, this attitude is unremarkable in the 19th century, and attests to the same masculine ideas of femininity the android herself will later embody.[282] Ewald's dislike of positivism is less surprising, since it complements his Romantic nature, but it jars with his lack of opposition to the term's applicability to Edison.[283] In this, he shares an impression held by many in the fictional

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[281] One notable example is in Rodolphe's drafting his final letter to Emma, "Il s'était tant de fois entendu dire ces choses, qu'elles n'avaient pour lui rien d'original. Emma ressemblait à toutes les maîtresses; et le charme de la nouveauté, peu à peu tombant comme un vêtement, laissait voir à nu l'éternelle monotonie de la passion, qui a toujours les mêmes formes et le même langage. Il ne distinguait pas, cet homme si plein de pratique, la dissemblance des sentiments sous la parité des expressions."

[282] Pascal Rollet, "Inflexions d'une féminité surnaturelle: la voix résistante de *l'Eve Future* de Villiers de l'Isle Adam." Jeering Dreamers : Villiers de L'Isle-Adam's L'Eve Future at Our Fin de Siècle (Atlanta : Rodopi, 1996).
Felicia Miller-Frank, Mechanical Song: Women, Voice, and the Artificial in Nineteenth-Century French Narrative (Stanford: Stanford University Press, 1995).
Marie Lathers, The Aesthetics of Artifice : Villiers's L'Eve Future (Chapel Hill: U.N.C. Department of Romance Languages, 1996).

[283] Villiers remarks on the subject of Edison's thinking "Positif, il n'estime les théories les plus spécieuses qu'une fois dûment incarnées dans le fait" (p.), and the inventor tells Ewald, who does not object, "En vérité, si l'on pouvait

universe, so instead of differentiating himself from them, the remark shows how closely he resembles his contemporaries.

The details of Alicia's shortcomings I have discussed above emerge in the chapter dedicated to her, but are offered by Villiers for the benefit of the reader, rather than Edison, to whom they are addressed. These precisions delay the advancement of the plot, since as soon as Ewald mentions the *Freyschütz*, so once he indicates his dissatisfaction, cites Alicia's beauty and her vulgarity, the inventor has already thought of the solution to his problem (the android). before learning any of the details Ewald takes for peculiar to his story, Edison "parut s'absorber dans une pensée secrete," and he already advises that "j'ai, peut-être, un moyen *de vous guérir*--ou, tout au moins, de..." (p. 794). Unlike his interlocutor, Edison is able to classify Ewald's story, which suggests to the reader that the character is not meant to be novel, much like Alicia. As Villiers later reveals, Edison has developed the android in response to the suffering of another man, Anderson, who ruined himself and drove his wife mad by not being able to leave the dancer with whom he was cheating on his longsuffering wife. [284]

The stories are alike in that Ewald and Anderson are both in love with singularly beautiful women of similar profession (one is an actress and one a dancer), and both carry on their relationships despite their better judgment (Anderson knows he is ruining himself and hurting his wife, while Ewald is on the brink of suicide). Villiers supports the comparison of the young man and Anderson through the similarity of their names, Ewald and Edward [Anderson],

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voir, d'une façon rétrospective, les commencements *positifs* de celle que l'on aime et *quelle était sa forme lorsqu'elle a remué pour la première fois*, je pense que la plupart des amants sentiraient leur passion s'effondrer dans une sensation où le Lugubre le disputerait à l'Absurde et à l'Inimaginable" (p.).

[284] Some critics call her a ballerina, but Villiers does not explain her role in the show Anderson and his friends watch further than calling her a *figurante*. He is in a hurry to narrate that afterward, she waits for them to all go drinking together, as they usually did.

and through the pairs they form with their lovers: Ewald and Alicia, Anderson and Evelyn. However, the resemblance is limited to the generalities which had been revealed when Edison offered the android. Most importantly, Alicia is genuinely beautiful, while there is nothing authentic about Evelyn, who seems to employ as part of her daily regimen every prosthesis displayed in the 1878 Exposition. In the following section, I will discuss Edison's argument in favor of the similarities of the two men's cases to show that it relies more on his skillful presentation rather than genuine resemblance. It will help prove his marketing ability by showing that the description of the android supplements its functions. Here, I am interested in Ewald's lack of distinction in the fictional universe, which is upheld by both author and protagonist. This is achieved in Villiers having Ewald definitively fall short of his impression of himself in accepting the android as a suitable mate. In the following section I will discuss the shortcomings of Edison's design as embraced by Ewald, notably his approximation of the soul through recordings of literature and philosophy, and limit my comments here to Ewald's negative definition of the soul he desires in his lover through the criticism of Alicia, and compare it with Sowana, the spirit which possesses the android.

The long conversation Ewald carries with Edison on the subject of the actress is started at the inventor's request for further definition of the terms in which the young man had described Alicia's defects. Ewald's last word on her, which to him sums up "l'ostentation intéressée, l'hypocrisie timorée, la vaine et machinale fidélité, la sécheresse inconsciente, la superstition incrédule" (p. 813) is that she is a *bourgeoise*. The soul he would prefer her to have then is the opposite of bourgeois, which his interlocutor takes to mean aristocratic. To Edison however, Alicia already possesses one, since she is from "quelque bonne famille, d'origine écossaise, anoblie récemment" (p. 813). The reader knows Ewald takes great pride in his aristocratic

heritage, and Villiers takes this opportunity to insist upon the significance of such markers to the character's worldview. However, once again, his definition of nobility is derived from his understanding of himself. Ewald explains that "il faut *être*--ou *naître*--noble, l'heure étant pour longtemps passée où l'on pouvait le devenir," adding that what separates him from Alicia "constitue la différence entre le pur-sang et les chevaux vulgaires" (p. 813). Alicia's class is significant because the soul which possesses the android, and which Ewald embraces as appropriately noble, is that of a bourgeoise: Sowana is the spirit of Anderson's wife. Moreover, the conversations they have, and which lead to his accepting her, in no way correct Alicia's reproached shortcomings.

Ewald recognizes in the android a 'cured' Alicia when she manifests an interest in his mood and correctly identifies that he is unhappy because of her when he starts to cry:

> A cette émotion, à cette parole, le jeune homme, en son saisissement, se sentit comme transporté d'un ineffable étonnement. Un intense ravissement l'inspira! Certes, il ne songeait plus à *l'autre!* à la terrible:--cette seule parole humaine avait suffi pour toucher toute son âme, pour y réveiller on ne sait quelle espérance. (p. 982)

To him, the android passes for human because she appears to care about him and understand his reaction in a particular situation, which could be seen as making up for Alicia's disinterest. Her lack of understanding of Ewald was however much greater. From this interaction with the android, it would be impossible for him to determine whether this Alicia would have a better grasp of his more complex thoughts or emotions, such as those he experienced in responding to music or to works of art.

After he learns of the possession, the characteristics which convince him to accept this soul as Alicia's opposite do not amount to nobility as much as they denote obsequiousness and echo Ewald himself. He decides he can love Sowana because she recommends herself as «un être de rêve" (p. 991), and because, like him, she is at death's door. The joy he takes in their resemblance can be noted in his answering "je résous de m'enfermer avec toi, ténébreuse idole! Je donne ma démission de vivant" to her parting "Adieu, toi qui ne peux plus vivre!" (p. 997). She shares his notion of science as the enemy of aesthetic pleasure, as she advises him when they listen to a recording of birdsong, "admirez-la: mais ne cherchez pas à savoir *comment* elle se produit" (p. 873). Like Alicia, Sowana is entirely dependent on Ewald in her existence outside her father's house, but unlike her model, the android has no thoughts of her own. His love alone gives meaning to her existence, and his desires shape her.[285] Sowana asks of him, «Attribue-moi l'être, affirme-toi que je suis! renforce-moi de toi-même. Et soudain, je serai tout animée, à tes yeux, du degré de réalité dont m'aura pénétrée ton Bon-Vouloir créateur», and offers in return "J'ai tant de femmes en moi qu'aucun harem ne pourrait les contenir. Veuille, elles seront!" (p. 992).

Carol de Dobay Rifelj points out that the android thus speaking would be considered human by the Turing test: through his interaction with Eve, Ewald cannot tell she is a machine. The judgment is based on the android's adept use of natural language and imitation, rather than

[285] Séduite par un fiancé, puis abandonnée pour une fortune, Alicia venait de quitter la demeure paternelle: elle se proposait de mener l'existence indépendante et nomade d'une virtuose; elle y renoncerait plus tard. Sa voix, son extérieur, son talent dramatique lui assuraient, si elle devait en croire quelques sérieux avis, une aisance au moins suffisante pour ses goûts modestes.--Quant à moi, disait-elle, elle se félicitait de cette rencontre du premier instant de son évasion! (p. 799)

independent thought, which this is what Ewald desired from his ideal Alicia.[286] In the 20th century then, Eve would indeed be human, but Ewald is not primarily seeking humanity, only a particular type of soul. The one he accepts, however, in addition to not being noble by birth or expression, is also as inauthentic as the one he was fleeing. Villiers imagines Alicia as un-original despite her superlative beauty, and despite her unique machinery, Eve is a copy of Alicia in her appearance and a copy of Ewald in her soul. His preference of her serves to bring Ewald much closer to his contemporaries. Villiers had defined the character through his unique, audacious quest and had him criticize others, with his lover at the forefront, for the importance they accorded to repeating certain phrases without reflection. In loving Eve, Ewald makes the same mistake; he is reassured by her inauthenticity and does not stop to ponder the ways in which she is reminiscent of Alicia. The significance of Ewald's failure to live up to the originality he so prized is that it is that of a character the author makes fully known to the reader through extensive description, and discussion in which he comments on his nature, his preferences, and his beliefs, and it is meant to invite assessment of the inventor along the same lines. Villiers began the *Avis* by asking the reader to recall all he had read about the inventor, and Ewald's development reinforces the criteria by which he should be assessed: difference from his contemporaries and the ability to analyze and understand the 19th century.

[286] Carol Dobay Rifelj, "Minds, Computers, and Hadaly." *Jeering Dreamers: Essays on L'Ève Future,* ed. John Anzalone (Amsterdam: Editions Rodobi BV, 1996): 127-39.

Section 3.2: ***Edison between fiction and reality***

The *Avis* of L'Eve future, even as it champions Edison's modern legend, attacks the apparent originality of featuring such a protagonist, in citing as precedent Goethe's *Faust*. Villiers asks, *"si le docteur Johannes Faust, se trouvant contemporain de Wolfgang Goethe, eût donné lieu à sa symbolique légende, le «Faust» n'eût-il pas été, quand même, licite?"* (p. 765). As Alan Raitt recounts in his biography of Villiers, Goethe's play exerted a powerful influence over the author throughout his career, and L'Eve future is testament to this, having the tragedy as its most popular literary allusion. When he discusses the genesis of the novel, Raitt then interprets its use of science to mimic Faust's magic. To him, Edison and Ewald are "en révolte contre Dieu" and the inventor is "au sens fort, un magician, un sorcier" who successfully manipulates the "vieille science défendue."[287] Villiers' question, however, can be read with reference to the process through which a historical figure becomes the subject of literature. Though he uses Goethe as an example, the author is reading into Faust the project he, himself, has undertaken. The tragedy and the novel then resemble each other in that they are both versions of an already recounted story.

Both aspects of the reference, the practice of retelling and the literary and mythological precursors of his protagonist are key to understanding the *légende moderne*. Edison's models are Faust and Prometheus, figures which share a willingness to transgress against moral order, and which have been read as the measure and meaning of the novel. Radix, for example, holds that in the inventor, "Prométhée se réincarne dans un personnage de légende à qui tout semble possible"

[287] A. W. Raitt, Villiers de L'Isle-Adam, Exorciste du réel (France: Corti, 1987) : 380.

(p. 79) and that the author proceeds by "s'appropriant le type du prométhée créateur insufflant la vie à sa créature" (p. 79). A close reading of the passages in which Edison is staged as Faust, and in which his resemblance to Prometheus is invoked, however, shows that he does not live up to these models. To the contrary, Villiers defines the modernity of his character through a break with the points of reference one would find relevant for the depiction of an inventor in literature. The legendary aspect of Edison is derived though his escaping the fate of such precursors and achieving in the novel, as in the newspaper reports of the 1870s and 1880s, technological excellence and commercial success.

The reader is confronted with Edison as Faust from the novel's exposition, where Villiers depicts the American alone in his study, pondering the limits of his science. As Goethe's protagonist in the tragedy's first act, Edison is unhappy, but unlike his predecessor, he does not dismiss the significance of the knowledge he possesses. Instead, he bemoans not being able to acquire more knowledge like that which he already has:

> Comme j'arrive tard dans l'Humanité! murmurait-il. Que ne suis-je l'un des premiers-nés de notre espèce!... Bon nombre de grandes paroles seraient incrustées, aujourd'hui, *ne varietur*,--(sic),--textuelles, enfin, sur les feuilles de mon cylindre, puisque *son prodigieux perfectionnement permet de recueillir, dès à présent, les ondes sonores à distance!...* (p. 770)

Edison's wish recalls the advertisement of the phonograph, which emphasized its versatility in terms of the different types of sounds or communications that it could record.[288] It is not surprising that the device should appear in the novel almost as soon as the protagonist, because

[288] Thomas Edison, "The Phonograph and its Future" *The North American Review* 126.262 (1878).

when Villiers starts writing, this is Edison's best known accomplishment, and is the central item featured in the inventor's popular stand at the 1878 Exposition, to which Villiers likely visited.[289] Moreover, the phonograph provides a good approximation of Edison himself. The American does not travel to France, but given his presence in the papers, he too, appears as a disembodied voice, leaving his accomplishments to speak for him.[290]

Aside from reminding the reader of Edison's image in popular culture, the remark cited above serves to characterize him as a proud inventor who overestimates his own importance in the history of science. In imagining that had he been alive much earlier in human history, he would have been able to record the "grandes paroles," the inventor erases the contribution of all prior works that made his phonograph possible. He is suggesting that at any time in history, he would have been able to carry out his activity, deriving from first principles or rebuilding from basic materials all necessary tools and devices involved. Though similar statements are made in the advertising of the phonograph (Baldwin, p.81), Villiers exaggerates them to mock the inventor by emphasizing his arrogance. The pride he takes in his work gains a diabolical aspect as his thoughts culminate in his bemoaning not being alive at the beginning of the world to record the Word by which it had been created. Recording God's Word implies that the inventor could also have reproduced it, which justifies Raitt's description of his activity as a "conduite factieuse et blasphématoire."[291]

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[289] Dorothy Kelly, Reconstructing Woman: From Fiction to Reality in the Nineteenth-century Novel (University Park: Penn State Press, 2007) : 132.
[290] Edison travels to France for the 1889 Exposition, where he is received very well, both by the public and officially. He meets Gustave Eiffel and French president Sadi Carnot.
[291] A. W. Raitt, Villiers de L'Isle-Adam, Exorciste du réel (France: Corti, 1987) : 199.

Edison further diverges from Faust as he complains that the attention he received for his invention is insufficient. In the first act of the tragedy, the doctor is unhappy because he finds his work to be held in too high a regard by his contemporaries. He is embarrassed by the reverence with which the townspeople greet him, and cannot see the good work he has accomplished in his career for his early failure. Sitting alone in his study, Faust thinks back on the experimental elixir he had developed with his father, and which had unfortunately killed his patients.[292] In his home, Edison envisions his interaction with his public very differently: Villiers has him exclaim, "et penser qu'après six mille et *quelques* années d'une lacune aussi préjudiciable que celle de mon Phonographe […] quantité de lazzis, émanés de l'indifférence humaine, ont salué l'apparition de mon premier essai!... «Jouet d'enfant!» grommelait la foule" (p. 771).

Though such a reaction does indeed greet Edison's phonograph in France, where it is suggested that it is merely an expensive toy, it is quickly overshadowed by the public's positive response.[293] The scientific community also embraces it, with *Le Figaro* noting that praise of the phonograph "fit résonner dans les murs sonores de l'Académie des sciences." Their excitement matches that of the general public, which is taken for "que le commencement de l'enthousiasme spécial, qui prend tous les auditeurs quand le phonographe se met à tourner et à bavarder" (1878/06/03). Villiers' version of Edison then appears petty or vengeful, since he focuses on the negative reception, without acknowledging the positive response that replaces it. His reaction is also notable because it suggests the inventor finds his interaction with his public, or the press, to be theatrical. As he puts it, their reactions are *lazzis*, rehearsed comical replies like those of the Commedia dell'arte. Edison may be accusing the press of lacking imagination, but I read this as

[292] J. W. Goethe, Faust (München: DTV): 35-36.
[293] Francis Jehl, and William S. Pretzer. Menlo Park Reminiscences (Mineola: Dover Publications, 1990): 272.

a first indication that the inventor is aware he plays a part in the spectacle of his representation, an aspect on which I focus later in discussing Edison's staging of his work to Lord Ewald. His irritation at the press does not bother Edison for too long. He leaves Faust far behind as he happily dives back to work: "il se leva, non sans un sourire, et se mit à faire les cent pas dans le laboratoire" (p. 772), a prospect which Faust finds unbearable.[294]

Villiers operates Edison's decisive break with Faust in the *Livre deuxième*, suggestively titled *Le Pacte*. In this section, Lord Ewald and the inventor reach an understanding, namely that Edison will build a counterfeit Alicia and Ewald will test her authenticity by trying to love her. The inventor is given twenty-one days in which to realize the android, at the end of which Ewald will commit suicide. The book title, the time limit, and the provision that the inventor will provide his friend with a beloved recall the terms upon which Faust and Mephisto settle. The arrangement however casts Edison in the devil's role, since he is providing a solution to Ewald's predicament. Moreover, in the play, the potion Faust drinks to grow younger also works to make him see Helen of Troy in any woman, characteristic which closely approximates the function of the android according to Edison.[295] The inventor may be copying an individual, but the machine he has devised is not only reproducible, but as I indicated earlier, this is not even the instance in which it was conceived. The reader first learns of the android in connection to Lord Ewald's sorrows, but Edison imagines the artificial woman after witnessing the ruin of another friend, Edward Anderson, at the hands of an actress. Edison perceives that such women represent a great danger, and decides to work on a replacement for them.

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[294] J. W. Goethe, Faust (München: DTV, 2004): 27.
[295] Ibid.79.

