LAVOISIER AND DAVID - SCIENCE, ART AND REVOLUTION

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Anyone with more than a passing knowledge of the chemical revolution of the eighteenth century is familiar with the portrait that Jacques-Louis David painted of the Lavoisiers in 1788. The original, now prominently displayed in New York's Metropolitan Museum of Art, is surprisingly large -the figures are life-size and the painting itself is more than 2 1/2 meters tall and 2 meters wide [102 x 77 inches]. Despite its size, however, the scene is intimate rather than heroic. Lavoisier, who was then 45 years old, is seated at a writing table. He has paused and turned to look at his wife, 15 years his junior, who appears to have come to his side after depositing her cloak and a portfolio of sketches on the chair in the background. It is a peaceful, carefully composed portrait of a prominent, purposeful couple, and since it is the only fully-developed picture of them that survives, we are grateful to have it.

Yet as with all images that are frequently reproduced and instantly recognized, there is a danger that we will take this portrait for granted and, ultimately, treat it as a mere sign, a thing of little intrinsic interest in itself. But to devalue the portrait of the Lavoisiers in this way would be a great loss. I wish to suggest that this elegant painting can tell us a great deal about science in the enlightenment. It can do so, however, only if we are prepared to admit that its meaning has not yet been adequately probed. Can we say why

this portrait was composed this way? Do we know what it seeks to tell us about its subjects? Historically, where does it stand in the development of art and science in a revolutionary era? These are the kinds of questions I wish to bring to the contemplation of this mute but eloquent artifact. I have found that when I put questions of this sort to this picture, it responds generously and opens up many intriguing vistas. Since I cannot explore them all today. I will merely mention some of the many contexts in which this painting ought to be examined and interpreted.

- Precisely what aspect of Lavoisier's achievement is represented in this picture? Why is he seated in a salon rather than a laboratory? Why is he writing rather than performing experiments?
- Why is Mme Lavoisier posed as she is? Iconographically, what is her function in the composition?
- Why were the specific instruments in the picture chosen and placed where they are? What message do they convey?
- How are the artist's specific vision and representational techniques deployed in this portrait? Where does it stand when compared to David's many other portraits?
- What does this portrait tell us about the relationship between art and science before the revolution? In what ways were Lavoisier and David engaged in similar cultural activities?
- What do the experiences of Lavoisier and David in the revolution tell us about the similarities and differences between art and science before and during the revolution? Were revolutionary and post-revolutionary art and science radically different from the art and science represented in this portrait?
- How does this portrait appear when compared to earlier, contemporary, and later artistic depictions of science and scientists? Of scientific instruments?
- What is the provenance of this painting? How did it come to be owned by the Metropolitan Museum and how has it been interpreted and hung there?

Those of you who know something of David's biography, as well as Lavoisier's, will recognize that many of these questions are not as farfetched as they may at first seem. Both men were highly successful Parisian academicians in the last generation to reach maturity before the revolution and, curiously, both had received their secondary educations in Paris' prestigious Collège Mazarin. They both also welcomed the revolution and engaged the possibilities it opened up with great energy and enthusiasm. Both were masters of cultural

politics and the politics of culture, yet as the revolution unfolded their paths and fates diverged. In August 1793 David, sitting as a member of the revolutionary Committee on Public Instruction, furiously and successfully opposed Lavoisier's appeal to have the Academy of Science exempted from the law disestablishing all previously-royal academies. Less than a year later Lavoisier fell victim to the Revolution. Shortly thereafter, David narrowly escaped the Thermidorian reaction against the Republic of Virtue. He then succeeded in re-establishing himself as France's foremost painter by executing heroic portraits of Napoleon. Following the Emperor's fall, he enjoyed the autumnal pleasures of advanced years as an apolitical, artistically productive old master in Belgium. Thus in their lives and in their interactions, David and Lavoisier embodied much of the political experience of art and science as these cultural enterprises evolved from being officially sanctioned academic activities in pre-revolutionary Paris into the distinctive and quite different forms of culture that art and science became in the nineteenth century. By plausible projection, therefore, if not by direct reference, the portrait of the Lavoisiers opens up numerous lines of investigation into the interplay of national politics and two prominent modes of culture during a period in which the modern world was being forged in the furnace of revolution.

