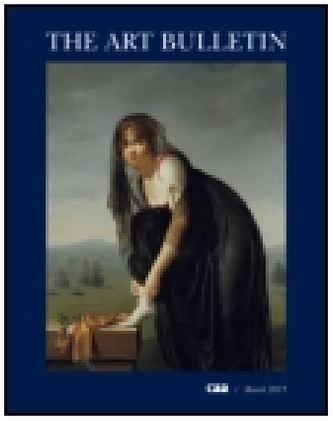

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Joshua Reynolds's "Nice Chymistry": Action and Accident in the 1770s

Matthew C. Hunter

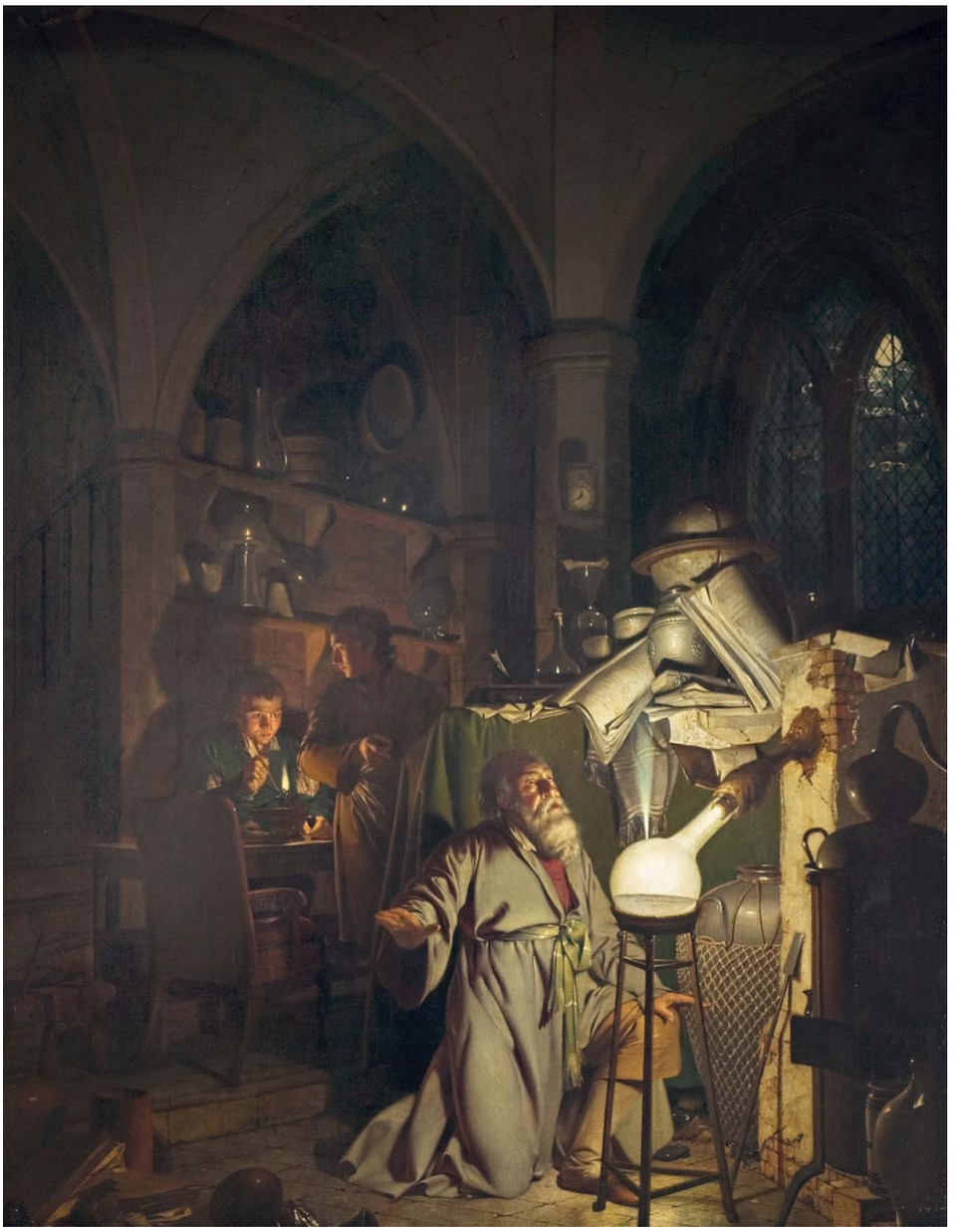
Among the eight paintings that Joseph Wright of Derby exhibited at London's Society of Artists in 1771, the most enigmatic is the picture known as *The Alchymist, in Search of the Philosopher's Stone, Discovers Phosphorous, and Prays for the Successful Conclusion of His Operation, as Was the Custom of the Ancient Chymical Astrologers* (Fig. 1).[1] From a low vantage point, Wright opens a view into a darkened, Gothic interior where a well-furnished laboratory is punctured luminously in two. At left, the parabolic blossom of flame from an oil lamp describes the profile and deictic forefinger of a standing youth, who directs his seated companion's attention. As the lamp's oily glow casts an elongated, humanoid shadow on the wall partitioning a spiral staircase from view, that finger—those eyes—point us toward the picture's eponymous experimenter at center right. Fallen to bended knee, the bearded philosopher extends a hand, as if to silence his assistants' chatter. While the roving eyes of apprentices and pictorial beholder may be distracted by Wright's lustrous implements, nearly legible manuscript scrawls, or the clock and moon registering time's implicit passage, the gaze of the adept is locked. He stares into the blinding jet of ethereal, blue-white phosphorous erupting triangularly and, per Wright's novel-of-a-title, unintentionally from the glass vessel in the pictorial foreground.