The significance of both Faust and Mephisto to the construction of Edison's modern legend is greatly diminished in light of the practical enterprise Edison has in mind, and which he shares with Ewald. The inventor advises that his predicament is far from unique, "en Europe et en Amérique, il est, chaque année, tant de milliers et tant de milliers d'hommes raisonnables qui,--abandonnant de véritables, d'admirables femmes, le plus souvent,--se laissent ainsi assassiner par l'Absurde en des milliers de cas *à peu près* identiques à celui-ci" (p. 904). His manufacture of the android relies on its easily reproducible mechanism. As he explains, "[l]a première Andréïde seule était difficile. Ayant écrit la formule générale, ce n'est plus désormais, laissez-moi vous le redire, qu'une question d'ouvrier: nul doute qu'il ne se fabrique bientôt des milliers de substrats comme celui-ci" (p. 930). In addition to not being a unique solution, Villiers makes it clear that to Edison, the android is as a product comparable to any other he has developed. The inventor's thoughts on revealing the new machine to the public suggest that he wishes the phonograph to have no competition in the market: "je tiendrai secret […] l'absolu perfectionnement que j'ai découvert […] J'écoulerai, de la sorte, pour cinq ou six millions de vieux phonographes--et puisque l'on veut rire... je rirai le dernier" (p. 772). This great attention to the development of the android as a money-making enterprise clashes with the literary model of Faust / Mephistopheles and emerges as a characteristic of Edison's modern legend.

Critics have not accorded Edison's plans for the manufacture of the android sufficient attention, preferring instead to focus on the finished product. Eve, possessed by the spirit Sowana, is seen as a more direct path to understanding the novel as *œuvre d'Art-métaphysique*. Noiray, for example, attempts to render Edison's profits metaphorical and explains that what Villiers is illustrating through him is a higher quest, "[d]evenir, non seulement célèbre, mais riche et producteur de richesses, triompher partout dans une société où les œuvres de l'esprit

seraient reconnues, même économiquement, pour les valeurs suprêmes, tel est le rêve de Villiers. Tel est le sens de cette «légende moderne»" (p. 57). The character whose tale it tells however is Villiers himself: Noiray identifies both the protagonist, "reconnu par les foules, réconcilié avec l'argent," as much as Ewald, "ce portrait de l'artiste en jeune homme," with the author.[296] Such a reading has the unfortunate side effect of erasing Edison's less noble or artistic sides, on which Villiers insists through ridicule, and which make up his difference from Ewald. In particular, this reading glosses over Edison's marked uncharitable nature, which distinguishes him from Prometheus. Villiers' Edison is possessed of a great love of humanity, and the author retains only audacity of the myth, not the magnanimity, or the punishment.[297]

In producing a counterfeit human being, Edison is aiming to improve people, rather than their standard of living in a significant way.[298] The inventor accepts Lord Ewald's assessment of Alicia as beautiful but unintelligent, and offers the machine as an improved version of the woman. In more general terms, he explains that he will reform men by modifying women, and explains that the android serves to "*annuler, en quelques heures, dans le plus passionné des cœurs, ce qu'il peut contenir, pour le modèle, de désirs bas et dégradants*" (p. 905). Radix takes his declaration as to the purpose of the machine at face value, observing in support of her reading of Edison as Prometheus that "les actions auront, elles aussi, une influence hautement bénéfique sur la marche de l'humanité" (p. 79). The hope expressed is very different from the relationship

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[296] Jacques Noiray, L'Ève Future ou le laboratoire de lidéal (Paris : Belin, 1999) : 157.
[297] It is in fact Ewald who is punished: the android is destroyed in a fire, and he commits suicide.
[298] This characteristic, Edison's desire to improve women, is an anticipation of Villiers that finds an echo in the historical figure. In Edison's Eve, Wood mentions that the historical Edison also pondered, at least in passing, the perfectibility of women. He describes in his journal how a feminine ideal could be formed starting from his wife, and adding traits he had observed in other women. Though he terms the perfection of this composite being 'Raphaelized beauty,' the method by which he envisions it will be achieved is identified with Galton (Wood, 2002, p. 145-6). Villiers could not have been aware of this aspect of Edison's life, the terms in which the inventor thinks approximate very well those in which his fictional version will present the android to Ewald.

the inventor entertains with his contemporaries, which is depicted as adversarial. Edison's comments on his reception have already indicated it, and Villiers references it again by making the inventor resentful of those he has helped make their fortune. Despite their apparent collaboration, he still reproaches these people not having been more ready to help him at the beginning of his career, as Ewald had: "Et ceux qui m'admirent, aujourd'hui, au point d'avoir fondé des sociétés au capital de cent millions sur mon crédit intellectuel ou mes découvertes passées et à venir, m'auraient parfaitement laissé crever comme un chien, à votre place! Et j'en ai quelque souvenir" (p. 793).

As opposed to Faust, Prometheus is a model Edison claims for himself, with references to the mythological figure providing the inventor a figurative frame in which to present his practical expertise.[299] As we have seen, everything scientific and material is disconsidered by Ewald, so in order to be successful with him, Edison must misrepresent his work. The principal area in which he does so is in speaking about electricity. The inventor refers to electricity as "cette étincelle, léguée par Prométhée" (p. 910), which in addition to giving it mythological rather than scientific significance also implies that he is an heir to Prometheus. As we have already seen, Villiers' Edison is very proud, so such a take on his work does not surprise the reader, and it is important to note that the image is also accepted by Lord Ewald. The young man asks him "veuillez bien m'apprendre, mon cher Edison, où je dois aller ravir une étincelle de ce feu sacré dont l'Esprit du Monde nous pénètre! Je ne m'appelle point Prométhée" (p. 841). We see Edison and Ewald employing the same 19th century metaphor, but to which they give different meanings: whereas

[299] According to the inventor's biographer, Paul Israel, the American was actively invested in representing himself as a modern-day Prometheus (Gaby Wood, 2002, p.144).

Edison knows what the referent of the figurative language is (electricity), Ewald does not.[300] The young man is asking for an explanation of how the android will be animated, but Edison is not willing to answer because he does not wish to bring his interlocutor into an overly scientific domain. Instead, the inventor adopts Ewald's frame of reference by replying, "Bah! tout homme a nom Prométhée sans le savoir-- nul n'échappe au bec du vautour" (p.841). They are still speaking at cross-purposes, however, and allude to different aspects of the myth. Each character's line refers to their impression of the other: Edison sees Ewald's suffering, and thinks of the punishment endured by Prometheus, while the young man perceives the inventor's power and thinks of Prometheus the creator who stole fire.

Such skillful manipulation of language and understanding of his audience are qualities unique to this inventor. As we have seen, Verne's inventors are both not interested in reaching their contemporaries, and prevented from doing so. Through his choice of words, Edison is able to disguises a great inequality under the appearance of equivalence, denoted by both characters being likened to Prometheus. In this conversation, passing himself off as the Titan allows the inventor to obscure from Ewald information which would have tainted his reception of the android -- the answer the young man sought was that he, as many others, would have to buy the *étincelle* from Edison. This, however, is not appealing to a man seeking a unique, metaphysical solution, and would be offensive to his sensibility.

Villiers makes Edison's rhetorical talent is complemented by his excellent staging of his work. Both aspects are defining traits of his modern legend because they contribute to the construction of his image and renown. They are more convincing to Ewald than the android's

[300] Prometheus as the father or symbol of electrical technology is very usual, from Mary Shelley to Jules Verne and to the 1900 Exposition.

scientific basis and the inventor uses them to supplement to its functionality. The first such indication is Edison's success in equating the problem experienced by Anderson with Ewald's even though they differ in an essential aspect. He explains to the young man that actresses, the women who eventually ruin men like Anderson, initially repulse them. The inventor hypothesizes that the men's first reaction is due to their instinctively spotting that the women's beauty, unlike that of their wives, is somehow dishonest, or factitious. They succumb because this appearance of perfection wins over the knowledge that it is illusory. Though Alicia's beauty is genuine and Ewald objects to her vulgar soul, Edison paints such a convincing picture of himself as a capable humanitarian that the young man believes he too suffers like Anderson. He achieves this result by terrorizing the young man with a prolonged demonstration of the accessories and prostheses[301] seductresses rely on to enhance their charms.[302]

Edison's terrible presentation of the 'beauty' that has ruined many men occupies chapters IV and V of the *Quatrième Livre*. The inventor presents Ewald with a troubling sight: "un petit être exsangue, vaguement féminin, aux membres rabougris, aux joues creuses, à la bouche édentée et presque sans lèvres, au crâne à peu près chauve, aux yeux ternes et en vrille, aux paupières flasques, à la personne ridée, toute maigre et sombre" (p. 898). His emotions overcome him, and he asks "Qu'est-ce que cette sorcière?" (p. 898). The inventor steps in as his guide to

[301]These devices are mostly not Villiers' invention, but items displayed at the 1878 Exposition, where Edison's stand was a great attraction (Villiers, p. 1446).

[302]The ideal beauty Edison deconstructs is described as follows : "c'était une ravissante enfant? disait Edison. Eh! eh! A tout prendre la passion de mon ami Edward Anderson ne fut pas inconcevable.--Quelles hanches! quels beaux cheveux roux! de l'or brûlé, vraiment! Et ce teint si chaudement pâle? Et ces longs yeux si singuliers? Ces petites griffes en pétales de roses où l'aurore semble avoir pleuré, tant elles brillent? Et ces jolies veines, qui s'accusent sous l'excitation de la danse? Cet éclat juvénile des bras et du col? Ce sourire emperlé où se jouent des lueurs mouillées sur ces jolies dents! Et cette bouche rouge? Et ces fins sourcils d'or fauve, si bien arqués? Ces narines si vives, palpitantes comme les ailes d'un papillon? Ce corsage, d'une si ferme plénitude, que laisse deviner le satin qui craque! Ces jambes si légères, d'un modelé si sculptural? Ces petits pieds si spirituellement cambrés?--Ah!... conclut Edison avec un profond soupir, c'est beau la nature, malgré tout! Et voici bien un morceau de roi, comme disent les poètes! " (Villiers, p. 898).

this supernatural world, and his explanations demystify it by dramatically revealing the tricks employed by women to fool men. The author accentuates the visual aspect of the show by having the inventor remark *voila* or *voici* to introduce almost every grotesque, disembodied item. For example, we read "voici les belles petites dents lumineuses, si enfantines et si fraîches! Ah! le premier baiser sur la provocante magie du sourire ensorcelant qui les découvrait! Et il faisait jouer, avec bruit, les ressorts d'un ravissant dentier pareil à ceux que l'on voit dans les montres des dentistes" (p. 901). Ewald and the reader both watch wordlessly Edison's performance, which deconstructs the ravishing beauty into an assemblage of devices that, to a man unused to them, and in the absence of the person who wears them, is senseless and unappealing.

This demonstration, however, also calls into question the assumption that Edison is a genuine scientific authority, which is held by Ewald and the reader alike. In the beginning of his presentation, the inventor remarks "Ecce pucella" (p. 899), an adaptation of Pilate's introduction of the degraded Christ, in an effort to give his subsequent revelation of the nature of women greater significance. Since Pilate is wrong, because according to John 19:5 the man before him is divine, Edison's expertise becomes dubious. Ewald's term for the decrepit woman the inventor shows him, *sorcière*, moreover recalls that Edison himself is the *Sorcier de Menlo Park*. The similarities between him and these inauthentic beings are further suggested through the laboratory décor. The inventor has not only accumulated the women's devices in his workspace, but he is surrounded by his own props. This room is full of his eye-catching, counterfeit marvels: mechanical birds, electrical flowers, and a ceiling that looks like the sky.[303] The inventor's own

[303]Villiers might have been inspired by Edison showcasing his bulbs in flowered chandeliers at the 1881 Paris Electrical Exposition.
Neil Baldwin, Edison: Inventing the century (Chicago: University of Chicago Press, 2001): 131.

clever language and his setting thus imply that he is closer to the women he appears to revile than the reader might have thought, and Villiers makes it clear that he does not have occult powers, but acts, instead, like a stage magician.

Despite this, Edison's scientific expertise is not being contested. Villiers calls the inventor's workplace an underground Eden, as the title of the *Livre Troisième* indicates, and Ewald finds it "pareil à ceux que, jadis, sous les palais de Bagdad, orna la fantaisie des califes" (p. 869), but these are Edison's own work, and he explains their mechanical and electrical nature to Ewald. The laboratory moreover makes the inventor appear a good businessman in that he knows to separate his public representation from his private life. This is reflected in his choice not to illuminate his home or workplace with his new electric light. The sky-like ceiling is achieved through the use of gas light, "trois lampes oxhydriques, entourées de globes teintés de bleu, flamboyèrent brusquement, au plafond, autour d'une sorte de foyer d'électricité rayonnante, illuminant le laboratoire d'un effet de soleil nocturne" (p. 790), and in the house, "l'ingénieur abaissa le ressort d'un briquet à hydrogène qui se trouvait plus près de lui que les allumoirs électriques. Le jet de gaz, au contact de la frêle éponge de platine, s'enflamma" (p. 778). This is a historically realistic decision, since the new technology is still very expensive and unreliable at this time, but it also supports Villiers' characterization of Edison as a modern legend inspired from the popular culture figure by the same name.

To great public acclaim, the inventor's experiments yield a bulb lasting about 100 hours in 1879. Large groups travel to see the device and many publications feature detailed drawings of the new lamp. In France, *La Lumière électrique*, *La Nature*, *L'Illustration* publish numerous articles on this development, the first touching upon 'la nouvelle lampe' in every other issue of

1880. Progress however is perceived as slow, and until the next year, the only place the bulbs can be seen is in Edison's home in Menlo Park.[304] Demonstrating great understanding, *L'Univers illustré* writes "La curiosité est très excitée en Europe à l'endroit de cette invention, et l'on a hâte de pouvoir s'assurer *de visu* des résultats merveilleux que les Américains en annoncent ; mais, Edison l'a déclaré, il ne livrera ses lampes au public que lorsque l'expérience à laquelle il les soumet depuis plusieurs semaines aura une durée d'au moins six mois" (1880/01/31). Eventually, public opinion turns on Edison, as he appears not to be living to its high expectations of 'the Wizard.' On both sides of the Atlantic, he is accused of having played a trick, or having faked his results. More leniently, J.W. Urquhart suggests in The Electric Light: Its Production and Use (1891), that Edison should abandon the lamp, because it cannot work. As Baldwin puts it, "the image of Edison in the zeitgeist of the new decade hovered between the poles of legitimate entrepreneur whose time had come, and unfulfilled prophet."[305]

In response, Edison works hard at improving the new technology and at developing a system of delivery of electricity, but is also careful to manage his representation in the press. He maintains a good relationship with them by giving interviews and writing letters, but he also takes matters into his own hands and founds *Science* magazine without publicizing his involvement.[306] He uses it in part to promote his work, and justify the 'slow progress' by explaining the steps required before electricity can illuminate a city. However, in the 1881 Paris Electrical Exposition, the American achieves a significant victory, which is also strongly representative of his unique talents. Though more than 50 types of electric light are shown, as indicates the exposition catalogue, Edison's display is the most visible because it occupies two

[304] Neil Baldwin, Edison: Inventing the century (Chicago: University of Chicago Press, 2001): 116.
[305] Ibid. 118.
[306] Ibid. 121.

large rooms on the first floor of the Palais de l'Industrie.[307] His representatives hire Camille Flammarion to place articles in *Le Monde Illustré*, *L'Illustration* and *Le Figaro* in support of Edison's work, and this prominent representation makes him stand out. His biographer stops short of asserting that a causal relationship exists between this effort in the press and the five gold medals the inventor is awarded. This success greatly improves Edison's visibility in Paris, which Villiers, an avid Exposition visitor, would certainly have noticed: he founds two companies in the city, and is hired to light the foyer of the Opéra. Though this is finally a public use of his new technology, it is still exceedingly expensive for private consumers. As an example, when Edison opens the Manhattan Pearl Street Station in 1882, J.P. Morgan can afford to have his Madison Avenue mansion electrified. Not using this light in Edison's laboratory then indicates that Villiers' inventor has made the reasonable choice for his work, while maintaining his reputation as an innovator.

The unveiling of the android supports the representation of the inventor as an astute showman who knows his audience well. To Ewald, it arrives as a relief from the horrors of women's prostheses, which Edison has presented in the hopes that if he proves all women are fake, in showing that Eve is also counterfeit, the young man will conclude she is also a woman.[308] His logic is flawed, but Edison's rhetoric bridges the gaps between what the Lord desires and what he can produce. Detailing Eve's systems, of which I am primarily interested in the third, "le Système-vivant, intérieur, qui comprend l'Equilibre, la Démarche, la Voix, le Geste, les Sens, les Expressions-futures du visage, le Mouvement-régulateur intime, ou, pour mieux dire, «l'Ame.»

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[307] Ibid. 131.

[308] I use "Eve" to designate the android because this is the most general term for the machines Edison designs to replace women. It this emphasizes his concern with their serial production, rather than supporting the singularity of Ewald and Alicia's case.

