John Tresch, *The Romantic Machine: Utopian Science and Technology after Napoleon.* Chicago: The University of Chicago Press, 2012. xvii + 449 pp. Map, figures, notes, bibliography, and index. $40.00 U.S. (cl). ISBN 978-0-226-81220-5.

Review of Sofie Lachapelle, University of Guelph.

In *The Romantic Machine: Utopian Science and Technology after Napoleon*, John Tresch explores the connections between the kinds of machines we use, the knowledge we hold, and the world in which we live. Our machines, Tresch tells us, "are bound up with the ways we think about nature and the ways we know it. When our machines change and our understanding of them change, so does nature, and so does our view of knowledge" (p. xi). Since the seventeenth century, "classical machines" like balances, levers, and clocks have suggested to us that knowledge is detached and emotionless and that nature that can be divided and measured. In contrast, during the first half of the nineteenth century, a new set of machines emerged that encouraged a more transformative and interdependent understanding of both knowledge and nature. For Tresch, the steam engine, geophysical instruments, daguerreotypes, newly invented musical instruments, and new printing technologies--to name a few--promoted a view of observers as engaged with and able to transform their environment. He calls these new machines, the "romantic machines" and the movement loosely surrounding them "mechanical romanticism."

Set in the Paris of the 1820s, 1830s, and 1840s, between the period of the Restoration and the end of the July Monarchy, *The Romantic Machine* recounts the story of a neglected moment in history during which the potential impacts of technology were passionately debated. In the mist of early industrialization, machines could appear to be both seductively wondrous and frightfully dangerous. They could hold the promise of a utopian future or the seeds of humanity made obsolete. Somewhere between the hopeless romantics and the soulless mechanics, the mechanical romantics promoted a view of instruments and machines as intertwined with the world and ourselves and potentially positive for humanity. The importance of romanticism for the history of nineteenth-century science has already been the topic of some works over the decades including Andrew Cunningham and Nicholas Jardine's edited collection, *Romanticism and the Sciences*.[1] Here, Tresch wants us to consider the intersection of technologies and romanticism as well. He argues that the encounter between mechanism and romanticism promoted a view of the machine as an organism capable of modifying our relationship to the world. As such, mechanical romanticism contributed to a wide range of fields of knowledge and activities, from the physical and the life sciences to the social sciences and mass entertainment.

The book is divided into three parts dealing with the importance of mechanical romanticism in the physical sciences, popular spectacles, and utopian social philosophies of the day respectively. In the first part, Tresch explores the ways in which romantic themes guided French scientific research in the first half of the nineteenth century. While the first fifteen years of the nineteenth century were dominated in physics by Pierre-Simon Laplace and his supporters (including Jean-Baptiste Biot and Siméon-Denis Poisson), the period that immediately followed was marked by a new generation of scientists with a distinctly anti-Laplacean agenda, in particular André-Marie Ampère, Alexander von Humboldt, and François Arago, on which three chapters of *The Romantic Machine* focus (Augustin Fresnel, Pierre Dulong, and Alexis Petit are also included in this latter group.) These anti-Laplaceans "shared the aim

of unified explanations of terrestrial forces, pursuing the connections and possible conversions among them. They worked with theories of undulatory motion for heat, light, and electromagnetism and had frequent recourse to ethers..." (p. 120). Far from describing French science as entering a period of decline during the years of the Restoration and the July Monarchy, Tresch sees the advances and concerns of the period as contributing to the important synthesis that would follow in the second half of the nineteenth century. The importance of fluids--whether fluids of physics or fluids of the mind--of processes of conversion and metamorphosis, the view of nature as connected, dynamic and changing, and the view of knowledge as human and active marked the work of Parisian scientists of the period.

In the second part of his book, Tresch focuses on the world of entertainment and discusses the use of machines to provoke emotions on the stage, and in the fantastic literature, art, and industrial expositions of the first half of the nineteenth century. Art met science in a number of spaces of the period. In the courtyard of the Louvre, fairs featuring displays of textiles, metals and other marvels of the industrial age were organized as early as 1801, 1802, and 1806, and again, in 1819, 1823, and 1827 (the industrial fairs that followed in 1839 and 1844 were set up on the Champs-Élysées), while, at the Palais-Royal, starting in 1845, Jean-Eugène Robert-Houdin organized his *Soirées fantastiques*, popular evenings mixing conjuring tricks and performances of automata under a scientific guise. Studies of light, color, and sound crossed onto the stage. In the hands of Etienne-Gaspard Robertson, the magic lantern became the instrument of *Fantasmagoria*, fantastical illusions. In his *Symphonie fantastique* and other works, Hector Berlioz combined new musical instruments such as Jean-Baptiste Vuillaume's octabasses and Adolphe Sax's saxophone with the latest studies in acoustics to create aesthetic effects and provoke overwhelming experiences in his audience. In various spaces around the city, panoramas and, more impressively, Louis-Jacques-Mandé Daguerre's dioramas were often accompanied by sound effects to produce impressive auditory and visual illusionary spectacles. And if romantic poets and other writers often decried the growing importance of mechanization and industrialization in the modern world, they were not immune to the power and wonders of some of the technological improvements of the period, most notably those innovations associated with printing (including the use of lithographic printing and cylindrical steam presses) and the growing industry of the serial novels, daily presses, and other affordable forms of written works for the growing reading public.