Since my time today is limited, I will focus on just two aspects of the Lavoisier portrait. I will first locate the painting far more precisely than has been done before in the context of Lavoisier's career both as a chemist and as a public administrator. Second, I will propose a reading of the painting itself, that is to say an interpretation of the meaning of its composition and execution. I should acknowledge at the outset, however, that much of what I will be suggesting is not supported by the kind of documentation that historians rightly look for in reinterpretations of the past. For me today, as for art historians generally, the object under examination is itself the primary text. If the interpretation I offer of its elements and meaning arouses your interest, sharpens your perception, and seems to reveal the artist's intentions, then it is to that extent valid and merits your consideration. In the end, however, my reading of this visual text, like all historical accounts that reach beyond the demonstrable, is tentative and open to correction.

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To laymen the chemical revolution, like so much of science, appears as a kind of natural event, mysterious in its origins, unambiguous in its implications, and irreversible in its consequences. Like an earthquake, it suddenly shifted the landscape, toppling phlogiston and elevating oxygen. But as students of this event have long known, the chemical revolution took place over time and was widely accepted only after a prolonged campaign in its behalf. Therefore, if we are to understand what David's portrait means within the context of the chemical revolution, we must first situate it temporally and thematically within the history of that event.

Lavoisier hammered out the new theory of combustion that lay at the heart of the chemical revolution during the decade following 1773.[1] By 1783 he had, with Laplace's assistance, experimentally quantified the heat flows in the chemical reactions of greatest importance to him; he had also demonstrated that water is a compound composed of oxygen and hydrogen. Lavoisier and his small group of collaborators therefore no longer believed there was any need to assume that a hypothetical fiery substance called phlogiston plays a role in combustion, respiration, or the reduction of ores to metals. The new oxygen theory explained these phenomena, as well as the formation of acids, with greater exactitude and economy

Convincing oneself and one's disciples was one thing; convincing chemists who had not been present at the creation of the new theory was another. The way Lavoisier responded to this second challenge is instructive. By 1755 he was the foremost chemist in France and one of the most prominent members of the Paris Academy of Sciences, the royal academy that exercised national authority in all matters scientific. Indeed, Lavoisier was chosen during that year to serve as the annual Administrator of the Academy. Conscious of his own authority and that of the Academy, he attempted to carry out a "coup de science". In June and July of 1785 he read to the Academy his famous memoir "Reflections on Phlogiston".[2] Historians of chemistry have long revered this brilliant attack on the concept of phlogiston, for as heirs to the revolution Lavoisier was trying to consolidate, they eagerly subscribe to the position he is advocating. But it appears that Lavoisier's colleagues in the Academy were more offended than persuaded by his high-handed rhetoric. Lavoisier revealed his mind perhaps a little too frankly in the "Reflections" and it proved to be woefully ineffective as a strategy for converting his contemporaries. As late as 1787 a majority of Lavoisier's fellow chemists in the Academy still refused to accept his new theories.[3]

During the year before the portrait was painted, Lavoisier realized that he could not bludgeon other chemists into accepting the new chemistry. He therefore devised a new, more accommodating and more comprehensive strategy to achieve his ends. His key allies were the fellow chemists Berthollet, Fourcroy, and, above all, the Dijon chemist Guyton de Morveau.[4] Their plan was to construct a new, rational language for chemistry, one that would replace the accumulation of ancient names of diverse origins then in use while covertly placing the new theory of oxygenation at the center of all chemical discourse. At the 1787 Easter meeting of the Academy, one of the two annual meetings open to the public, Lavoisier patiently described the new system of chemical nomenclature they proposed. He knew that before the Academy would permit publication of this system, a committee of chemists would have to report favorably on it. Inevitably, given the circumstances, this committee was dominated by those opposed to his new theories, yet they showed great fairness in recommending that the Academy allow the new nomenclature to be published. Lavoisier in turn promised to leave the draft sheets describing the new system on display in the Academy as long as necessary to insure that all members had a chance to examine them. This accommodating strategy of working within the system and persuading rather than compelling assent paid off, and the book written by Lavoisier and his colleagues, the *Method of Chemical Nomenclature*, was published in the summer of 1787. At that point the campaign to convert chemists and other scientists outside the Academy began in earnest.[6]