(p. 908) Edison convinces Ewald that the android's semblance of animation and intelligence is the solution to his problem. Already the label he has affixed on the machinery making up Eve's movements and speech indicates the inventor is preparing the positive reception of his work. "L'Ame" would appear to reveal Edison's interest in the metaphysical, but the term is only borrowed from Ewald, who desired to have Alicia's soul replaced. Edison is concerned with offering his customer exactly, and literally, what he wanted. As he remarks,

> Le remède consiste *à réaliser vos vœux … je veux accomplir votre rêve tout entier!*
>
> Milord Ewald, ne vous êtes-vous pas écrié, tout à l'heure, en parlant d'*Elle*: «Qui m'ôtera cette âme de ce corps?»
>
> --Oui! murmura, lord Ewald, un peu interdit.
>
> --Eh bien! C'EST MOI. (p. 820)

Though Edison relies on spectacle, it is not to say that Villiers sacrifices the scientist to the stage magician. Edison is not only technologically proficient, he imagines such a provenance for himself. He integrates his work into the tradition of Albert le Grand, Vaucanson and Maëlzel [sic], but adds that they "furent, à peine, des fabricants d'épouvantails pour les oiseaux. Leurs automates sont dignes de figurer dans les plus hideux salons de cire, à titre d'objets de dégoût d'où ne sort qu'une forte odeur de bois" (p. 832).[309] Though Edison finds the automata unsightly and unpolished, he reminds Ewald that his work builds on theirs, as he notes "oui, telles furent

[309]St. Albertus Magnus (c. 1200 - 1280), Doctor of the Church, legitimized the study of nature as a science within the Christian tradition.
Jacques de Vaucanson (1709 - 1782) is a French inventor whose work includes automata (such as the 'digesting' duck), and the development of a loom later patented by J.-M. Jacquard.
Johann Nepomuk Maelzel (1772 -1838) is a German inventor who perfected the metronome, and is also known for his fraudulent chess-playing machine, "The Turk."

les premières ébauches des Andréidiens" (p. 832). His decadent interlocutor responds however with medieval and alchemical allusions. In Eve, he sees similarities to the work of Paracelse and Raymond Lulle, "au temps des magistes et des souffleurs du Moyen âge" (p. 834), which indicates that he is also fond of theatrical metaphors.[310]

Edison's ability to present his work in terms that are relevant to such an audience is demonstrated again, as he skillfully reinforces Ewald's metaphorical interpretation of the *étincelle*. The inventor contends that the android is 'alive' because of "ces poumons, l'étincelle les met en mouvement comme l'étincelle de la Vie met en mouvement les nôtres" (p. 855). Her lungs are golden phonographs, and she will be loved by Lord Ewald because of them -- Edison has recorded there the poetry and philosophy that serve as replies to all of the questions her lover would have.[311] As he clarifies,

> Les chants et la parole de l'Andréïde seront à jamais ceux que lui aura dictés, sans la voir, et inconsciemment, votre si belle amie, dont l'accent, le timbre et les intonations, à des millionièmes de vibrations près, seront inscrits sur les feuilles des deux phonographes d'or,-- perfectionnés à miracle, aujourd'hui, par moi, c'est-à-dire d'une fidélité de son de voix vraiment... *intellectuelle*! (p. 855).

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[310]Paracelsus (1493 - 1541) is the byname of a German alchemist and physician who turns away from the study of medicine in medieval universities.
Ramon Lull (c. 1232 - c. 1315) is a Catalan mystic and poet whose work, Ars Magna (1305-9) attempts to unify all forms of knowledge in support of the Christian faith. He is also cited as the author of a number of 14th century works on alchemy. According to Michela Pereira, however, already in the 19th century scholars began considering that these were not written by him, as his attitude toward alchemy had been negative, and all the volumes were published posthumously. Given Ewald's characterization, it is much more likely he is imagining this Ramon Lull, rather than the Christian apologist.

[311]It is interesting to note that, in a manner of speaking, the android anticipates a development in the career of the historical Edison. In 1890, the Edison Phonograph Toy Manufacturing Co. produces dolls containing small phonographs with recordings of nursery rhymes. They are very unsuccessful both because of their large size and their high cost, and production is quickly abandoned. (Wood, p.151).

To the reader, this remark meant to stress how much the android will resemble Alicia, calls into question her perfection because it implies that her intelligence is derived from Edison's skill, rather than from the recordings themselves. It is the *fidélité de son* that is *intellectuelle*, a comment which bears on the phonograph's ability to record sound and reproduce it accurately.

In this aspect, Villiers draws on Edison's representation in the press, as such considerations are a standard of the coverage of the phonograph. We read, for example "le phonographe existe, […] il est certain qu'il garde les sons qu'on lui confie et qu'il les répète fidèlement, que de plus savants que moi n'assignent pas de limite de temps à son fonctionnement". The impression that the phonograph can 'chat' to its audience is a mainstay of Edison's marketing.[312] One article, said to be translated from an American magazine, recounts that a reporter, welcomed by "le professeur Edison" to his laboratory at Menlo Park asked "«Comment va le phonographe aujourd'hui, M. Edison? » «Oh! À peu près comme d'habitude,» fut la réponse, «mais venez le lui demander » "(1878/04/12). Most importantly, however, the success of the phonograph, like that of Edison in convincing Lord Ewald, is directly dependent on spectacle: when in 1878 Edison founds the Speaking Phonograph Company, the new machine is exploited by exhibiting it: its performance is its first commercial use. It was mass-marketable for recording and reproducing sound only 20 years later.[313]

One reason Edison stresses the *fidélité de son* over the intelligence of the replies is that the phonograph only provides sequential access to its recordings. Eve becomes a 'perfectly cultivated hetaira,' as Miller-Frank puts it, through her golden lungs, but the Lord doubts she can

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[312]Eleven years later, in Bram Stoker's Dracula, Mina's first reaction upon seeing the phonograph is still to ask "May I hear it say something?" (Stoker, p. 269).
[313]Moreover, as Gaby Wood points out, phonographs were sold in velvet-lined wooden boxes that resemble the coffin in which the android travels.

appear to reason. He does not share Edison's faith in the power of language, and questions her to what extent she will appear alive

> --Mais, *sans âme*, en aura-t-elle conscience?
>
> Edison regarda lord Ewald avec étonnement.
>
> --Pardon: *n'est-ce pas précisément ce que vous demandiez en vous écriant*: QUI M'OTERA CETTE AME DE CE CORPS?» (p. 862)

Edison returns again to Ewald's declaration because this is the only sense in which he has been able to provide him the solution he sought. Instead of attempting to correct how the machine plays back the recordings, which would indicate his willingness to produce a unique solution to Ewald's problem, the inventor convinces him that this does not make the android any worse than Alicia. He is intent on demonstrating the wide applicability of his devices, and when he cannot change them to fit a situation, he reinterprets it so that his work appears valid. To Ewald, he argues that given that Alicia's responses are always inappropriate, he must already take great pains to interpret creatively what she says in order that they have a conversation, and by extension, a relationship.

Speaking with Eve will require the same involvement, but because she is prepared with much more intelligent words, and elegant gestures to accompany them, it will be a much more pleasurable exercise. Edison concludes,

> En vérité, *tout, je vous assure, peut, absolument, répondre à tout*: c'est le grand kaléïdoscope des mots humains. Étant donnés la couleur et le ton d'un sujet dans

> l'esprit, n'importe quel vocable peut toujours s'y adapter en un sens quelconque, dans l'éternel *à peu près* de l'existence et des conversations humaines.--Il est tant de mots vagues, suggestifs, d'une élasticité intellectuelle si étrange! et dont le charme et la profondeur dépendent, simplement, de *ce à quoi ils répondent*! (p. 913)

To win the argument, the inventor extrapolates a general maxim from his very particular circumstances: "tout peut répondre à tout," with the intimation that if Eve can sound like Alicia, she is a suitable replacement by any other measure. Edison convinces Ewald that in loving Alicia he already loves an illusion, because he must ignore her faults. Having equated Eve and Alicia through their physical aspect, and now through Ewald's perception of them, the inventor concludes that living with the android as a companion is just a matter of practice, "Avec un peu d'habitude--(ah! vous savez! il faut connaître une femme!)--tout vous deviendra *naturel*" (p. 858).[314]

Edison is thus selling imperfection as perfection: the phonograph's sequential access, a shortcoming of its playback function, is recommended to Ewald as further evidence of the fidelity with which Alicia has been reproduced. This has, however, been the basis of his entire presentation. The inventor has offered the young man as a solution for his complex, metaphysical problem, a reproducible machine, and convinced him that it met all his requirements. Edison has succeeded because he is adept at staging his devices, as he did in the Expositions, so that they cannot be evaluated solely on technical grounds. A showman and a sophist, his science is nevertheless reliable, as the many devices Villiers accumulates in his laboratory attest.

[314] Edison's presentation of Eve's other systems reveals that Alicia's likeness has been photosculpted onto the android, so the machine does indeed perfectly resemble her.

The spectacle that accompanies his work is in fact demanded by this audience; as we have seen, Ewald is fond of the Middle Ages. In the description of their interaction in the laboratory, Ewald is "émerveillé," and the inventor does his best to reproduce this reaction to the *merveilleux* by terrifying Ewald with the props women use to seduce men. The android then appears as a saving vision: in this comparison, Eve is at least an honest (transparently inauthentic) woman, and her behavior is reliable, because it is guaranteed through Edison's "Science avec la toute-puissance de ses mirages" (p. 845). The inventor's purposeful representation of his technology as magical is the aspect of Edison's modern legend that separates him from his literary and mythological precursors. Villiers casts Edison as Faust and Prometheus only to show that he is not possessed of the same passions or operates in the same frame. As in his 19th century, the inventor is a technology merchant: the Eve he offers Ewald is only one of a series, and the inventor sees little difference between her and the phonograph itself.

Conclusion

Commenting on the novel's being confined to Edison's laboratory, Noiray observes that it becomes *le laboratoire de l'idéal*. The inventor is at work on producing the artificial ideal of decadence, but it is only realized in a lasting manner by Villiers in L'Eve future.
This reading prefers the artistic and literary pursuit to the scientific, which appears as only the latest iteration in a long line of transgressive acts aimed at giving humanity control over that which was not traditionally its domain. Echoing late 19th century disenchantment with the powers of science, Edison is a magician with better tools, but equally imperfect results. We have seen however, that Villiers makes reference to the best-known literary and mythological

precursors of the inventor, Faust and Prometheus, in order to show how different his protagonist is from them. Edison does not impress through his humility, devotion to his discipline, or charity toward humanity. Instead, this inventor is motivated by financial gain and is interested in developing technology, both of which define his domain as worldly. The presentation of the android to Ewald shows this best: Edison insists on discussing the mechanisms animating her, but for the benefit of his audience he delivers a theatrical presentation of its functioning.

The same concession to the audience is to be found in Villiers' explanation of his work in the full version of the *Avis*. There, the author explains that the literary project is grounded in scientific research which demanded "la langue rigoureuse et sévère de l'algèbre," but it is successful because he has managed to avoid "surcharger, des signes de l'«intégrale»," des pages entières" (p. 1557). Though it would appear the scientific subject is an impediment to literature, the two domains are equally important to Villiers, and he finds them both realized in the novel. One indication is his dedicating a third of the *Avis* to recapitulating the research he has done, and writing about further avenues he could have explored.[315] The reason he has held back on providing more scientific detail is in order to render the text readable to the public. Otherwise, the novel would have required constant cross-referencing with physics and mathematics manuals, which Villiers did not believe his contemporaries were willing to do.

Read back into the novel, this concern with giving science a literary manifestation endows Edison's clever manipulation of language in explaining the android a scope greater than his efforts in the novel. As we have seen, Villiers maintains a great inequality in linguistic ability

[315] An earlier version of a preface, which Villiers never finished, cited also "ouvrages de vulgarisation scientifique comme ceux de Montferrier ou comme le Dictionnaire d'électricité, sur lesquels l'auteur aurait pu prendre d'appui pour être sûr de ne pas se tromper" (p. 1556).

between the two characters: the inventor understands the referents of Ewald's allusions and the precise meaning he gives to certain terms, but the latter cannot understand Edison's particular connotations. As a consequence, the android he accepts falls short of the ideal woman he desires, but he fails to notice because the inventor has prepared him not to see its shortcomings. The inventor's magic, his sleight-of-hand, is then to render technology more efficient through language, and in the *Avis*, the author claims a similar accomplishment for himself.[316] He believes that in L'Eve future he achieved a harmonious transition from "la plume" to "la craie" (p. 1557), and two disciplines they represent are so closely entwined for him that they appear to be confused. He refers, for example, the potential critics of his scientific accuracy to his stylistic shortcomings.[317]

Villiers' assessment of the novel's strengths falls on the side of literature. He argues that with the work being concerned with the cutting-edge of research, in not being overly precise, it will never become obsolete, unlike scientific publications, which are "démodé, par les découvertes de la Science, dans les six mois" (p. 1558). Meant in support of the lasting power of fiction, this formulation is of interest because the manner in which it suggests that the novel is comparable to scientific works is similar to the way in which Edison, the protagonist, resembles the historical Edison.[318] In an unfinished preface, Villiers had written that in writing the novel "il s'agissait *de savoir se tromper*" […] de poser seulement un problème «scientifiquement soluble» sans prétendre apporter une "formule chiffrée" (p. 1555), indicating his interest was in imitating

[316] This resemblance between the effects of rhetoric and magic on an audience is pointed out also by Seneca in the 45th epistle to Lucilius.
[317] "Ce serait donc faire une dépense d'esprit inutile que de me reprocher ma [sic] affectation d'ignorance, -- mes redites des choses ressassées, l'usage que j'ai choisi d'un certain ton, confiant, parfois, surtout au début, à celui *Puff* américain, -- mon soulignage extraordinaire de mots et mon luxe exagéré de capitales … mon mépris trop accentue, des adjectifs éculés si en faveur, et des substantifs anémiques ayant cours" (p. 1559).
[318] In this respect, Villiers finds a further similarity with Flaubert's account of Carthage, which is better remembered than the work of those who criticized its accuracy.

science in the manner of literature, which approximates his interpretation of Edison from contemporary sources. Such a figure shaped from the press could well have been a naturalistic exercise, but in L'Eve future it is a fiction of contemporary reality meant to reach a plausible conclusion by overtly fictional means – Edison's task, his interlocutor, and the cast of inauthentic characters surrounding them are the markers of this process.

Thus imagined, Edison's laboratory is Villiers'. The method of L'Eve future and the novel's protagonist constitute the modern legend promised in the *Avis*. It is along these lines that it lives up to the author's claims as to seriousness and novelty, which have been related to his success in demonstrating the superiority of the artistic pursuit to the scientific.[319] The seriousness of the project is derived from the *œuvre d'Art-métaphysique* and a much-cited letter the author writes to his friend Jean Marras in 1879. Villiers is in the early stages of writing, but is certain already that "je sais ce que je fais et je sais que cela pèse lourd, cette fois-ci. … c'est un livre vengeur, brillant, qui glace et qui force toutes les citadelles du Rêve!" (Correspondance I, p. 261-3). Though other claims to novelty are more popular, I find particularly significant a declaration included in the full version of the *Avis*. Villiers writes that "[n]ul ne saurait contester que [ce roman] est SOLITAIRE dans la littérature humaine" (p. 1559). Proceeding as he did in explaining his protagonist, he likens his work to Flaubert's Salammbô, nevertheless concluding that in the case of L'Eve future "je ne lui connais ni de précédents, ni de congénères, ni d'analogues" (p. 1558).[320] This is best represented in his protagonist. As an inventor figure, he is without precedent, and his legend is uniquely modern in its challenge to the magical aura

[319] Jacques Noiray, L'Ève Future ou le laboratoire de lidéal (Paris : Belin, 1999).
A. W. Raitt, Villiers de L'Isle-Adam, Exorciste du réel (France: Corti, 1987).
[320] According to Villiers, his use of physics is comparable to Flaubert's use of history in the reconstruction of Carthage in that both accounts are imprecise because they are meant to be literary rather than scientific.

traditionally cast on scientific work in fiction, *les citadelles du Rêve*. Villiers' exploration of science means to demystify, rather than teach, the reader not being meant to understand how the android functions, only to see it as a machine. It is in the service of the literary text he has imagined, one which he distinguishes from his earlier work and that of his contemporaries through the reinvention of Thomas Edison.

CHAPTER FOUR: Naturalizing Anticipation in Zola's Travail

Though Zola's second *Evangile*, Travail (1901), is now among his least read works, in the beginning of the 20th century it quickly outsold La Curée, La Joie de vivre and Au Bonheur des dames.[321] It is well-received by workers' and socialist organizations, with Zola biographer Armand Lanoux remarking "le livre fut commenté comme une Bible par les universités populaires qui font deferler sur la France des vagues de cours du soir bénévoles."[322] Maurice Le Blond opens his contemporary review of Travail by remarking "tous nos amis ont déjà lu ce livre," but the details of the novel are far less familiar to modern readers.[323] One way to summarize its vast scope is that it follows the development of a factory town from the late 19th century through the mid-20th century, illustrating the positive effects of wide-spread electrical technology usage. The reader accompanies Luc Froment on a visit to his friend, Jordan, the wealthy owner of the La Crêcherie ironworks, which he is looking to sell. The reader is left to infer that this character is yet another 19th century capitalist, since Luc arrives earlier than expected and has time to survey the neighboring and competing facility, l'Abîme, where workers live in poverty and work in terrible conditions. He will however be, instead, an inventor much like those a reader might find in *littérature d'anticipation*, and together with Luc, he will help prepare the foundation of an utopian and egalitarian 20th century.

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[321] All citations drawn from Emile Zola, Travail (Paris: Fasquelle, 1901).
[322] Armand Lanoux 279.
[323] *La Revue Naturiste*, May 1901

This future, however, is only remarkable because of its literary Zolian past. As Henri Mitterand notes, the environment sketched out above is already familiar to readers of Zola's industrial novels.[324] He finds that Travail particularly recalls Germinal, and cites in support the author's employing a similar narrative and descriptive strategy, pointing out also that the Abîme's ill effects on the workers parallel those of Le Voreux, the pit of Zola's earlier novel. The characters are primarily the same drunk, exhausted, violent laborers who mistreat women, and who, out of desperation, disastrously strike against the *patronat*. Luc finds them "ruiné déjà par le travail vorace, la face bouillie, les yeux brûlés […] par l'ardeur des fours à creusets" (p. 7). Like Germinal hero Etienne Lantier, Travail's protagonist is moved by his immersion into the working class milieu. The young man longs to reorganize labor to ensure humane conditions, a dream which is realized as the novels closes. In the utopian community dignity is returned to the workers, their activities having been rendered less exhausting and even pleasurable.

The *Evangile* diverges from Germinal because its protagonist is successful in his project to correct the inhuman 19th century industrial community. Zola's reassessment of Germinal has at its foundation an inventor figure borrowed from anticipation, which allows him to effect change in the previously descriptive naturalist novel. The protagonist is inspired in his quest by positivist and socialist philosophy, as the author stresses repeatedly – Luc is a fourieriste and saint-simonien, but his plan can only be realized through Jordan's scientific advances. In Zola's representation, this philosopher is more inclined to admit that progress can come from the sciences, but the reliance on the inventor is remarkable because Jordan resembles very much the figures discussed in previous chapters. He has mastered electricity, but works in secret, is

[324] Henri Mitterand, "Un Anti-"Germinal": L'Evangile social de "Travail"" Roman et Société (Paris : Armand Collin. 1973) 74-83.

unconcerned with the usefulness of his inventions to a public wider than himself, and does not seek to transmit his knowledge. In an early exchange, he explains to Luc that he is not interested in wealth, "je ne veux pas devenir plus riche […] je ne vends que pour échapper à tous les soucis du gain" (p. 198), leaving him free to concentrate on experiments. To realize utopia, Zola orchestrates a meeting of science and philosophy, with Luc's philanthropic social reforms as the visible, public face, a mirror for Jordan's secret, individual scientific achievement.