The third and final part of the book deals with the preponderance of themes of mechanization, engineering, and industrialization in the works of early to mid-nineteenth-century utopian thinkers. Central to Tresch's account of the interplay between romanticism, machines, and social utopias in this era is the École Polytechnique where many Saint-Simonians were trained and where Auguste Comte worked as a teaching assistant (as a student, he had been expelled from the École in his second year.) From the role of machines and engineering for the technocratic Saint-Simonians to the calls for the liberation of workers and in particular typesetters through new printing technologies coming from Pierre Leroux (the editor and printer of the literary and philosophical journal, the *Globe*), Tresch explores the use of concepts present in thermodynamics, studies of work and heat, physiology and the life sciences (in particular, in the work of Geoffroy Saint-Hilaire) for romantic utopian thinkers in their call for social metamorphosis. Finally, the last chapter before the conclusion discusses Auguste Comte's Religion of Humanity, which Tresch understands to be an extension of Comte's earlier positivist philosophy into the realm of the religious sphere.

The book concludes with a discussion of the 1848 revolution which Tresch describes as, at least in part, brought on by problems associated with industrialization. In the early months of 1848, economic crisis and unemployment, demands for electoral reforms, and political repression brought the July monarchy and its government down in favor of a second republic. While Leroux and other radical thinkers gained seats in the Assembly, conservative attitudes grew in strength across the country. When elections were held in the fall of 1848, Louis-Napoléon Bonaparte, nephew of the former emperor, won. He would rule the Republic for the next three years. During this short period, Tresch argues, the meaning of machines shifted. While they continued to be associated with the liberatory potential expounded by Arago and

Leroux, they also came to be recognized for their potential as tools of repression, thus preparing the way for the Second Empire. The simulated sunrise in Giacomo Meyerbeer's 1849 opera *Le prophète*, produced by an electric lamp invented by Léon Foucault, is discussed as a precursor to the theatricality of the Second Empire's regime. As well, the demonstration--or spectacle--of Foucault's pendulum, first presented to journalists and scientists in the vaulted Meridian Hall of the Paris Observatory in early 1851 and rapidly moved to the Panthéon by President Bonaparte is read as a pivotal moment for Tresch: "[o]n the upswing it displayed the power of reason over tradition and arbitrary rule, offering a challenge to the traditional alliance between religious superstition and monarchy. But then, when lighting shifted and the backswing began, the demonstration could be read as an affirmation of the power of the absolute state and the necessary submission of subjects to a higher power" (p. 305.) A few months later, in December 1851, President Bonaparte would organize a coup d'état and declare himself Emperor Napoléon III. While mechanical romanticism did not entirely disappear from the scene after 1851, Tresch argues, the oppressive and distracting possibilities of machines came to the foreground, most notably in the transformation of Paris by the Baron von Haussmann.

With *The Romantic Machine*, Tresch has provided us with a stimulating and convincing account of "alternative modernities" or of a moment in time when science and art could be thought of as complementary to one another. The centrality of Honoré de Balzac, both in terms of his various connections to many of the historical actors discussed in *The Romantic Machine* and the themes of his own *Comédie humaine* highlights the intertwining of science, technology, and culture in the Paris of the first half of the nineteenth century where France's revolutionary memory and recent political experiences, Enlightenment culture, and extreme centralization came together to provide a very particular and volatile setting for dreams and fears about machines. From the Académie des sciences, the Paris Observatory, and the École Polytechnique to the opera and theater houses of the period, *The Romantic Machine* takes us on an enjoyable and meaningful journey through the history of a neglected past while leaving us to ponder on the relationship of science and art in our own present.

NOTE

[1] Andrew Cunningham and Nicholas Jardine, eds., *Romanticism and the Sciences* (Cambridge: Cambridge University Press, 1990).

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