Although in the David portrait Lavoisier appears as a chemist rather than as a tax farmer or royal administrator, we need to look briefly at several other aspects of his public career as well. Indeed, Lavoisier was a man of considerable eminence in several different fields, even though his public actions, while always well-intentioned, were not always widely appreciated. By the end of 1787 he had, as one of the four Directors of the royal Gunpowder Administration, so improved the production of gunpowder that France was able to supply the British colonies with ample powder during their war of independence while also meeting all of France's other needs.[7] And by 1787 work on the new Paris custom's wall, which was under Lavoisier's direct supervision, was so far advanced that he was already being roundly condemned in anonymous pamphlets for enclosing the city.[8] And finally, in 1787 Lavoisier and his wife were in Orleans, where they owned a large farm, from September to November while he served as a

representative of the third estate at the first meeting of the recently constituted provincial assembly. This was a commitment that absorbed his considerable energies for several months just before the David portrait was composed and painted and continued to occupy him through much of 1788. But do these activities have any bearing on the David portrait?

The connection, I believe, is to be found in the extraordinary pre-revolutionary optimism regarding the power of representation and legislation, at least among reforming liberals such as Lavoisier and David. As a reformer of chemistry, Lavoisier, while always working through the Academy of Sciences, moved from a novel theory that explains specific reactions to a recasting of the entire language of the science, an act of legislative prescription that was completely in accord with French notions of cultural authority. As Jean d'Alembert, a foremost scientist, academician, and editor of the great Encyclopedie, intoned, men of science and letters "fix the use of language" and "legislate for the rest of the nation in matters of philosophy and taste".[9] The calling of provincial assemblies, although shortly to be overshadowed by the more consequential calling of the Estates General, was, as Keith Baker has argued, an extraordinarily bold and significant act on the part of a traditional monarch. In his portrait of Lavoisier David put a pen rather than a piece of experimental apparatus in Lavoisier's hand because he was being depicted as a legislator of science rather than a discoverer of facts about nature. If I am right in this, then the composition effectively brings into conjunction the chemical, administrative, and legislative activities that were foremost in Lavoisier's mind at the time the portrait was being painted.

Nearly everything I have said so far about Lavoisier's career and his concerns at the time the portrait was painted can be found in scholarly studies that have been in print for over a hundred years. I wish I could report that curators, connoisseurs and historians of art who have consistently praised the Lavoisier portrait as one of David's masterpieces have shown a lively curiosity about the specific historical context within which this painting was produced, but such is not the case. In fact, they have shown practically no interest at all in this aspect of the painting -more evidence, as if more was needed, that C.P. Snow was correct when he characterized contemporary art and science as constituting two distinct cultures. Art historians who have examined this painting have for the most part been content to repeat each others' abstract and frequently erroneous comments on

what Lavoisier achieved as a chemist and what the portrait means. An especially egregious example of ill-informed, slack thinking can be found in Thomas Hoving's memoir, published last year, of his 10 years as Director of the Metropolitan Museum of Art.[10] Hoving takes great pride in the devious way he managed to obtain this great work for the Met in 1977, but his understanding of Lavoisier and David, and their interactions, is totally scrambled.

Before reading portions of Hoving's account of this painting, I must ask you to remember that the portrait was painted in 1788, the first meeting of the Estates General, which marked the beginning of the Revolution, was held the following year, the Republic was not declared until 1792, and the Terror began in 1793. Hoving unfortunately collapses all these events into a single moment.