Though critics, including Henri Mitterand, have previously described this *Evangile* as a *roman d'anticipation*, the resemblances between Zola's work and that of his predecessors, particularly Verne, has not been studied.[325] Scholars are perhaps discouraged by the naturalist's own take on Verne's writing: he grows ever more critical of the *Voyages Extraordinaires* as they become more popular. The significance of the inventor figure in Travail however goes beyond revealing an affinity between two popular but very different 19th century literary figures. Jordan is remarkable because he is a Vernian inventor whose work is successful, having far-reaching consequences in a naturalist fictional universe. Zola's innovation is to give a positive weight to scientific work, and to depict the inventor as Luc's perfect complement. Though Jordan pursues his interest for himself and as a leisure activity, with the benign indifference of the inventor to his contemporaries, his method and drive are reflected in Luc's work toward the ideal reorganization of labor. Characters given different personalities, social classes, and professions, are both made to seek, in their naturally-derived, dissimilar and independent ways *vérité*, both knowing it will lead to *justice*.

[325] For example, Henri Mitterand, Zola III: L'Honneur (Paris: Fauard, 2002) 907.

These goals recall the author's thoughts on the *Evangiles*. According to Zola's notes, the novels are "la conclusion naturelle de toute mon œuvre : après la longue consultation de la réalité, un prolongement dans demain, et d'une façon lyrique, mon amour de la force et de la santé, de la fécondité et du travail, mon besoin de vérité et de justice éclatent enfin. J'ouvre le siècle de demain. Tout cela basé sur la science" (Ebauche p. 350). Travail's emphasis on science gains a further dimension in this context. Though the novel has been greeted by critics from its publication onward as a new direction for the author of the Rougon-Macquart, the formulation emphasizes the strength of the link between the cycles. Science is a prism through which to revisit naturalism, a direction suggested by Travail's close engagement with Germinal. It is at the foundation of the reform of the working class, the unreachable horizon of Zola's earlier novel.

Section 4.1: ***The roots of Travail in Germinal***

One of the often-noted differences between Zola's Rougon-Macquart and his Evangiles is the scope of the novels. Frederick Case, for example, opposes "la vision totale de la société" of the earlier cycle to the "introspection sociale" of the later novels, with the particular concern of Travail being identified as "l'evolution sociale."[326] His Cité ideale dans *Travail* goes on to study this novel in terms of the institutions it portrays, performing a sociological analysis of the utopian community in comparison with other French utopian texts, such as Charles Péguy's

[326] Frederick Case, La cité idéale dans Travail d'Émile Zola (Toronto : University of Toronto Press, 1974): 3.

essays. It traces the roots of Zola's critique of capitalism, presenting the socialist ideas the author supported in historical context. The author is primarily interested in the latter portions of the novel, considering the section set in the 19th century as a necessary starting point for the futuristic books, which are of greater interest.

Travail's 1901 reviews already embrace the critical criteria we notes in modern scholarship. Most commend its socialist or Fourierist ideas, and others cite its importance for the utopian genre. Jean Jaurès, for example, remarks "la Révolution sociale a enfin trouvé son poète"[327] and *L'Association Ouvrière* effusively thanks Zola, "au nom de ceux qui, depuis trois quarts de siècle n'ont cessé de proclamer le génie de Fourier,"[328] while *Le Temps* suggests Travail be placed "à côté de *l'Utopie* de Thomas Morus."[329] Less attention is accorded to the novel's links to naturalism, though *La Revue de Revues* writes that Zola takes a surprising turn from his earlier Assommoir and La Terre. The *Revue Universelle* nevertheless finds that Travail continues "le symbolisme de M. Zola, déjà bien manifeste dans plusieurs volumes des *Rougon-Macquart.*"[330] The comment is in reference to the novel's focus on working-class characters, who are then discussed in detail as the complex plot is presented, but no parallels with Germinal are drawn.

That the first part of Travail revisits the universe of Zola's earlier, more famous, novel is a point made in passing by critics studying Zola's political engagement. Eduardo Febles, for example, starts from this observation in his discussion of the anarchist and terrorist characters of

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[327] *La Petite République*, April 23 and 25, 1901
[328] June 15, 1901
[329] June 23, 1901
[330] 1901, p. 613-6

Zola's novels.[331] Donald Reid evaluates the depiction of the relationship between workers and management in the two novels in the context of contemporary journalistic writing on workers' lives.[332] A key parallel he identifies between the novels is their shared expectation of a paternal relationship between the two sides, one which is indeed expected in 19th century writing on the management of industrial communities. The novels diverge, with Germinal being a tragedy, because Zola sets up the possibility of the mine owners taking a paternal responsibility for the workers but the relationship is not established. In this account, Travail is then utopian because Luc selflessly assumes this task – he is the protective father of the working class. On this issue, Mitterand concludes that "si Germinal est un évangile d'affrontement, Travail est donc un évangile de la réconciliation … la lutte des classes n'est qu'un mauvais souvenir."[333]

The evaluation of the difference between the novels on this criterion – Travail's turn toward the ideal being that it is not the story of a successful strike, but of a world in which such action is no longer necessary, is a central aspect of the significance of the *Evangile*'s first book. However, Zola's investment in the extensive re-writing of the horrors of workers' lives under 19th century French capitalism, which is a subject of both novels, requires further analysis. Opening Travail in the same naturalist 19th century of Germinal suggests that the ideal world can grow out of the familiar 19th century. From the exposition, in which a lonely traveler surveys an industrial landscape, the impression that a naturalist novel is beginning is only strengthened through the readers' discovery of the characters, which number, in addition to the impoverished

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[331] Explosive Narratives : Terrorism and Anarchy in the Works of Emile Zola (New York: Rodopi, 2010).
[332] "Metaphor and Management: The Paternal in Germinal and Travail" *French Historical Studies* (1992): 979-1000.
[333] Mitterand cites elements as varied as the research Zola undertook in preparation to the characters and their relationships and significant issues in the plot of the two texts.
Henri Mitterand, "Un Anti-"Germinal": L'Evangile social de "Travail"" Roman et Société (Paris : Armand Collin. 1973) : 79.

workers, a wealthy and cruel family who own the frighteningly-named Abîme, and a shop owner who will no longer extend credit to his customers.

In considering the relationship of the two novels, it is useful to recall that the author had always considered Germinal to be forward-looking. In his 1884 notes, Zola writes that "le roman est le soulèvement des salaries, le coup d'épaule donne à la société qui craque un instant: en un mot la lutte du travail et du capital. C'est là qu'est l'importance du livre, je le veux prédisant l'avenir, posant la question la plus importante du vingtième siècle." It also ends with an eye to the future, in a stern warning addressed to the 20th century: it advises that the conflict between *le travail et le capital* will recur and intensify, with some subsequent generation eventually triumphing over their oppressors. It is with this future generation that one would expect Travail to be concerned, or with this stage of the conflict, given its first book. Zola however revisits Germinal to draw on its essential elements, only to combine them differently, yielding the ideal community.

He begins by rewriting Etienne, the literal-minded reader of socialist texts into Luc, who is concerned with their vision and spirit. He reimagines the foundational structures of the workers' society, in Germinal, the family, or the reproductive couple, into the union of two luminaries, Luc and Jordan. The new society is founded on abstract ideals, the most visible of which is science, and they, rather than shared genetic heritage, knit the community together. In Germinal, these elements are integral to preventing the workers' progress beyond their situation. Their rewriting in Travail allows Zola to bring about the "hommes nouveaux" to which the

earlier novel's title alluded.[334] Thus, the author's utopia grows on the skeleton of naturalism, with Jordan's work on electricity providing the spark of life.

Section 4.2: ***The social reformer as a rewriting of Etienne Lantier***

The comparison of Zola's two protagonists is suggested by their both being introduced as outsiders plunged into a working-class milieu, and assigned the same great task of reforming it. They enter their respective communities in similar scenes, which give the reader an overview of the locality, an idea of the average person through a brief encounter with one of the representative members of the community, all before a long descent into the factory town. Philippe Hamon seizes on the geographical approach, seeing this exposition as setting the tone for Etienne's progress in the novel. He goes on to read it in terms of the protagonist's conquest of variously delimited spaces commonly associated with the miners.[335] Etienne is then shaped into a hero through his ability to navigate distinct spaces of the novel, with his ultimate failure as a leader punctuated by his rejection from the environment. His quest to become integrated in the community entails his gaining access to the mine, the cafés, the miners' homes, and finally to their most protected place: the revolutionary meetings at the Plan-des-Dames. Admission is possible because the protagonist comes to be seen as a political leader, earning the respect of the

[334] He explains the title of Germinal in an 1889 letter to a Dutch journalist.
[335] Le Personnel du roman (Geneva: Droz, 1998).

miners because of an apparent engagement in their cause and a familiarity with a variety of socialist texts.

This key aspect of Etienne's initial success, his study of philosophical works, is of great importance to understanding the relationship of Travail and Germinal. Both protagonists' reform plans rely on their reading, and the differences in their approach to the task explain the novels' divergence. In Travail, the success of the ideal community, as opposed to the failure of the strike and any subsequent violent action by the workers in Germinal, has been linked by critics to Luc's turning to Fourier, rather than the more violent anarchist texts Etienne consulted. Though the author cultivates this impression through frequent repetition of Luc's being devoted to the early 19th century thinker, Fourier's teachings do not play the central role in bringing about better conditions for workers. Luc tempers theory through a careful observation of his milieu, the reading's essence taking seed in his imagination. Zola prefers this more abstract engagement with the philosophical writings in the later novel over Etienne's practical approach -- this protagonist views knowledge gleaned from books as a blueprint for action. Preferring this method of drawing inspiration is conducive to the parallel between science and philosophy which is key to Travail's utopia. Further driving Luc and Etienne apart is the impact familiarity with the texts has on their relative standing in the community. In Luc's case, his studies serve to integrate him to the working class, rather than distance him from it, as Etienne's education succeeds in doing.

Before he ever starts reading anarchist texts, Etienne's training already distinguishes him among the miners through his specialized technical skills. He is a machinist, but must accept

employment as a *herscheur*[336], with Zola underlining that this is a demotion by mentioning also that the position is available because the woman who had performed it had died.[337] The author follows up by noting that, as opposed to the majority of other workers, the protagonist is literate. In a scene in which the miners ask him to read to them an announcement, we learn that in the *coron*, children are frequently kept from school if they are needed to work at home. Illiteracy thus appears as a defining, inherited trait in this community. Despite being more educated than the miners, Etienne does not initially feel superior to them. This becomes his dominant outlook when he begins to study anarchist writing, and it is because he becomes aware of his own ignorance.[338] As Ana-Islabel Aliaga-Buchenau shows, the protagonist's desire to study is inspired by outside influences, namely his correspondence with Pluchart, an organizer for the *Association Internationale des Travailleurs*, and his conversations with Souvarine, the anarchist, which drive him to read.[339]

Etienne's discovery of texts and ideas with which he was not previously familiar shames him: "Une honte secrète, un chagrin caché le rongèrent dès lors: il ne savait rien, il n'osait causer de ces choses qui le passionnaient, l'égalité de tous les hommes, l'équité qui voulait un partage entre eux des biens de la terre" (p. 1274). He continues to read in order to stop feeling ashamed, with Zola noting "Aussi se prit-il pour l'étude *du goût sans méthode* des ignorants affolés de science" (p. 1274). This problem heavily marks his project of self-education. Despite his enthusiasm for knowledge, which is not rooted in genuine or altruistic interest, Etienne lacks

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[336] In this capacity, he pushed a loaded mine cart on tracks.
[337] In the comparison with Travail, this failure is emblematic of the difference: Etienne does not have access to technology, whereas in the later novel, everyone is, and must, learn to manipulate the machines that have taken over the most difficult types of labor.
[338] Quelle nausée, ces misérables en tas, vivant au baquet commun! Pas un avec qui causer politique sérieusement, une existence de bétail, toujours le même air empesté d'oignon où l'on étouffait!
[339] Ana-Islabel Aliaga-Buchenau The « Dangerous » Potential of Reading (New York: Routledge, 2004).

purpose or organization. He consults a great diversity of materials, seeking information he later exchanges with his two interlocutors, Souvarine and Pluchart, in a meretricious effort to join their community.

Zola stresses that Etienne's knowledge is not put to productive use, even though he puts it to extensive use. The protagonist highlights his new ideas in conversation, and then attempts to formulate revolutionary goals based on his readings. The aims he conceives are however very vague, as for instance the "prochain triomphe des opprimés" (p. 1275), and appear to have benefitted from his studies only in that they are cited from them: "une phrase qu'il avait lue et qui lui semblait bonne à dire" (p. 1275).[340] On this issue, Aliaga-Buchenau observes that "[i]n good Cartesian manner, Etienne finally perceives himself as a man because he is thinking – that is, reading."[341] The equivalence of the two activities should be an obstacle to the protagonist's leadership, but his audience is unable to notice it.[342] Zola highlights the lack of accuracy in Etienne's speeches, he proceeds by "mêlant ses lectures" (p. 1279), but he is not troubled by his incomplete understanding of his sources "ne craignant pas, devant des ignorants, de se lancer dans des explications où il se perdait lui-même" (p. 1279). He has accurately understood that his audience is even less capable than he is of following a logical argument, and he secures the miners' leadership through empty rhetoric.

His ascent to this position helps characterize the miners as much as the protagonist. In this case, the crowd and its reformer are very much each other's image despite their best efforts, while in Travail, the leader, Luc, will be actively invested in developing this resemblance.

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[340] Il n'en était point encore à se fabriquer un système, dans le vague de ses lectures. (p. 1275)
[341] Ana-Islabel Aliaga-Buchenau The « Dangerous » Potential of Reading (New York: Routledge, 2004).
[342] La honte de son ignorance s'en allait, il lui venait un orgueil, depuis qu'il se sentait penser. (p. 1275)

Etienne imagined an educational project for his followers, in addition to leading the miners, "il voulait leur élargir le ciel" (p. 1460). In Germinal, such progress is impossible, and Etienne's poor understanding of the works consulted undermines his educational project, an area in which Luc will succeed. In the context of Naomi Schor's assessment of the miners as "the ultimate have-nots," the failure of the protagonist to instruct the miners goes to complete their destitution.[343] Schor draws this conclusion in analyzing the workers' depiction as the opposite of the rich bourgeois crowd, which in a key scene observes them from above, and within a house, marveling at how repulsive they appear as they march through the streets.[344] Etienne's musings on the difficulty of educating only solidify the impression that the division of the two classes is insurmountable:

> les élever au bien-être et aux bonnes manières de la bourgeoisie, en faisant d'eux les maîtres; mais comme ce serait long! Et il ne se sentait plus le courage d'attendre la victoire, dans ce bagne de la faim. Lentement, sa vanité d'être leur chef, sa préoccupation constante de penser à leur place, le dégageaient, lui soufflaient l'âme d'un de ces bourgeois qu'il exécrait. (p. 1460)

The protagonist would see the miners evolved into the bourgeoisie because he wishes them to be in control of their own work, but this class is also the limit of his vision. Just as he wrote his speeches by repeating as best he could his readings, in imagining change, Etienne is caught between pre-determined social poles. The educational initiative fails as much because of the terms in which it is conceived as it does due to the protagonist's shortcomings.

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[343] Naomi Schor, Zola's Crowds (Baltimore: Johns Hopkins University Press, 1978) 124.
[344] Ibid. 125.

Etienne's reluctance to educate the miners also suggests that his studies have inspired in him the desire to no longer be part of their community. His reading of socialist texts has driven him to despise the working class, and he appears discouraged at the prospect of the hard work and long period of time he would have to dedicate to the project because it would entail living among the miners. He is unwilling to undertake the effort, and leaves the community to find a future for himself alone. Because reading and thinking, that is to say, analyzing, are the same to Etienne, he is unable to evaluate the gap between theory and practice. Despite the time he has spent among the miners, he understands neither their character, nor that of the owners, and is unable to predict the consequences of the strike to which he has incited the workers. Once it starts, and management is intractable, the miners' furor cannot be controlled. Etienne no longer has a function, and reacts to this loss of status by drinking.

The development marks the end of his project of self-education, since it allows Etienne's "mal héréditaire, la longue hérédité de soûlerie, ne tolérant plus une goutte d'alcool sans tomber à la fureur homicide" (p. 1459) to return.[345] The violent manifestations of drunkenness are a recurrent concern in the novel, having, for example, already cost Etienne his previous job in Lille. Following his social ascension, the protagonist sinks back into his familial *tare*. Such an opposition between the figure into which the protagonist is shaping himself to be and his heritage serves to underline how strong a force the latter is in Zola, and defines its purpose -- to prevent change. The same is true of the miners, and it is the reason why Etienne despises them. Zola writes about La Maheude, a representative mother in the community "sa résignation séculaire, dans cette hérédité de discipline qui la courbait de nouveau" (p. 1586), and about Catherine,

[345] Etienne Lantier is the son of Gervaise Macquart and Auguste Lantier, whom Zola has pass on alcoholism.

Etienne's love interest, "[e]lle demeura stupéfaite, bouleversée dans ses idées héréditaires de subordination, d'obéissance passive" (p. 1170). Miners thus appear hereditarily prone to being subordinate and unwilling to question those in power. This indicates that in Germinal, heredity is the enemy of self-invention, an idea which is re-written in Travail. By privileging education (in the sciences), and reimagining the parent, this novel weighs nurture higher than nature in its rewriting the 19th century proletariat.

The significant difference between the two novels is not the literature consulted, but the reader. Zola stages an elaborate reading scene for Luc, in which instead of being concerned with the character's interpretation of the texts, or presenting his thoughts as he rediscovers Fourier, the author presents his growing inspired by the reading to pursue his own projects. It is no longer a matter of enacting a certain script dictated by the written sources, but finding in them the light by which to write his own. The way in which Luc reads is thus more important than the materials themselves. This protagonist is given the opportunity to contribute of himself in the development of the community.

In addition to rejecting readers like Etienne, Zola removes those holding extreme political positions from the universe of Travail. Eduardo Febles reads this as the author's lack of interest in anarchism as a political theory, favoring instead to exploit "a stereotype of the anarchist as terrorist," a figure he finds appropriate for the historical period. Indeed, Lange's threat is more important than its sources. Like in Germinal, the origin of this character's ideas is literature, but his studies also lack organization. Lange has absorbed his ideas from materials that have been sent to him by others: "les idées d'anarchie extrême, qu'il tenait de quelques brochures, venues et restées en ses mains, par il ne savait lui-même quel hasard" (p. 250).

On his brief appearances in the novel, Lange repeats that the town must be destroyed in order to be rebuilt, advocating "la propagande par le fait, la bombe peut réveiller le people" (p. 252). Though he speaks to Luc, the protagonist takes very little information from the conversation: "Luc emporta le frisson de cet accès de grande poésie noire, de ce rêve du bonheur par la destruction, qui hantait ainsi quelques cerveaux de poètes simplistes, parmi la foule des déshérités" (p. 253). Zola's notes in the Ebauche indicate that these poètes simplistes, models for Lange are Paris' Guillaume Froment and Germinal's Souvarine. A marginal character, Lange is possessed by a "passion sectaire" (p. 250), and his isolation being underlined spatially. After his visits to the factory, he retreats to "un coin sauvage et perdu [ou] il vivait là sans Dieu ni maître, dans la libre indépendance de son travail" (p. 245). The author ridicules his aspirations by showing that he has realized the anarchist dream but in isolation, in a location that has no association with civilization, *un coin sauvage*.

Luc's engagement with philosophical literature reverses the precedence Etienne accords to reading over thinking. Partially accounting for this difference is that Luc is not narrowly specialized, with Zola showing that he can understand both philosophy and science.[346] This is a characteristic Luc shares with his partner Jordan, and is a central theme in Verne's didactic project, satirized by Robida and Villiers as a failure of the inventor's public. Zola however adapts it to one of the central aspects of naturalism, its treatment of heredity. Evaluating the differences between Luc and Etienne as readers, and the relative success of their enterprises, we see that their nature and education are more important than their politics. The novel weaves Luc's taking inspiration from reading into its elaboration of a new model of heredity, one in

[346] Zola establishes early on that Luc's education is in the sciences, « Il travaillait alors lui-même avec le célèbre chimiste Bourdin" (p. 177)

which the transmission of acquired characteristics dominates over the manifestation of the ancestral *tare*, in a break with the *Rougon-Macquart*. The *Evangile*'s new men are styled on Luc and Jordan, who are successful in forming them in their image as devoted learners and researchers.

Luc's philosophical affiliation is an epithet cited in Travail with a frequency reminiscent of Etienne and Lange's slogans. It emerges that Luc is much more invested in Fourierism, with the mention of Saint-Simonianism being made to prepare the positive reception of science, and help explain the ideal relationship of the two protagonists.[347] The significance of Luc's epithets, however, is different than that of the anarchists: in addition to giving weight and conferring an impression of realism to his ideas of reform, being a "fourieriste et saint-simonien" is a characteristic the protagonist acquires during his stay in Beauclair.[348] Zola stages Luc's rediscovery of the philosopher as a contamination by his surroundings. He feels the influence of a long-deceased "docteur Michon, le grand-père, un rêveur humanitaire d' une charité divine, un fouriériste et un saint-simonien de la première heure," who nevertheless, in his own time, had been incapable of bringing about utopia. Luc is given the doctor's room, in which the latter "y était mort, parmi ses livres" (p. 174), and which remains infused with his essence, "cette chambre vénérable où l'on sentait beaucoup de bonté, beaucoup de raison et de sagesse" (p. 224).

The protagonist, whom the reader had thus far seen only moved to pity by the sad conditions in which the workers live, seems very much at home in this environment, but he

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[347] His Introduction aux travaux scientifiques du XIXe siècle (1803) and Mémoire sur la science de l'homme (1813) attest to the belief that science and industry can be employed to correct the situation of the working class. Saint-Simon, like Fourier, proposes an egalitarian society, in which work in many disciplines is equally valued, and experts from many domains have a say in the organization of the community.

[348] Zola's notes in the Ebauche indicate that not lapsing into fantasy in writing Travail was a great concern.

remains only vaguely aware of the books, much less of their contents, until he suffers an "insomnie fiévreuse" (p. 224). It is this moment of personal crisis that convinces him to study Michon's texts, among which he finds, "Fourier, Saint-Simon, Auguste Comte, Proudhon, Cabet, Pierre Leroux, d'autres encore, la collection complète, jusqu'aux plus obscurs disciples" (p. 225). Luc studies the books as little more than decorative objects: he surveys authors and titles, counts the volumes, and is very impressed with their variety. Zola advises us that thanks to his education, the character had already read many of the works, though he had not seen them collected before. He stresses the powerful effect of the library as a whole, noting that the books "étaient toute une phalange, toute une avant-garde du siècle futur" (p. 225), and they were so pleasing to Luc because of their arrangement "côte à côte, paisiblement mêlés, d'une force souveraine en leur union" (p. 225).

The emphasis placed on the collection as a whole serves to recall that it had entertained a close and particular relationship with the man who had assembled it, and whose heir Luc becomes, by occupying his space, and by using his books. In addition to tying Luc's discovery of the texts to the history of Beauclair, this presentation can be read as a metaphor for the new system of heredity Travail proposes. It combines the transmission of a large set of information, philosophical this time, rather than genetic, with the unique traits of a particular individual. Michon's books allow the doctor's preoccupations, or passions, to affect the protagonist, but Luc is not taken over by them, though he is susceptible to the texts. Zola's conclusion of this scene changes metaphor from that of influence, or contamination, to impregnation, thus strengthening the suggestion that heredity, a central Zolian preoccupation, is being reinvented.

If Germinal was concerned with what the future would reap from the present, Travail seeks to show how a better harvest can be prepared. Under Zola's description, Luc's reading scene shows Fourierism takes seed in the protagonist's imagination, which prepares him to give birth to the future. The character consults only one reference from Michon's large collection, a volume entitiled *Solidarité*.[349] It is an 1842 analysis and summary of Fourier's writings by Hippolyte Renaud, which the narrator praises because of its ability to distill the essence of his thought. Luc thus reviews, to quote Zola, philosophy "réduite au suc des vérités" (p. 226).

Its effect is that of moving Luc to formulate a plan of reform, later referred to by the author as "tout ce qui avait germé en lui de la récente lecture de Fourier" (p. 261). The verb Zola uses to express Luc's being inspired by his reading, *germer*, can refer both to birth and harvest, and the two images remain combined in later references: "la semence était jetée, la moisson lèverait" (p. 231). Such imagery closely recalls the closing scene of Germinal, echoing its painting of the fertile countryside gestating and giving birth to new men. In the later novel, however, a single character, rather than an entire class, is responsible for the *récoltes du siècle futur* and the future generations described in Travail are far from the *armée noire, vengeresse* (p. 1591) of the naturalist novel. Instead, Luc looks forward to "la moisson attendue, des hommes fortifiés par les exercices du corps instruits par l'expérience en pleine nature, rapprochés par l'intelligence et par le coeur, devenus des frères" (p. 300).

As in Germinal, we note that the protagonist entertains a privileged relationship with the texts, but this time, there is an accord between his particular character and the materials

[349] Zola had also read in preparation for the novel. Despite Jaures' report that at the end of the 19th century, the author was hard at work on reading Fourier, Mitterand raises doubt over his engagement with the thinker's works, suggesting instead that Travail owes much more to Zola's conversations with JB Noirot and their visit to the Guise familistère (ZIII, p. 700).

consulted. Luc's use of Michon's collection is unique among those are familiar with it. When he discovers the books, the doctor already has a convert in Beauclair in Soeurette, Jordan's sister, his secretary and constant companion.[350] The reader learns she had grown up with the doctor's "belles histoires qu'il inventait, des phalanstères fondés dans des îles heureuses, des villes où les hommes réalisaient tous leurs rêves de bonheur sous un éternel printemps" (p. 188). She is however no reformer, in Zola's description, "elle était une humanitaire" (p. 188). It amounts to her exhibiting toward the workers the charitable behavior the mine-owners of Germinal did not. Though certainly kinder than Mme. Grégoire, Soeurette is no more efficient in changing the way the working class lives. She appears strongly moved by their plight, but is incapable of applying Fourier's ideas, which only find a fertile ground in Luc.

The importance of Fourier's thoughts as expressed in his writing is further diminished when Zola notes that Luc's reading allows him to bring forth "une mission dont il se sentait gros" (p. 222). If the mission predates his rediscovery of philosopher, then the character's own intellect, and his observation and analysis of Beauclair, are the sources of his program of reform. As we have seen, the author presents in great detail the character's reaction to the books and recapitulates his experience with them, while little attention is given to discussing Fourier's ideas or their possible application.[351] What the reading renders clear to Luc is briefly summarized as the possibility of reorganizing the factory town into a society shaped around passion for one's work, thus allowing individuals to pursue one's interests and abilities: "Le coup de génie était

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[350] As I suggested in the introduction to this chapter, Zola is rewriting the family and the couple of the Germinal *coron*, and the following section discusses in detail how women's role in shaping the family, and by extension, society of the future, is minimized in favor leaving the future to grow from the Luc - Jordan couple.

[351] « Il suffirait de réorganiser le travail, pour réorganiser la société tout entière, dont il devait être l'obligation civique, la règle vitale » (p. 228). The repeated use of the conditional mood suggests Luc is unsure how to achieve this goal.

d'utiliser les passions de l' homme comme les forces mêmes de la vie" (p. 227). The anticipated consequence is that the new society will see "le travail remis en honneur, devenu la fonction publique, l'orgueil, la santé, la gaieté, la loi même de la vie" (p. 228).

This idea is central also to the only futuristic novel Zola included in his preparatory dossier for Travail, Edward Bellamy's Looking Backward (1888). It uses as a frame tale the awakening in the 20th century of a 19th century aristocrat, who is then able to realize the horror of his own industrial times. One reason Zola references it in elaborating the *Evangile* is because of its popularity: it was a bestseller in America, its 1889 sales placing it second only to Uncle Tom's Cabin, and it was also well-received in Europe, where it was translated into more than 20 languages before turn of the century.[352] The essential aspect the two novels share is the issue of labor being valued and honored as labor, rather than having merit only in comparison with other types of work. In Looking Backward, which imagines a more distant time in the future than Travail, the disappearance of the social classes has brought about egalitarianism in the standing of the professions. According to both authors, and inspired by Fourier and Saint-Simon, the ideal community would assess work as effort.

An example of both this central notion of the works, and the great difference in how the authors illustrate it is a scene from Bellamy's novel in which the visitor from the past studies the waiter serving him in a café. The stranger finds him "highly educated, and the equal, socially and in all respects, of those he served" (p. 112). This is established though conversation, and on this occasion, his interlocutors are the aristocrat narrator, and a professor. To stress how the future has evolved over the present, the author has the aristocrat expresses to his futuristic host his

[352] Elizabeth Sadler, " One Book's Influence: Edward Bellamy's "Looking Backward"" *The New England Quarterly* 17.4 (1944) 530-55.

surprise that "a young man like that [would be] serving so contentedly in a menial position" (p. 112). The professor, however, is only vaguely familiar with the term *menial*, and explains how such judgments are no longer made in their enlightened society since all work is equally valued and all workers are equally remunerated.

As a reaction to Bellamy's and other utopian works, Zola's notes show that he opted against the presentation of the desired world as perfected, a strategy which then requires the clarification of its principles to an outside observer. Though the incident drawn from Looking Backward could easily be integrated in the last book of the *Evangile*, the French author strove to emphasize the development of the 19th century, with all its faults, as known to his readers, into the much brighter 20th century. To explain the desired, future value of labor, he then draws on the dedication to one's work exhibited by Luc, a trait we will note he shares with Jordan. From the reading scenes of Travail, it would appear that Zola does not wish to clarify whether the progressive notion regarding the significance of work is an inherent or acquired characteristic, since Fourier both re-awakes and plants seeds in Luc. It is nevertheless one he will pass on to the coming generations of Beauclair.

On this issue, it is important to note that such perspectives on work can be entertained by Luc and Jordan because of their material circumstances: neither needs to earn a living. Whereas being independently wealthy is a common characteristic of the inventor figure, Luc's occupational freedom is problematic. As the comparison with Germinal indicates, this protagonist is to be read through the prism of Zola's naturalist works: he is an idle bourgeois. Criticism has discussed this perceived shortcoming of Travail's utopian vision, pointing to the development of the ideal world not being spear-headed by a worker, as bespeaking a paternalistic

attitude toward the proletariat. The author nevertheless takes great pains to integrate Luc to the community, and draw the classes, whose opposition was unbridgeable in the earlier novel, closer together. In this section, we have seen that political extremes, reminiscent of Etienne's readings and associates, are eliminated, which serves to avoid the recreation of the polarized community of Germinal. In the following section, I will show that Zola's re-imagining of the couple and the family in their capacity of producers and educators of coming generations works to overcome the heavy burden of heredity, while investing Luc and his partner Jordan ever more into the working class. This effort depends wholly on Jordan's work in electricity. It is not simply a matter of freeing the workers by giving them the time to acquire an education: the inventor is a symbol of novelty, and change. The figure to which he corresponds in contemporary works of early science fiction becomes under Zola's imagination a mirror of Luc through his characteristic dedication, and passion to his endeavors.

Section 4.3: *Zola's version of the Vernian inventor*

The role of the inventor figure as a unique innovator in Travail can be understood through comparisons with his literary predecessors in *littérature d'anticipation* and his philosopher partner Luc. The deep resemblance of the two characters is an aspect of their relationship of which they remain unaware, Zola allowing them only to speak instead of their mutual admiration. Luc's utopia is given a solid, scientific, foundation in Jordan's work, but that is not the part he imagines for the inventor. After finishing *Solidarité*, and before consulting with

Jordan, Zola's protagonist imagines his plan for the future as "une association entre le capital, le travail et le talent. Jordan apporterait l'argent nécessaire, Bonnaire et ses camarades donneraient les bras, lui serait le cerveau qui conçoit et dirige" (p. 262). This formulation repeats the division of the social classes, indicating that Luc assesses his fictional environment in traditional 19th century terms, and takes Jordan for a mere capitalist. Through the comparison with Germinal, we have understood that Zola is preparing to introduce a classless world, but proceeding more subtly than Bellamy, he will look carefully at the 19th century to distinguish the roots of such a possibility. This is what can be realized through Jordan, in his dimension as an inventor, a contemporary literary figure uniquely associated with innovation and change. The responsibility Zola assigns to him is that of erasing the major distinction between the owners and laborers: he gives technology, in Germinal the exclusive possession of the bourgeoisie, to the working class.

Zola's sparse presentation of the philosophical ideas that inspire Luc is in strong contrast to the great detail he offers on the technology Jordan develops, the *fours électriques*. Mitterand's overview of the author's dossier indicates that it contains a wealth of notes drawn from the Grand Dictionnaire Universel on topics related to metallurgy, with particular attention given to blast furnaces, the technology on which the competing fictional factories operate, and which Jordan seeks to replace.[353] Much of this information, though carefully recorded, was deemed too technical to include in the text by the author, but his dedication to the topic indicates the importance, if not preference, accorded to science. The second source of inspiration for Travail, is the author's visit to Unieux ironworks, which he used to observe for himself how the factory was organized and how the workers lived. This method is similar to the research he undertakes

[353] Henri Mitterand, "Zola à Anzin: les mineurs de Germinal" *Travailler* 1 (2002): 37-51.

for the naturalist novels, and Zola keeps "que les elements essentiels" in his description of the Abîme factory, which like Unieux, manufactures weapons. It is a similarly productive expedition to the one Zola undertakes to the Anzin mines in preparation for Germinal, where he draws inspiration for the Quirgnon family from the factory founders. Both Mitterand and Febles discuss the many similarities between the two sets of managing families, the Qurignon and Grégoire of these novels, which helps characterize the environment of Travail as thoroughly 19th century.[354] The goods manufactured, the processes employed, the management, and the conditions offered to the workers combine to represent the Abîme as an industrial horror which must be corrected. This is the purpose of the Crècherie, the rail factory Jordan's work on electricity makes possible.

For Zola, reforming the factory through better technology goes far beyond safer working conditions and shorter hours. It is remedying the ills of an entire society which in the *Rougon-Macquart* was inevitably heading for apocalyptic destruction, as David Baguley argues.[355] The mine in Germinal, "[c]ette fosse, tassée au fond d'un creux, avec ses constructions trapues de briques, dressant sa cheminée comme une corne menaçante, lui semblait avoir un air mauvais de bête goulue, accroupie là pour manger le monde" (p. 1135), takes the dimension of a mythological evil. Miners are devoured by it, with accidents peppering Germinal, but more often Zola's descriptions imply that such work dehumanizes them. It contributes to their appearing bestial, which is the imagery Etienne uses to color his resentment of his fellow workers. Even when he is only seeking work in Le Voreux, the protagonist perceives himself as less than human, wondering "ou laisser derrière un mur sa carcasse de chien perdu?" (p. 1142) and the pit itself appears to him equally bestial, "au fond de son trou, avec son tassement de bête méchante,

[354] Eduardo Febles, Explosive Narratives : Terrorism and Anarchy in the Works of Emile Zola (New York: Rodopi, 2010).
[355] David Baguley, Naturalist fiction: the Entropic Vision (Cambridge: Cambridge University Press, 1990).

s'écrasait davantage, respirait d'une haleine plus grosse et plus longue, l'air gêné par sa digestion pénible de chair humaine" (p. 1142). The vocabulary however precedes his long acquaintance with them, suggesting that it is the necessary effect of the mine.