> During David's reign as a member of the revolutionary committee charged with signing the death warrants of those sent to the guillotine, the painter had produced one of history's most memorable portraits. It is full length, representing in their studio a most gifted couple, the scientist Antoine-Laurent Lavoisier, the discoverer of the properties of mercury, and his talented wife, an architect. In the painting the pair are shown in a library, he seated and she standing, looking confidently out at the viewer.

Hoving the goes on to say that the portrait

> is a triumph of humanism -or so it appears at first glance. It becomes less so when one learns that David, clearly taken by the beautiful and intelligent Mme Lavoisier, had been a member of the revolutionary tribunal that had condemned her scientist husband to the guillotine. Her life was spared. David then pursued her so tenaciously that she fled the country. David's name does not appear on the death sign-off of Antoine-Laurent Lavoisier- normally, all members of the death squad had to sign before the killing.

Hoving's account of the Lavoisiers and David is romantic balderdash. Lavoisier did not discover the properties of mercury; his wife was not an architect. To read into the portrait an undocumented amorous attachment that supposedly emerged years later is utter nonsense.

Hoving deserves considerable credit for bringing the David portrait to the Met; as a connoisseur and curator he was utterly unaware of the meaning of the artifact he acquired.

Happily, other art historians' accounts of this portrait and of the relationship between the artist and his subjects are better informed than Dr. Hoving's. But even the best analyses of the portrait are restricted primarily to the kinds of iconographic comparisons and discussions of composition and technique that are of foremost concern to art historians. The Lavoisiers have therefore been repeatedly characterized as a happy, bourgeois couple, wealthy and accomplished, but essentially private people. The portrait has been compared to earlier double portraits, in a few of which the wife is cast as the muse, especially bourgeois scenes done in England and Holland. This is all informative, but it doesn't take us very far. To stress the Lavoisiers' happiness, quiet achievement, and bourgeois self-sufficiency is, I believe, to miss entirely their intense and sustained engagement in public life as it was lived in Paris in the final decades of the old regime.

Even Thomas Crow, whose recent book on *Painters and Public Life* in Eighteenth-Century Paris has been so deservedly praised for its political analysis of David's pre-revolutionary works, says nothing more than that Lavoisier was "wealthy, polished, and immensely gifted."[11] With this brief dismissal, in an otherwise thorough study of the cultural politics of art in pre-revolutionary Paris, Crow relegates the portrait to the limbo of high decoration. I believe it deserves better, not just because the Lavoisiers and David were more complex and more significant figures than such treatment indicates, but because science, like art, was an intensely contested aspect of public culture in pre-revolutionary Paris. When rightly understood, the portrait shows us how David and the Lavoisiers decided to represent visually the nature and authority of natural science itself while also declaring the triumph of the new chemistry.

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At the beginning of 1788 Mme Lavoisier, who had been taking drawing classes with David,[12] asked Lavoisier's younger colleague the chemist Hassenfratz to suggest several ideas for a painting that would represent the triumph of the new chemistry. It seems likely that the Lavoisiers had already decided to engage David for this task and were prepared to pay the enormous fee he would require for such a

commission; they certainly were able to do so. Hassenfratz, doubtless thinking of the series of classical allegories that had gained David such an adoring following in the biennial salons in which academic paintings were exhibited, suggested the picture might depict "Phlogiston nearly vanquished in its battle with oxygen" or "The genius of the new chemistry bringing hypothesis to ground".[13] In the end, however, the artist and the Lavoisiers decided on the double portrait we know. It is not heroically gestural, in the manner of David's earlier *Death of Socrates* or *Oath of the Horatii*, but it does make the two statements Mme Lavoisier called for: it represents the triumph of the new chemistry and it provided yet another weapon for the campaign against phlogiston.