Viewing the dehumanization of the workers as their enslavement, Jacques Noiray writes that the miners become part of the machine of capitalism, of which the mine is the symbol. In considering the figurative machine, however, it is important to note that technology itself is of little help to the miners, appearing rather as their adversary, or a further tool of their oppression. Not only is it the private possession of the capitalist management, it is located primarily above ground, leaving the men to work in what Zola describes as hellish galleries below ground. As Paul Rakes notes, this arrangement was typical in the 19th century, "an array of modern equipment at the surface facilities, while underground face operations continued as a labor-intensive enterprise that changed little in several decades."[356] Noiray goes on to note that episodes in Germinal in which hatred of the machines erupts in violence are contrary to historical reality. Etienne's ordering the destruction of the Gaston-Marie pump during the riot ensuing from the strike then becomes a characteristic of Zola's fictional 19th century, which is being rewritten in Travail. In Noiray's assessment, it is also a scene of "mort tragique de la machine, provoquée de main d'homme," and this fearful fascination with the machine will be happily resolved in the *Evangile*.[357] The study of science, and its technological products, are demystified in the new society, as Jordan's work paves the way to widespread access to technology. His being a spiritual father of the community allows him to pass on his passion for the discipline.

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[356] Paul Rakes, "Technology in Transition : The Dilemmas of Early Twentieth Century Coal Mining" *Journal of Appalachian Studies* 5 (1999): 28.
[357] Jacques Noiray, Le romancier et la machine: l'Univers de Zola (Paris : J. Corti, 1981) : 171.

Because technology appears as both the product of, and at the same time, that which defines a particular way of life (i.e. terrifying industrial 19th century v. enlightened electrical 20th century), Jordan's devices are futuristic, because they innovate upon the standards of the 19th century in technology and social organization. The reader can approach them with the expectation that they act as the foundation of a new way of life, one which does not rely on the workers' sacrifice, and is thus conducive to a new social structure. Having technology, and its human source, represented as an ally of the workers, or in their service, is a novelty in the Zolian universe. In Germinal, the resident engineer, Paul Négrel, is acutely conscious of his position as an intermediary between owners and workers. Though in the beginning of the novel there are indications that he wishes to appear one of the working class, or that he is comfortable in their company, his firm allegiance to the bourgeois side is revealed in time. He grows to hate the workers as he carries out his affair with Mme. Hennebeau[358], while being at the same time recommended as a good match for the daughter of the Grégoire family.[359] Négrel's redoubled association with the enemy of the working class indicates that science and engineering are yet another capitalist possession, and suggests there is no possibility of reconciliation.

In imagining Jordan's scientific products as cutting-edge in an effort to present them as a definitive break with this system, Zola takes inspiration from the exhibits of the 1900 Paris International Exposition. Its electrical marvels were a central attraction, with the fair boasting an electric tram, sidewalk, escalator as well as many large-scale industrial devices. It is easy to imagine the fictional inventor's electric arc furnaces alongside them. Beyond the devices

[358] She is the wife of the general manager of the mine.
[359] The Grégoire family owns the mine.

themselves, the author's experience of the Exposition gives context relevant to understanding the figure of the inventor through a perspective more personal than that of anticipation.

Because Zola had written about the 1878 Exposition for *La Grande Revue*, founded by his Dreyfus affair lawyer Fernand Labori, he had been invited to cover also the turn of the century event.[360] He answered the request for "un bel article de poésie et de philosophie sur l'Exposition" negatively, citing his state of mind. Sadness over the Dreyfus affair prevented him from joining the nation in its celebration:

> J'ai beaucoup réfléchi au sujet que vous m'avez proposé, et je vous avoue que, plus je vais, plus il m'inquiète et m'est pénible. Je ne suis pas du tout dans un état d'âme à célébrer notre Exposition, à chanter glorieusement notre fin de siècle. Je ne saurais que dire pour que ma tristesse ne sortît pas de chacune de mes phrases. Je ne suis pas de cette Exposition et je ne veux pas en être par aucune manifestation.[361]

Despite his stated reluctance to participate in any way, Zola visits the Exposition repeatedly, documenting its sights and visitors in 186 photographs.[362] Alfred Cohenhoff reads Zola's photographs as a 'reportage' because of their documentation of all aspects of the event: the pavilions, the grounds, the Eiffel tower.[363] Of particular interest are his naturalistic images of people, who are not posed, but collected to show the variety of tourists attracted; all ages and social classes are present. Stressing the similarities between the author's photographs and the

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[360] F. W. J Hemmings. "Emile Zola devant l'Exposition Universelle de 1878" *Cahiers de l'Association internationale des études francaises* 24 (1972) : 131-153.
[361] John Christie, "Zola, Labori and La Grande revue (1900): An unpublished correspondence." *Renaissance and Modern Studies* 4.1 (1960): 44-58.
[362] Marie-Laure Hinton, Emile Zola Photographe (ProQuest, 2008) : 110.
[363] Alfred Cohenhoff, "A la recherche de la vérité chez Zola. La photo comme moyen d'investigation littéraire" *The Hebrew University Studies in Literature* 9.1 (1981) : 43-60.

documentation prepared for his novels, Jean Adhémar calls the images "photo-notes," while Alain Buisine notes that Zola approaches photography with the same dedication he had shown to journalism and literature.[364]

Travail's faith in the reformative powers of science and technology can be traced back to the Exposition, but Zola as an accomplished and prolific photographer is of equal significance to the novel. He is interested in both the technical and artistic aspects of photography, as the 2002 exposition "Zola à la Bibliothèque nationale de France" attests.[365] There, his notebooks detailing exposure times, aperture settings and chemical compounds for processing featured side by side with the photographs themselves. Commenting Zola's work, René Dennilauer writes that one can see in his efforts "une volonté de dominer la technique."[366] The author owns a variety of cameras, takes over 4000 slides during his career, and has 3 laboratories where he works at developing and printing.[367] Photography is his principal hobby during his exile in England, which he discusses in correspondence with Jeanne Rozerot, Maurice Le Blond and others.[368] To Jeanne, in particular, Zola stresses the aesthetic qualities of the photographs and the album arrangement, while in other letters he discusses the framing of his subjects and their lighting in order to achieve a multitude of effects. Photography accompanies the writing of Fecondité, the *Evangile* preceding Travail, but while his literature is publicly shared, his work in the new medium remains private. As Charles Grivel notes, that is the case for Zola's Exposition

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[364] Jean Adhémar, "Emile Zola, photographer" One Hundred Years of Photographic History. Ed. Van Deren Coke (Albuquerque: University of New Mexico, 1975): 3
Alain Buisine, "Emile Zola, notes sur la photographie" Les Cahiers Naturalistes 66 (1992) : 325-331.
[365] Michèle Sacquin, "Zola à la Bibliothèque nationale de France" (BNF-Fayard, 2002) : 221-229.
[366] René Dennilauer, "La photographie, il y a 100 arts… Repères chronologiques" Les Cahiers Naturalistes 66 (1992) : 316.
[367] John Lambeth, "Zola: Photographer" Emile Zola and the Arts: Centennial of the Publication of L'Oeuvre. Ed. Jean-Max Guieu. (Washington, DC: Georgetown University, 1988) : 55.
[368] In 2002, the Norwood Society exhibited Zola's photographs of the area, taken during his 1898-1899 stay in England.

photographs, as well as for the rest of his collection, which depicted more intimate subjects, such as his family with Jeanne.[369] Bringing Zola's two endeavors together, Sylvie Thorel-Cailleteau writes that despite their divided audience, with literature being meant for all his contemporaries, and photographs for his closest circle, the two are alike in that they blend the artistic with scientific.[370]

The main characteristics of Zola's photographic practices discussed above -- his working passionately but keeping his efforts and results private, and his effort's combing art and science, are to be found also in his version of the inventor. Though Zola was familiar with literary models of the figure, his personal engagement in experimentation through photography, an endeavor contemporary with the Exposition and the writing of Travail, adds further definition to Jordan, whose presence in the novel has been perceived as discordant. To critics, Jordan appears as a recluse whose exclusive dedication to science is at best odd, and at worst, as reprehensible as the Grégoire's disengagement. Mitterand writes about his disinterest in the practical applications of his work, that the inventor "croit à l'électricité comme en une magie nouvelle, sans se poser à aucun moment les problèmes économiques et politiques que soulève le progrès technique."[371]

Implying that Jordan works in science for its own sake, this assessment suggests that he can be integrated to the type of the Vernian inventor. His other principal characteristics, such as his isolation from his contemporaries, which is stressed by the author through the character's confinement to his laboratory, his unique financial independence amongst those who might be

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[369] Charles Grivel, « Zola photogenèse de l'œuvre », *Études photographiques*, 15 Novembre 2004, [En ligne], mis en ligne le 28 août 2008. URL : http://etudesphotographiques.revues.org/394. Consulté le 16 juillet 2013.
[370] Sylvie Thorel-Cailleteau, "Un regard désolé: naturalisme et photographie." *Les cahiers naturalistes* (1992) : 269-274.
[371] Henri Mitterand, "Un Anti-"Germinal": L'Evangile social de "Travail"" Roman et Société (Paris : Armand Collin, 1973): 81.

conceived as his community (other ironworks owners) further reinforce Jordan's similarity to the model. Zola however is not merely rewriting contemporary fiction. When speaking of Jordan's isolation, he terms it an "existence cloîtrée de savant" (p. 144) with the allusion to the same religious confinement later being made to describe "La Crêcherie, si fermée, où Jordan vivait en savant solitaire, ainsi que dans un cloître" (p. 178). Though the revolutionary work of Verne's inventors is similarly encased, as best exemplified in the two Cpt. Nemo novels, where the Nautilus encapsulates the inventor, and the same can be said of the marvels Villiers' Edison hides in the laboratory lying under Menlo Park, these authors err on the side of magic. The inventors' work is often interpreted as such, with, for example, the villagers of Verne's Château des Carpathes believing the telephone installed unbeknownst to them, and the electrified castle gate, are the devil's work.

Beyond separation and isolation, referring to Jordan's existence as 'cloistered' imagines him as a monk. In Zola, the religious reference implies that the inventor too inhabits the world of his contemporaries, but lives for something else. Based on the parallel with other 19th century works, this other goal is certainly science, but the author isolates Jordan from the environment reminiscent of Germinal in order to more easily recommend him as a parent of the new, ideal world. Luc will carry the responsibility of giving his companion's work a social dimension, which marks a break with the inventor figure in anticipation. Though the protagonist's plan initially saw Jordan as *le capital*, he acts instead as *le talent*, the function Luc had reserved for himself. The inventor's work carries the mark of novelty by being easily fit into the Vernian model, but it is accepted by the community (Luc), and brought to serve the public. This mutation in the role of science in society is never realized in anticipation, but in Travail is transmitted to future generations. Luc's work and Jordan's success lay science at the foundation of a new

society, ensuring that its pursuit comes naturally to ensuing generations. As we will see, the Beauclair of the 20th century gives free access to the laboratory to all inhabitants, many of whom are naturally attracted to scientific work.

In the sections of Travail preceding the depiction of the 20th century, the machines Jordan builds are elaborate electrical devices typical of the inventor in late 19th century anticipation novels. In Verne, the inventor's mastery of electricity amounts to a privileged relationship to the future, and is his defining characteristic. His excellence in this domain, however, comes at the price of his exclusion from society, to which he becomes inimical. Inventors are scientists who experiment and build a device so advanced it escapes the interpretation of contemporaries, and thus causes fear, a reason why they so often appear to terrorize the public. For example, in Vingt milles lieues sous les mers, the public's fear of Nemo's Nautilus is the subject of several chapters before the submarine ever appears. The mystery surrounding its terrifying performance is defused through a review of its many electrical applications. Because of his association with Luc, however, Jordan's project is not a source of fear to his contemporaries. The protagonist is charged with explaining it to the workers and all in the fictional universe who may otherwise have not known how to interpret it.

As in Verne's works, the future in Travail flows forth from Jordan's electrical advances, as the first description of his laboratory already indicates. There, Zola metaphorically foreshadows the great, positive impact electrification will have on the industrial life of the Crêcherie. Electricity flies above the chthonic machinery of the lab, animating the inventor and prompting him to explain his work. The accumulation of equipment in Jordan's lab could appear oppressive and perhaps frightening, as are all such large devices in the author's novels, and

indeed Zola does little to present the lab as peaceful or orderly to the reader, or to Luc, the *focalisateur* of its description. The "appareils géants qui encombraient [la salle]" (p. 140) lie under the equally busy and complex "réseau de câbles et de fils [qui] apportait la force […] qui portaient la foudre" (p. 140). However, Jordan only has to "tourn[er] un bouton, et la salle entière s'égayait d'un flot de lumière électrique" (p. 138). The laboratory is now light, bright and lively, and Jordan, whom Zola had described as sickly and quiet, grows rosy-cheeked and explains at length his current project. We can thus see that the close relationship, even interdependence, Verne created between the inventors and the machines appears also in Zola – electricity has the same effect on both Jordan and the device: it makes them active, and makes them intelligible. The light, coupled with his explanations, renders the machine chaos of the lab interpretable to Luc.

From this conversation, and subsequent interactions with Luc, the reader can conclude that Jordan sees his project as purely scientific: it is directed toward the eradication of steam power in the metallurgic industry. The inventor's objection to steam is that "à l'orifice des puits, ces machines à vapeur, ces chaudières, sans compter ces kilomètres de câbles, d'un si gros entretien, tout cela est barbare, tout cela mange du temps et de l'argent... il faudrait autre chose, une autre chose, plus pratique, plus simple, plus directe" (p. 482). As we can see, then, the workers do not figure into his argument. Jordan instead does not like how cumbersome and expensive steam technology is, or how scientifically backward it is, in contrast of course to his own electrical devices. Though in the last third of the novel he concedes to Luc that the *fours électriques* could improve the workers' conditions, the way in which he pursues the modernization of La Crêcherie shows that his priority is not speed of application, which would accompany a humanitarian interest. Jordan first produces the *fours*, then elaborates batteries for

the storage of electricity that will power them, and finally thinks of finding a strong, cheap electrical power source and of putting in place a delivery system to link his various inventions. He thus appears to solve problems as they present themselves, rather than to have designed a plan to address a well-defined, pre-existing goal. Such a path is more descriptive of one's engagement in a leisure activity, where there is no pressing need for results, as pleasure is derived from the process.

This impression is conveyed to the critics by the finished machine. Luc remarks to a worker brought to marvel at the device, "quelle aisance, quelle propreté, quelle simplicité! […] Plus de colosse barbare, dont la bonne digestion donnait tant d'inquiétudes! Plus de ces organes multiples, encombrants, dont il avait fallu l'entourer, les épurateurs, les réchauffeurs, la machine soufflante, le continuel courant d'eau!" (p. 519). Jordan has spent sixty years working since that scene in the laboratory, and we can see that he has achieved his goal -- the *fours électriques* are the opposite of the steam-powered machines against which he has worked. They are also interpretable as such by his public, as these are Luc's own thoughts, delivered extemporaneously. Like the illumination of the lab, they are very easy to manipulate: three buttons control them. They are, lastly, much more efficient than their predecessors, needing to run only a few hours a day for much greater results. This affords the workers greater freedom, which is the most direct way in which Jordan's work can be made to support Luc's.

Scholarship on Travail, notably Noiray's Le Romancier et la machine, which looks at the novel's use of technology rather than philosophy, emphasizes the impact of Jordan's completed

work.[372] The critic focuses primarily on the changes brought to the fictional universe by this project, suggesting that the novel's utopian vein marks the beginning of a new literature for Zola. He argues that his naturalist works had long had their own scientific imagery, being haunted by entropy, the thermodynamic principle conceptualized in the 19th century by Sadi Carnot. It describes the eventual breakdown of the large-scale machines, be they mechanical or social, featured in Zola's novels. David Baguley and Eduardo Febles share this opinion, using entropy as a metaphor for the social crises described by Zola. An electrical machine, particularly a lossless one as that which Jordan invented, would then be the suitable model for a fully-organized and perfectly efficient new society.

Though Zola does indeed see technology as the measure of the society that utilizes it, one shortcoming of such readings is that they do not distinguish Jordan's process of invention from its product. The difference is particularly significant because it is one of the key ways Zola diverges from contemporary novels featuring inventors, where the authors provide few details on this aspect of the character's work. Noiray writes about Jordan's method that is presents "un ensemble cohérent et progressif, comme Zola lui-même le rappelle à la fin du roman, en dressant le bilan des travaux."[373] He goes on to point out that the inventor has outlined a full system, from the power source to the button that operates it, and has thus solved a wide range of problems, from the transmission of electricity over long distances to finding the means to capture solar energy. However, Jordan's work on the *fours électriques* does not follow the path through which the critics summarize it. Zola has the inventor begin with the goal first, the *four*, which is for many chapters contained in his laboratory, then he begins work on making transmission efficient,

[372] Jacques Noiray, Le romancier et la machine: l'Univers de Zola (Paris : J. Corti, 1981).
[373] Ibid. 201.

then he identifies a power source. This counter-intuitive path indicates that Jordan is driven by his passion for research and experimentation, rather than following a plan aimed at achieving a particular goal on a particular schedule. His conversations with Luc support this, revealing that the inventor does not share his devotion to social reform, leaving his development of the new technology to suggest that he works as a gentleman scientist.

Dividing Jordan as an inventor from all communities associates him very closely with the electrical machines, which as Jacques Noiray points out, become extensions, or avatars of their scientists.[374] Unsurprisingly then, Verne kills all inventors together with their technology, and their knowledge is never transmitted. Zola repeats this standard in elaborating his inventor, though he chooses a more subtle way of removing Jordan from the fictional universe. Once his project is complete and Luc has demonstrated it to the workers, Jordan simply expires. His death is portrayed as the extinguishing of a source of energy, his last act being to watch the sun set. The image of his death bookends Luc's inception of the project as his impregnation, "Jordan se coucha, si chétif, si débile en son grand âge, comme réduit à la taille d'un enfant, et, ainsi qu'il l'avait dit, son œuvre étant faite, sa journée finie, il laissa la mort enfin le prendre" (p. 838), stressing their similar complete devotion to their individual missions.

Such strong resemblance between the two innovators of Travail adds a novel dimension to the definition of utopia, which represents a rewriting of the role of science in both naturalism and anticipation. If one looks at the *Voyages Extraordinaires* as a whole, progress propagates slowly, as a consequence of the inventors' repeated destruction. The scientific community mostly

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[374] Jacques Noiray, Le romancier et la machine: l'Image de la machine dans le roman français, 1850-1900 (Paris: J. Corti, 1981).

receives accounts of the demise of the inventors and non-technical observations regarding their devices, which critics argue indicates that Verne strives to maintain the universe unchanged.[375] The inventors' experimental devices offer brief glimpses into the future, but the 19th century remains the definitive frame. The discussion of Travail's relationship to Germinal demonstrated that the same is true in the case of Zola. A 20th century that redeems the 19th emerges in this novel because Jordan's activity is made socially-relevant by Luc. In the protagonist's enunciation, the better world would be brought about through an association of *le capital*, *le travail* and *le talent*, an arrangement in which he imagines himself as *le talent*. However, since Zola showed that Luc's work, though enlightened, was not original, accepting him in this position is not immediate for the reader. Jordan's accomplishments more evidently mark him as the creative power, especially when considering that in *littérature d'anticipation* such characters are distinguished through the uniqueness of their work. The negative weight assigned to invention in those works is thus reassessed in Travail through the presentation of an ideal new century in the novel's last books.

Zola's depiction of the scientist's devotion to his discipline mirrors Luc's selfless dedication. Verne and Robida's inventors, just as Villiers' Edison, all possess infinite wealth, a characteristic with which Jordan is also endowed. In Travail, however, this serves to cut off Jordan from his professional community, the other factory owners, reflecting also Luc's disinterest in wealth. Instead of his being concerned with profit, like the others, Zola repeats that Jordan's wealth is 'sufficient.' For example, we learn that "Jordan, s'estimant assez riche et sans

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[375] Arthur Evans "Science Fiction vs. Scientific Fiction in France: From Jules Verne to J.-H. Rosny Aîné." *Science Fiction Studies* 15.1 (1988): 254-76, 338-68.
William Butcher, Verne's Journey to the Centre of the Self : Space and Time in the Voyages Extraordinaires (London: Macmillan, 1990).

ambition aucune, se serait débarrassé volontiers du haut fourneau" (p. 134), thus justifying his lack of interest in extending La Crêcherie beyond its current facilities in the beginning of the novel. Both his lack of interest in the financial aspects of the factory and his being 'assez riche' are attitudes not shared by those associated with the Abîme, who are described either as very rich or not rich enough. Jérôme Qurignon, the previous owner of the facility is "si riche" (p. 74), Boisegelin, his son in law is "très riche" (p. 88), while his ever-envious aide Delaveau is "pas riche" (p. 92).

The amount of Jordan's wealth, 'sufficient,' denotes a certain equilibrium also echoed in his equanimity, rather than optimism or pessimism, in the pursuit of science. When a major experiment fails, after logically summarizing the setback and its implications, Jordan immediately restarts, despite mentioning that "ce sont des années de travail à reprendre" (p. 352). He goes back to work because "c'est bien simple, et il n'y a évidemment pas autre chose à faire […] jamais on n'abandonne une œuvre. S'il faut vingt années, trente années, s'il faut des vies entières, on les lui donne" (p. 325). Verne's inventors are equally consumed by their work, and after having their machines destroyed or damaged, set immediately to work. Zola's inventor however also discusses his dedication to his purpose, indicating how well his work suits him, "je suis une petite machine montée avec soin et qui fonctionne logiquement" (p. 195), and applies himself to "labeur regulier, varié sans cesse, attirant" (p. 194).

This description echoes Luc's philosophical perspective on the new society, and utopia's reorganized labor, made possible through Jordan's machines, is equally varied and attractive:

> Aucune autorité n'existait plus, le nouveau pacte social se fondait uniquement sur le lien du travail nécessaire, accepté par tous, devenu la loi et le culte. Une infinité de groupes le

> pratiquaient, […] rien n'arrêtait plus l'expansion de chacun, le citoyen évoluait à son gré dans son devoir de travailleur, faisait partie d'autant de groupes qu'il voulait, passait du travail de la terre au travail de l'usine, donnait ses heures au gré de ses facultés et de son désir. (p. 642)

Fourier and Saint-Simon's vision is realized, as the two protagonists have produced a society held together by the members' interwoven interests, and which offers them access to satisfying work that suits individual aptitudes. Luc and Jordan's shared work ethic and abstract ideals have been transmitted to the coming generations. Such a development is possible due to a strong accord between the protagonist's projects, which is presented as naturally arising. Their ideas are independently formed in the exercise of their distinct disciplines, and are supported by both men's particular quest for truth. As he first sees the Abîme and Crêcherie, Luc immediately longs to reorganize labor "selon la loi naturelle, de vérité et d'équité" (p. 12). Later, he hopes his work will reap "la grande moisson de vérité et de justice" (p. 81), the reformed Crêcherie being repeatedly called by the narrator *cité de vérité et de justice*.

For his part, Jordan finds that scientists are the better revolutionaries, being "les vrais hommes d'action, ceux qui font pour demain le plus de vérité, le plus de justice" (p. 194). It would appear a socially conscious pronouncement, one the reader might expect to hear from Luc, but Jordan remains close to the Vernian model. He explains that scientists are uniquely capable because only science offers reliable truth, "une vérité que la science a démontrée devenait irrévocable, éternelle" (p. 147). He aims too high, however, remarking also that "toute l'injustice cessera lorsque toute la vérité sera" (p. 194). The scientific quest, imagined here as truth-generating, appears to engulf Luc's work. Jordan finds science can end injustice, but the author

shows that without a social consciousness, it would have never left the lab. The inventor would have sold La Crêcherie, condemning the workers to even worse lives. Scientific truth thus needs Luc's philosophy to bring about the future.

Zola's utopia is not only presented as better than the future of anticipation, but as the only future of a 19th century industrial venture. The Abîme has suffered the fate of its workers: it has exploded, failing under its poor management and over-work. In the new Crêcherie however, the shorter work hours and better education allow the laborers a comfortable life, and also to own automobiles, fancy clothes and jewelry. Most importantly, this world takes science, like all other types of previously denigrated work, out of its Vernian refuge, and gives it a new, public purpose and egalitarian access: "les laboratoires de physique, où chaque savant est libre de venir étudier, expérimenter, lorsqu'il pense avoir fait quelque découverte, utile à la communauté" are now in the center of town, and occupy "de grands pavillons" (p. 591-2). Because of this new character of science, there are many such *savants*, and electrical devices that make every aspect of life easier abound. For example, homes in the new city heat and light themselves, and cooking is automated.

A consequence of the reforms, which is unique to Zola's version of anticipation, is that they make the existence of inventors such as Jordan impossible. The new scientists are no longer reclusive or specialized, as the passage presenting the new division of labor indicates that all people engage in all activities, so there is no need for individuals to be exclusively inventors. This is in keeping with Fourier, who disliked the specialization of workers supported by economists such as Adam Smith in the interest of efficiency. His model of the well-rounded individual was *le papillon*, moving from one type of work to another in order to maintain work

interesting.[376] Already in the notes to Travail there is a sense that Jordan's reach must be limited, but there Zola makes an effort to restrain his creativity. The author, for example, chooses against having this scientist also invent immortality and the electric sidewalk.[377] In the novel, we have seen that Jordan overestimates the power of science to bring about the future, so his predictions also indicate that he does not have control over the times to come. At the same time, Zola's notes show he is equally suspicious of exclusively philosophical utopias, reminding himself that "une 'Icarie' est illisible".[378] The balance between these types of writing is achieved thematically by Zola in grounding his fiction of the future equally in philosophy and science, and by extending naturalist documentary practices and exposition to new ends.

[376] Kesten, Seymour R. Utopian Episodes: Daily Life in Experimental Colonies Dedicated to Changing the World, NY: Syracuse: Syracuse University Press, 1993. 12
[377] The electric sidewalk was exhibited at the 1900 Paris World's Fair. Zola's notes are cited in Febles, E. "The Anarchic Commune as World's Fair in Emile Zola's Travail." Nineteenth-Century French Studies 36.3&4 (2008) : 286-304.
[378] Also cited in Febles.

Conclusion

In the beginning of this chapter, a comparison of Travail and Germinal showed that the later novel's repetition of many key elements of Zola's bestseller is meant to give utopia roots in the common source of the two novels, the industrial landscape of the 19th century. Travail recapitulates the conflict of the workers and management, but presents a way to overcome it. The author appeals to science anew, which in this iteration becomes more than a tool for characterizing society. As Mitterand suggests, "si dans Germinal, la grève et l'insurrection […] dont le retour régulier est […] inévitable, Travail nous propose un mythe inverse et complémentaire : les progrès continus de la science et de la technique donneront aux réformateurs la double maitrise des forces naturelles et des forces sociales" (p. 81). Now a diegetic element, science gains the benefit of a social conscience through Luc and enjoys wide dissemination in the new utopian world. Through this, the *littérature d'anticipation* model of science proposing a unique source of progress in an inventor who refuses to teach, only to selfishly guard his results, disappears with Jordan.

The emphasis placed on the significance of science to the utopian project echoes Zola's own remarks in the *Ebauche* for the *Evangiles*, in which he identified the discipline as the foundation of the future he would depict. It was a domain in which he was unable to envision change in the *Rougon-Macquart* series, in part due to his documentation. Though he visits the Anzin mines in 1884 in preparation for Germinal, a novel set in the Second Empire, about 20 years earlier, Zola's observations need little adaptation before being integrated. As Mitterand points out in the Pléiade, mining technology and the workers' living conditions had changed very

little in the intervening decades. The differences that do intervene are in the "organisation syndicale et politique des mineurs, dans ses fins, ses structures, ses formes de lutte" (p. 1810). It is this form of progress that the new technology of Travail, inspired from the forward-looking 1900 International Exposition, is meant to sustain. This source, and elements common to the representation of scientific work in anticipation, allow Zola to inscribe change in the workers' fictional future.

More than illustrating the increased prominence of science, and its cooperation with philosophy, utopia relies on the naturally-arising accord in the personalities and work ethic of its founders. Luc and Jordan share a similar devotion to their endeavors, disinterest in wealth, and quest for truth and justice. These are traits that define the coming society Zola envisions, and which ensure its stability. They rise to prominence over the elements that rendered the tragedy of Germinal endlessly repeatable because in addition to Luc and Jordan's explicit reforms, the ideal world attests to the transmission of their characteristics. The new men of Travail's third book issue from the redesigned family of the founders, two spiritual fathers whose interests they share, and toward whose ideals they work.

Seeing Luc and Jordan as the parents of the new working class is an image inspired by Germinal, where the author had identified the miner's promiscuity as an obstacle to their progress. In addition to depicting the negative effects of such behavior on the community, it is represented as a tool of the miners' oppression. Promiscuity is tolerated, if not overtly encouraged, by the owners because it produces future miners. Zola focuses on the plight of children born to young, impoverished mothers who are condemned to the same fate as their parents. In one formulation, he writes, "Que de misère! et toutes ces filles, éreintées de fatigue,

qui étaient encore assez bêtes, le soir, pour fabriquer des petits, de la chair à travail et à souffrance! Jamais ça ne finirait" (p. 1242) reinforcing the cyclical nature of the tragedy through repeated use of the term *meurt-de-faim* to denote the children. The expression is then used and the miners themselves, in the conversation of the owners. For example, the Voreux engineer Negrel teases the owners that they should enjoy their meal "comme si une bande de meurt-de-faim eût guetté la table du dehors" (p. 1310), and later, looking at the mother of the Maheu family and her children, M. Grégoire sees "cette femme et ces enfants pitoyables, avec leur chair de cire, leurs cheveux décolorés, la dégénérescence qui les rapetissait, rongés d'anémie, d'une laideur triste de meurt-de-faim" (p. 1212). The title becomes engrained also in the minds of the miners, with the narrator recounting "Oui! le travail demanderait des comptes au capital, à ce dieu impersonnel, inconnu de l'ouvrier, accroupi quelque part, dans le mystère de son tabernacle, d'où il suçait la vie des meurt-de-faim qui le nourrissaient!" (p. 1384).

The miners are thus infantilized, an impression which Zola defines through their being unable to contemplate the future. They are unconcerned with the life of subsequent generations, and unable to grasp their long-term economic impact. The only objection mothers raise against their children's sexual activities is with regard to their immediate financial situation. They fear that once their sons have their own children or get married, they will no longer be able to contribute to their family budget. The coming generation is thus cast as a burden on current generations, leaving the miners looking backward, rather than toward the 20th century.

In Travail, Zola minimizes the importance of the reproductive couple, which in Germinal had maintained the miners subjugated and in Etienne's case, had complicated his involvement in the community. Mitterand summarizes the significance of Luc's corresponding female

companion very succinctly, noting that "sauvée [elle] remplace Catherine degradée et perdue."[379] The development of the two relationships however follows opposite trajectories, with Josine, Luc's love interest, starting in the situation where Catherine's degradation had ended. When Luc meets her, Josine is already living with a violent factory worker much like Chaval, and has her much younger brother in charge, acting as a stand-in for a child. Zola does not limit his reorganization of the family to this reversal, proposing instead an elaborate arrangement of couples. Though Josine is Luc's primary partner, they do not marry, nor do they live together. Luc spends much of his time with Jordan's sister Soeurette, who loves him deeply, and who is in turn her brother's companion. Different affinities relate these couples, only one of whom has children, but all of whom are invested in the education and support of the new generations.

In recasting the couple, Zola breaks the pattern of inevitable suffering, which is the future's only reserve in Germinal. The *armée noire*, the final product of the young miners' sexual activity, is thus avoided. The author also replaces the literal depiction of generation through the transmission of abstract ideals. Luc and Jordan are cast as the new pair who shapes the future, this time through their fertile intellect. As parents of the utopian society, they employ science and philosophy to pass on the traits that had made them unique individuals in the fictional 19th century. Though the transformation of the 19th century into the 20th would be impossible without Jordan's scientific efforts, this foundation does not commit the future to a specialization in this domain, as is the case in the anticipation works that focus on the coming century. Zola's utopia echoes Verne's thoughts on the ultimate fate of 19th century scientists – they can point the way to the future but cannot advance to it. However, because this is neither a

[379] Henri Mitterand, "Un Anti-"Germinal": L'Evangile social de "Travail"" Roman et Société (Paris : Armand Collin, 1973) : 77.

roman d'anticipation, nor a naturalist novel seeking to describe the 19th century, but a fusion of the two, Travail can rewrite the subjects of both literatures: ironworks and laborers, inventors and science.

CONCLUSION

Two major trends can be distinguished in the novels studied. Firstly, despite repeated punishment or condemnation, the authors perceive the inventor as having increasingly greater influence over the society of which he is not a part. Verne's characters may achieve significant knowledge of the natural world and represent a threat garnering newspaper coverage in the fictional universe, but Zola's Jordan is able to lay the foundation of a new society. Secondly, though I am considering novels associated with several different literary movements, in each case, the inventor is depicted as combating their respective literary standards. In Verne, the inventor acts against the author's decreed educational mission. Though Robida's futuristic novels make him a public figure, the inventor's work destroys his high social position. In Villiers de l'Isle-Adam, the inventor renders concrete the ephemeral, artificial ideal of decadence, and in Zola's Travail, he brings social reform into the previously descriptive naturalist novel.

The works analyzed present variations in the engagement of inventors with the fictional universe, ranging from characters that have retreated in seclusion (as for example Nemo in Verne's L'Ile mystérieuse) to those who have control of the economy and free access to the government (such as Robida's Lorris in La Vie électrique). Despite this difference, inventors are all depicted as having succumbed to the temptation of science for the sake of science. They are reminiscent in this of Balzac's Balthazar Claës. Their extreme dedication to their unique discipline, essentially a 'private science,' is condemned on several accounts. A central argument against the inventors is their disregard for the openness and social service expected of the discipline. Their work appears as a perversion of the Enlightenment, which placed great

emphasis on the dissemination of scientific information and, as Kant put it, on the "usage public de notre propre raison."[380] It is also useful to recall that Denis Diderot opposed awarding inventors exclusive rights to their discoveries because he believed society would have much more to gain from knowing the processes by which a particular device was achieved. He wrote, for example, that

> Rien n'est plus contraire au progrès des connaissances que le mystère. Loin de nous donc cet esprit d'intérêt ou d'orgueil, qui semble conspirer avec l'imbécillité naturelle de l'homme et la brièveté de sa vie, pour perpétuer son ignorance ; ce serait un crime que de priver ses semblables de la connaissance d'un art utile ; ce serait oublier toute la misère de leur condition, que de leur envier la connaissance d'un art d'agrément.[381]

The excerpt is from a pamphlet prepared on the "Histoire et secret de la peinture en cire" (1755), in response to the development of an artistic process (wax painting) by the comte de Caylus, who wished to keep exclusive rights to it. In his argumentation, Diderot distinguishes between advances that come from technical invention and artistic creativity. Whereas he recognizes the uniqueness of the latter category, and believes it should be protected, he finds the first to be based on a reproducible method, which should be freely available.[382]

Placing the figure of the inventor proposed by anticipation – a lone genius, possessor of a private science, whose chosen existence is only tangentially related to that of his century in the

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[380] Emmanuel Kant, « *Qu'est-ce que les Lumières* » in Eléments métaphysiques de la doctrine du droit (Paris : A. Durand, 1853) 283.
[381] Denis Diderot, L'Histoire et le secret de la peinture en cire. No place of imprint, undated https://archive.org/details/lhistoireetlesec00dide 1-2.
[382] Liliane Hilaire-Pérez discusses this pamphlet in the context of Diderot's views of creativity as evidenced in the Encyclopédie in "Diderot's Views on Artists' and Inventors' Rights: Invention, Imitation and Reputation." *The British Journal for the History of Science* (2002): 132.

historical context of 19th century French science, its failure can be explained by considering Bruno Latour's analysis of the success of Louis Pasteur. His Pasteurization of France (1988) begins with an image of this scientist that appears very close to the inventor figure. Latour writes, "When we are dealing with scientists, we still admire the great genius and virtue of one man and too rarely suspect the importance of the forces that made him great."[383] His reading of Pasteur proceeds through Actor-Network Theory, which assigns agency to human and non-human actors in order to understand how scientific or technological innovation is produced. For the scientist he studies, Latour corrects the imbalance between his perceived image as a powerful lone genius and the relatively unimportant society from which he stands out. He shows that no individual can bring about scientific revolution single-handedly, and never through a private science.