What in fact is going on in this carefully composed painting? We begin with the composition itself, which while rather obvious is also significant. The two figures are linked and firmly balanced within a focusing circle of light. The sleeve of Mme Lavoisier's dress is highlighted and draws the eye to and then down her arm to the table top. This line is echoed in the angle of the pen Lavoisier is holding, which defines his center of gravity. The line of her arm is extended along the fold in the table cloth and Lavoisier's regally extended and disproportionately long, well-stockinged leg. It ends at the masterfully rendered glass globe on the floor, an instrument Lavoisier had used three years earlier to demonstrated that water is formed when hydrogen and oxygen are burned together. But why is this fragile globe on the floor? Is this a subtle reference to the numerous pictures in which explorers who have sailed across distant oceans are shown with one foot propped up on a terrestrial globe? Is Lavoisier too an explorer, if not of maritime realms then of the physical world revealed by experimental apparatus? Perhaps reference is also being made to Lavoisier's leading role in equipping and writing instructions for observations to be taken on the voyage of the Comte de la Perouse. This elaborately planned government-sponsored exploratory voyage to the Pacific was mounted as France's answer to the voyages of Captain Cook. It departed with great fanfare in 1785 and its two ships were still thought to be proceeding as instructed when the portrait was painted.[14]

The instruments in the portrait are curiously arranged; their purpose ambiguous.[15] They are in themselves masterpieces of craftsmanship and one suspects that they are so prominently emphasized in the composition and rendered with such exquisite care in part at least because David wished to convey his admiration for the skill of fellow

artisans. They are, of course, above all visual icons that identify the central figure's claim to our attention. Yet they are not merely the scientific furniture of the sort frequently exhibited by wealthy amateurs, but rather, like the horses, armor and weapons of famous military figures, they are the very instruments with which the subject has attained his commanding position in society. And yet they are not connected or charged as they would be in a laboratory. They stand, rather, in uneasy disjunction, tools brought out for display rather than at work. For this scene is not set in a laboratory, the table at which Lavoisier is working is not a bench where experiments are being performed. The instruments are an important part of the story, but they are presented to support its main purpose and message.

Lavoisier is writing. We cannot be sure what papers are on the table before him, but it seems reasonable to assume that if a specific composition is implied, it is the new chemical nomenclature published in 1787. It could be that David has shown him at work on the manuscript of the *Elementary Treatise on Chemistry*, which was published the year after the portrait was completed, for we know that Lavoisier had been drafting and redrafting the *Treatise* for several years. Yet it seems likely that the representation is of a work achieved rather than one not yet completed, for this portrait was to be above all else a visual declaration of the triumph of the new chemistry. But the important thing is that Lavoisier is writing, not performing experiments.[16] He bestrides chemistry not as a discoverer and exhibiter of facts, but as an author of theories and a legislator of language. As in so many David portraits, the pen is the symbol of achievement, authority, and command.

What is Mme Lavoisier's role in this composition? Forget the romantic claptrap about David being infatuated by her - if it was true, it was irrelevant to what was important in both their lives. She is indeed presented, as many have noted, as Lavoisier's muse. Just as St. Jerome is traditionally depicted as guided by an angel as he painstakingly translated the Bible into Latin, so too is Lavoisier pictured as inspired by his wife as he laboriously drafts the new language of chemistry. But what kind of inspiration is he receiving as he turns to gaze at her? Clearly it is not direct soul-to-soul illumination, for she does not meet his eyes. He contemplates her, yet he sees only what he can see, not what she sees, for her gaze is directed outward at the viewer. Clothed in a simple, unrevealing dress and presenting an expression that is as passive and enigmatic as the *Mona Lisa*'s, she

dominates the picture without forthrightly declaring what her presence is meant to convey. But were we to see this picture with eighteenth-century eyes, we would recognize that she clearly represents nature herself. Nature, according to the conventions of the time, was feminine, passive, and inward, as Mme Lavoisier is in this picture. She looks directly at the viewer to invite contemplation of nature herself, but she does not immediately reveal any of her secrets. Unlike St. Jerome's angel, she is a thoroughly naturalistic muse, and her posture and composure are such that it requires a perverse imagination indeed to view her as erotically charged. Lavoisier looks at her not in adoration or with carnal desire, but with a reflective, even bland air of calm affection and sustained inquiry. His is an engaged curiosity ready to move on to action and accomplishment. The moment David has captured will soon pass and Lavoisier will return, refreshed and inspired anew, to the task at hand.