For Pasteur, success depended on many social and natural forces, Latour's actors. It relied also on the diffusion of knowledge and its social acceptance, neither of which, he demonstrates, was wholly dependent on the innovative character of the science or its accuracy. Tellingly, the first part of The Pasteurization of France is dedicated to locating 'Pasteur,' that is to say, his ideas and concerns, in the scientific discourse of the time. Latour surveys the *Revue Scientifique*, *Annales de l'Institut Pasteur*, and *Concours Medical* from 1870 to 1919 in order to demonstrate how Pasteur translated his theory of the microbe into the language of pre-existing science. He depicts success as a question of infiltrating the popular, predominant hygienist movement, which was at the time a significant social force. It, rather than Pasteur alone, was capable to "define what was at stake, prescribed the aims, posed the problems, demanded that

[383] Bruno Latour, The Pasteurization of France (Boston: Harvard University Press, 1993) 14.

others should solve them, distributed praise or blame, and laid down priorities."[384] Against this background, anticipation's inventors are unsuccessful because they insist on their division from the values and aims of any society of which they may have been part. Their unique understanding and practice of science, as well as their reluctance to 'translate' their work into the terms of their public, seal their fate.

In the novels, this results in the condemnation of inventors who specialize in electricity, a field of cutting-edge science. Such a development implies that in anticipation, the speed of progress is less important than exerting control over the path society takes to progress. Control rarely implies governmental oversight, just as it does not bring subsidy from official sources. Science is left at the latitude of specialists, but with a warning against too solitary or individualistic a pursuit. This notion is most clearly expressed in Verne's *Voyages Extraordinaires*, which often stage a contest between the inventor and the larger scientific community. It is in the background of Robida's satirical novels, which conflate events and characters, allowing the inventor to threaten his contemporaries, extorting various industrial privileges from them in exchange for diffusing the impending disaster he had brought about himself.

After the crisis created by the inventor, which through its recurrence in every novel staging such a character appears inevitable, it is an official representative who is given the last word. Often, a second-hand account of the inventor's work is presented by a scientist, or another official, such as a policeman or journalist, who was able to observe the incident. Though this is most common in Verne, Villiers' Edison learns of Eve's demise from the papers, and in Zola,

[384] Ibid. 25.

Luc publicizes the news of Jordan's death. The primary purpose of this public recapitulation, however, is to inform the community that the threat posed by the inventor has been thwarted. With the exception of Travail, this results in a minimal scientific impact, so despite the advances he achieves, the inventor does not emerge as an inspirational figure for the fictional universe.

The inventor's work escapes the supervision of a learned society, which is thought to ensure a certain level of openness. One explanation is that such societies have been vetted as reliable, and their findings beneficial to the public. Their work is preferable over that of the inventor even though in the authors' depiction, it is slower to come to fruition. Oversight ensures that inventions are disseminated, giving access to the scientific knowledge to all who study the discipline. This perspective mirrors findings presented by Evans on Verne's educational mission, in which the critic demonstrates to what large an extent the novels are conceived to supplement instruction in the sciences.[385] Writing accessible novels about science parallels leaving the development of science to bodies that ensure wide access to it. Both speak to the hope that such an action would entice current and new generations to the pursuit of science. It is Zola who renders this most explicit in Travail, placing laboratories encased in glass, in which all are welcome, and where children play, in the center of the utopian settlement he imagines.

In historical context, the power ascribed to any such learned society is as fanciful a hope as Edison's android. Inventions submitted for patent protection in France in the 19th century were not subject to scientific examination, and products were advertised 'sans garantie du Gouvernement.'[386] The first laws governing invention date from the Revolution, and they were

[385] Arthur Evans, "Science Fiction vs. Scientific Fiction in France: From Jules Verne to J.-H. Rosny Aîné." *Science Fiction Studies* 15.1 (1988): 254-76, 338-68.
[386] Olivier Faure, Les Français et leur médecine au XIXe siècle (Paris : Belin, 1993).

only revised once before the 20th century, in 1844, though there were repeated intellectual debates over their usefulness.[387] Beltran notes that the government's intent in extending patents is minimalist: a letter is "la simple reconnaissance d'une propriété."[388] It is also important for our understanding of how scientific work was construed at the time that in rewarding achievement in technology, the laws bestowed their protection on the basis of the utility and marketability of a proposed device, thus its promise of helpfulness to the nation. Novelty was also important, but easy to establish, since France adopted a first-to-file system, as opposed to America's or Britain's first-to-invent system. This implies that while the latter two nations were more interested in identifying "the first and true inventor," France decided primacy solely by the date an invention was registered.

The utility of the invention was left up to the public to assess, and legal protection was conceived by the Chevalier de Boufflers, rapporteur of the Revolutionary *Comité d'agriculture et de commerce* on the status of invention, so that France would benefit from the exploitation of new discoveries:

> considérant en même temps combien le défaut d'une déclaration positive & authentique, peut avoir contribué, jusqu'à présent, à décourager l'industrie françoise en occasionnant l'émigration de plusieurs artistes distingués, & en faisant passer à l'étranger un grand nombre d'inventions nouvelles, dont cet Empire auroit dû tirer les premiers avantages.[389]

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[387] Fritz Machlup and Edith Penrose, "The Patent Controversy in the Nineteenth Century," *Journal of Economic History* 10.1 (1950).
[388] Alain Beltran, Sophie Chauveau, and Gabriel Galvez-Behar. Des Brevets et des marques: une histoire de la propriété industrielle. (Paris : Fayard, 2001) 35.
[389] *Loi du 7 janvier 1791* in J. Chateigner, Ed. Recueil des proclamations et arrêtés des représentants du peuple français 13.37 (Brussels : G. Huyghe, 1795) 169.

Patents were expensive at the time, an aspect which the laws took into account by reminding inventors that they were also free to give up their right to exploitation, in exchange for "l'honneur de faire jouir sur le champ la Nation des fruits de sa découverte ou invention."[390] Inventors were made the subsequent promise that "lorsqu'il prouvera par la notoriété publique, & par les attestations légales que cette découverte ou invention est d'une véritable utilité, il pourra lui être accordé une récompense sur les fonds destinés aux encouragements de l'industrie."[391] As Beltran comments, this was to communicate to inventors that even if they would not reap great financial rewards, by being generous "la société les paye en gloire et en renom et elle distribue aux inventeurs ces brevets d'immortalité qui font les Galilée, les Newton, les Lavoisier, les Volta."[392]

Though this was indeed the way in which Daguerre's invention reached the public, even for authors outside the corpus discussed here, it is not the predicted outcome of the high cost of patents. Flaubert's joking remark about *Inventeurs*, as a class, since he uses the plural, in his Dictionnaire des idées reçues touches on this important question. In explaining this type, he writes, "Inventeurs: Meurent tous à l'hôpital. Un autre profite de leur découverte, ce n'est pas juste."[393] This recapitulation of commonly-held notions about inventors suggests that members of the group are deserving of the public's pity, for having been victims of injustice. Inventors are penniless because they have been robbed of income by others, who have capitalized on their work. This is a fear held also by Balzac's David Séchard, who explains in Illusions perdues how detrimental the *brevet de perfectionnement* can be to inventors. It allowed rivals to protect and exploit improvements made on others' work, sparing them initial expenses and research.

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[390] Ibid. 171.
[391] Ibid. 170.
[392] Alain Beltran, Sophie Chauveau, and Gabriel Galvez-Behar. Des Brevets et des Marques: une histoire de la propriété industrielle (Paris : Fayard, 2001) 32.
[393] Gustave Flaubert, Dictionnaire des idées reçues (Paris : Boucher, 2002) np.

In the novels of anticipation, inventors err too much on the side of the idealization of their science as a pursuit free from the requirement of social usefulness. It can also be argued that that they also fail to capitalize on their work in ways encouraged by the French government. They do not seek patent protection, preferring to work in secrecy, and in Verne and Zola, they do not market their work at all. Even in cases where inventors are deeply engaged in the economy of the fictional universe, such as Villiers' and Robida's, the seemingly more positive narratives still take a very dim view of the protagonists. Inventors are very productive, and become public figures of the fictional universe, but the authors show that they do not have the best interests of their contemporaries at heart. They are too motivated by money, placing the same single-minded pursuit that characterizes their science into their mercantile projects. Robida's Vingtième siècle trilogy pushes the economic threat the furthest, illustrating wide-scale environmental pollution, overpopulation and continual armed conflict as consequences of an overreliance on science. Similarly, Villiers' Edison is unconcerned with the negative effects of his products, as long as they are lucrative. His android, which seemed to fulfill the promise of Edison as a new, successful Prometheus, disintegrates under his concern with its marketability. For all its audaciousness, the inventor's appreciation of the artificial being is materialistic.

Villiers' attack against Edison relies on the idea that he provides a mechanistic answer to a spiritual problem. In so doing, the novel anticipates the 1890s crisis over the bankruptcy of science before it even receives its name, by exploring the fear that, left to its own devices, science will devalue human life.[394] One of the first critics to comment on L'Eve future, Max

[394] Harry W. Paul, "The Debate over the Bankruptcy of Science in 1895." *French Historical Studies* (1968): 299-327.
Roy MacLeod, "The 'Bankruptcy of Science' Debate: The Creed of Science and its Critics, 1885 -1900" *Science, Technology & Human Values* 7.4 (1982): 2-15.

Nordau, points out this very limit of positivism: to him, the android is a mad project because it is too faithful a copy of a person.[395] To revisit the terms of my analysis, there is nothing Promethean in it, no desire to improve life for humanity. Edison reproduces human nature with all its faults, as shows my discussion of the android's recorded conversation. The unhappy future Villiers anticipated is one in which science wins over religion, leaving man no incentive to act morally. Without any higher authority, science might harm the public by serving them too well, encouraging them in their vices.

Verne and Robida's work also deals with the loss a system of reward and punishment with a metaphysical source. By making the value of scientific effort be its service to the public, these authors imagine a secular, socially-minded supervision of the discipline. Their inventors' threat is thus not creativity per se, but its isolation. Usefulness of invention and national interest go hand in hand in this period, so working on science for private purposes offends collectivity. Though in their texts, the Promethean parallel is rejected, in context, it is very much present. The inventor narrative is a cautionary tale meant to ensure French science supports the modern, democratic society.

The exclusion of inventors from the world of their contemporaries, despite their recommendation as sources of progress, reserves them a precarious position halfway between a craftsman and an intellectual. Though some works feature inventors who are proficient in the same disciplines as scientists revered in anticipation, they use this knowledge to produce technology, and do not support the development of their field. Such work appears as *techne*, eminently skilled but practical, and it constitutes a perversion of the cultural understanding of

[395] Max Simon Nordau, Degeneration (Lincoln: University of Nebraska Press, 1993).

science as *episteme*. Toward the end of the century, the inventors' specialization in electricity gains a new dimension: electrical devices are also prized consumer goods.[396] As authors condemn the inventor in his capacity as a merchant, he appears as a threat to art or literature. Looking beyond the influence of scientific vulgarization on fiction, this corpus reveals the complex attitudes of literature toward the growing prominence and manifold manifestations of science in the 19th century.

The legacy of the 19th century inventor novel is exemplified by Raymond Roussel's Locus solus (1914). The novel recapitulates the inventor's isolation from the intellectual community and his contemporaries, a crucial feature of the novels, but exaggerates the uselessness of his inventions. The protagonist, Martial Canterel, animates corpses through the use of *vitalium* and *resurrectine*, substances he alone possesses, mounting them in elaborate monstrances where they reenact their most important accomplishments. A popular example is that of Danton's head, which though submerged in a vat is still able to repeat his speeches.[397] This marvel is achieved through the application of electricity and animal magnetism, which in Roussel's description is quite literal: a cat has been fed batteries and fitted with a conductive material, completing a circuit that returns electricity to the disembodied head.

This scene is representative of the very different role ascribed to science in Roussel's literary project. Though an enthusiastic reader of Verne, the later author is not interested in the

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[396] Iwan Rhys Morus, Frankenstein's Children : Electricity, Exhibition, and Experiment in Early-Nineteenth-Century London (Princeton: Princeton University Press, 1998) 261.

[397] John Tresch discusses the Danton scene in the context of French reflection on reason and the connection and disjuncture of the body and mind. Touching on Roussel's passion for 19th century anticipation writers, while stressing the difference of Locus Solus, he mentions that it extended to the collection of physical objects, concluding that "such fetishization of the relics of the public representatives of science points to an irrationality underlying the public cult of reason of which Verne and Flammarion were the popular priests" ("In a Solitary Place: Raymond Roussel's Brain and the French Cult of Reason," *Studies in History and Philosophy of Biological and Biomedical Sciences* (2004) 327) .

accurate representation of science, nor does he take it as a subject. Its depiction in Locus solus breaks with 19th century fiction in that the author does not see science as an ordering principle for the fictional world. Whereas in the *Voyages Extraordinaires* or in Zola's Travail, knowledge of science calmed fear and righted social wrongs, in Roussel science is endless, undefinable complication. Canterel's mechanical tableaux are not only complex, when their workings are presented with the promise of logical explanation only to reveal further machinery. Science thus functions as a literary-productive constraint, anticipating the role Roussel's own writing and that of Verne would eventually play in shaping Georges Perec's La Vie mode d'emploi (1978). Perec uses intertexts with these authors to generate both the plot and text of his novel, in a similar manner to the methods explained by Roussel in his posthumous Comment j'ai écrit certains de mes livres (1935).[398]

In Roussel, the figure of the electrical inventor acquires an archetypal dimension, representing the author's reflection of the 19th century French literary tradition in which the character had evolved. In this, it recalls the portrayal of Faust, Don Quixote, Don Juan and Robinson Crusoe in Ian Watt's Myths of Modern Individualism. My study does not extend his reflection into the cultural production of the 19th century, since it proceeds to reconstruct a particular character from a number of different sources, rather than tracing the ways in which unique figures become representative of the individual in a particular age, only to grow far beyond their bounds into modern mythological status. Using both perspectives as a starting point, however, would allow productive inquiry into the mytholigization of modern inventors, such as Thomas Edison at the turn of the 20th century, and Steve Jobs at the turn of the next.

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[398] Carolyn Durham explores the structuring principles of Roussel's novels in light of this volume in L'Art Romanesque de Raymond Roussel (York, SC: French Literature Publications Company, 1982).

Edison becomes a literary character in the United States in the late 19th century, appearing in Edison's Conquest of Mars (1898), Garret P Serviss' version of H. G. Wells' The War of the Worlds (1897), and a number of Tom Edison Jr. stories by Philip Reade (1891-1892). From these early fictional versions, Edison is a symbol of technological omnipotence, his future promise being the only dimension greater than his current achievement. Villiers' L'Eve future may well postulate that the inventor is a creature of the newspapers, but the magnitude he wished to impart to this statement is only realized much later, and in the United States. This is one aspect analyzed in Charles Bazerman's The Languages of Edison's Light, which studies the rhetoric employed by the Edison team in the popularization of electric light, showing how its significance and potential were constructed and received by the public.[399] Edison's biographies also stress how carefully his image as an inventor was crafted in response to contemporary expectations, and to what extent this effort contributed to the success of his work.[400]

Popular culture in the 20th and 21st centuries has come to embrace two competing interpretations of Edison. On one side, his image as revolutionary genius has weathered well the impact of new technologies, even once his most recognizable invention, the incandescent bulb, has been replaced in usage. It remains a metaphor for a great idea, just as Edison continues to be popularly synonymous with invention. His birthday is National Inventors' day in the United States, he was Life Magazine's Man of the Millennium, and a 2010 Time Magazine special issue focused on his continued relevance for the 21st century. In literature, graphic novels, video games

[399] Bazerman also analyzes the discourse of electric light before specialized, engineering audiences and in patents' proposals.
[400] Neil Baldwin, Edison: Inventing the Century (Chicago: University of Chicago Press, 2001).
Paul Israel, Edison: A life of Invention (New York: Wiley, 1998).

and film, however, Edison has acquired a dark shadow. A *lieu commun* is to depict him as a reactionary, paternalistic figure, whose plans are thwarted by his rival, Nikola Tesla.

The first fictional work to bring the two together, J. Weldon Cobb's To Mars with Tesla (1901), reverses their respective popularity, recasting the American as Tesla's young apprentice. Christopher Priest's The Prestige (1995) and Christopher Nolan's film adaptation by the same title (2006) comment the technological race between the two inventors both indirectly, through their main characters, and directly by featuring the inventors as secondary characters. Matt Fraction and Steven Sanders' graphic novel The Five Fists of Science (2006) casts Tesla and his friend Mark Twain as heroes fighting Edison's evil capitalist empire. Minimizing the presence of Edison, Thomas Pynchon's Against the Day (2006) and Jean Echenoz's Des Eclairs (2010) both fictionalize Tesla's biography, bringing to the forefront his poetic, Romantic outlook on technology. In different terms, the grandeur of Tesla's scientific aims is stressed in Interplay Entertainment's series of *Fallout* games (2008-2010) and Airtight Games' *Dark Void* (2010), which both use Tesla to represent breakthrough technology in futuristic settings. An extension of my work in the field of cultural studies could thus entail analyzing the American inventor's evolving mythology and the cultural purposes it serves, as well as discerning whether it is a model for the ways in which the legacy of Steve Jobs is being construed.

The question of the inventor's appropriation of establishment science could inform a reassessment of auteur theory and Truffaut's 'Politique des Auteurs' in the field of film studies. Since both the inventor and the *auteur* are considered driving creative forces, issues surrounding the private use of cultural artifacts, the distancing of an individuals' expertise from national origin, and the strong implicit association between personal traits and achievement in a particular

medium developed in this study would help frame a new discussion of *nouvelle vague* filmmakers. Looking beyond this movement, a productive case study could be built on the work of Werner Herzog. The framework would allow us to bridge his feature films focused on eccentrics, such as *Aguirre*, *Fitzcarraldo*, and *Heart of Glass*, and his documentaries, *Grizzly Man*, *Encounters at the End of the World*, and *Cave of Forgotten Dreams*. In addition to closing the genre gap, this inquiry would also illuminate Herzog's existence as an auteur in the two stages of his career, corresponding to his work in two cultures, and two centuries. Most importantly, it would bring together the aesthetic signature of the auteur with his technical mastery. This combination of the pure and the applied recapitulates the makings of the inventor in 19th century French literature, reinvesting the figure with new, broader significance.

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