Although Lavoisier does not physically dominate this picture, he is its central actor. His is the active, masculine role of mediating between nature and society, a role he fulfills by creating and codifying knowledge and making it known to the interested public. His mind is located, both conceptually and pictorially, in the middle of a triangle formed by his wife (the embodiment of nature), the instruments on the table (the means by which precise knowledge of nature is acquired), and the manuscript on the table (the place that public knowledge is inscribed). This is the space in which he operates. The looming presence of the room in which they are situated and the furniture seen in the crepuscular light of the background are of no consequence. This is a picture of high intelligence working at the top of its form, surrounded and informed by the resources that it needs to render the world intelligible. Inspiration, experimentation, reflection, inscription: these are the steps, according to the leading figures in the enlightenment, that lead to reliable knowledge of nature, and these are precisely the steps Lavoisier is following in David's marvelous portrait of enlightened science.

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I would like to end with a plea for a revaluation of the Paris bourgeoisie at the end of the enlightenment. The master narrative of Modernism, especially when refracted through the lens of Marxism, has taught us to despise the bourgeoisie. While many historians are prepared to grant that at certain crucial moments the bourgeoisie

played a revolutionary role in history, it is commonly thought that their overriding concern with personal wealth and private happiness prevented them from engaging in a sustained manner in the kinds of heroic action needed to create modern nations and modern democracy. Historians, although normally eager to discredit the narratives of their predecessors, have shown an unusually high degree of agreement across generations in consigning the bourgeoisie to the scrap heap of history.

Unfortunately such thinking encourages one to conclude that if the Lavoisiers were bourgeois, which they were, then they were just like all those self-amused and self-satisfied bourgeois capitalists and merchants in Holland and England. But in fact, I wish to argue, many bourgeois scientists, and most notably Lavoisier, were central players in the emergence of modern liberalism on the Continent. Those who believe, as I do, that we should seek to revivify rather than abandon our liberal heritage will want to take seriously the bourgeois scientific tradition, and especially its role in public cultural contestations in pre-revolutionary Paris. The David portrait of the Lavoisiers is, I believe, no less political than his far more famous classical allegories, we simply are not attuned to its political medium and message. To get in tune, we must rethink the history of science, the history of the bourgeoisie, and the history of liberalism itself. These are all eminently suitable projects for a post-modern age.

NOTES

1. See Arthur Donovan, *Antoine Lavoisier - Science, Administration, and Revolution*, Oxford: Blackwell, 1993, chapter 6
2. See *ibid.*, pp. 167-74.
3. *Ibid.*, p. 158.
4. *Ibid.*, pp. 164—7.
5. *Ibid.*, pp. 157-64.
6. *Ibid.*, pp. 174-87.
7. *Ibid.*, p. 199.
8. *Ibid.*, p. 232.
9. *Ibid.*, p. 161.
10. *Making the Mummies Dance*, New York: Simon & Schuster, 1993, pp. 416-7.
11. New Haven: Yale University Press, 1985, p. 231.
12. Although it has long been believed that Mme Lavoisier took drawing classes with David, documentary evidence that supports this claim has only recently been discovered; see Madeleine Pinault Sorensen, "Madame Lavoisier, dessinatrice et peintre", *La revue* (Musèe des arts et métiers, Paris), no.6 (March 1994), pp. 23-5.
13. Jean-Pierre Poirier, *Antoine Laurent de Lavoisier 1743-1794*, Paris: Pygmalion, 1993, pp. 2-3.
14. *Ibid.*, pp. 178-9.
15. For a description of the instruments portrayed, see Jean-Pierre Poirier, "Le couple Lavoisier sous l'oeil de David," in *La revue* (see note 12), pp. 26-9.
16. Cf. the frequently reproduced sketches of Lavoisier in his laboratory made by Mme Lavoisier in 1790-1; Donovan, p. 279.