If Wright had thus transposed to a deep past experimental events then but a century old, the Derby painter was fastidious in depicting the facts and furniture of this alchemical accident.[2] At least, he intended to do so by obtaining and then replicating key details of laboratory design from his friend Peter Perez Burdett, a Liverpool entrepreneur.[3] An innovator in aquatint printing techniques that yield an image when acid-resistant rosin is dispersed over an etching plate, suspended in aqua fortis, and variously inked or burnished to produce a tonal design, Burdett reciprocally fashioned richly modulated reproductions after Wright's candlelit scenes in that experimental medium (Fig. 2).[4] Announcing his aquatints as "the effect of a stained drawing . . . wrought chemically, without the use of any instrument of sculpture" in early 1770s London, Burdett was simultaneously attempting to sell techniques of chemical image transfer to enterprising printers like Benjamin Franklin and to industrialist Josiah Wedgwood as cost-saving, skill-eliminating tools for use in the pottery works.[5]

Given Wright's contacts with Birmingham's Lunar Society (an informal group of provincial intellectuals who convened on full-moon nights to explore matters relating to natural philosophy and other topics), his patronage by the Midlands doyens of Britain's Industrial Revolution, and recent discoveries of his experimental pictorial facture, the Derby painter's attraction to chemistry seems readily plausible.[6] More surprising is the robust interface between chemical practice and pictorial art commanded by Wright's fellow apprentice in Thomas Hudson's London-based portrait studio: Sir Joshua Reynolds (1723–1792). Best known now as a leading Augustan theorist and first president of Britain's London-based Royal Academy of Arts, Reynolds used a clandestine laboratory of esoteric waxes, fugitive pigments, and unstable painting media to craft visually striking images that came together quickly and stopped his audiences dead in their tracks. However, as have discovered generations of conservators and collectors, those images soon began to deteriorate as *objects*—flaking, discoloring, visibly altering in time.[7] Analyzing Reynolds's *Self-Portrait as a Deaf Man*, researchers have unearthed a strange thicket of internally differentiated media and techniques (Fig. 3). Against a darkened ground, the painter cocks a hand to his ear to amplify the voice of the picture's implied beholder, propping his elbow on a ledge forged from pigment suspended in a medium of beeswax, spermaceti extract, and linseed oil. That crooked arm casts its shadow on a vermilion jacket fashioned, in turn, from pigment mixed with walnut oil and beeswax; other areas of the paint film have been built up from triterpenoid resin, bitumen, and varnish.[8]

More pernicious than the disease has been its putative cure. When cleaning the Tate Gallery's *Sir Watkin Williams-Wynn with His Mother* (ca. 1768–69) in the late 1940s, conservators found a puzzling morass of damage and attempted remedy.[9] "The worst area," they noted, "is in the upper part of the sky to the right, where a considerable archipelago of blue and blue-grey paint, mostly in the hatching, is new. . . . There are many repaints in the forehead and all over his head."[10] All excavation and would-be stabilization ceased once it became clear that further work "would certainly have shown up more of Reynolds' bad drawing."[11] What we now see as Reynolds's paintings, such reports proclaim, is a wicked world where generations of conservators' errors have compounded original artistic sins. "The liquid swirling of paint," so observes a 1994 report on the *Van der Gucht Children* (ca. 1785–86; Huntington Art Gallery, San Marino, California), ". . . would appear to have resulted from both the inherent vice of the artist and inappropriate treatment."[12]

A recent research project and exhibition at the Wallace Collection in London will surely help to shed more light on the unusual methods of Joshua Reynolds, an eccentric ("perverse" is the word used by one leading conservator) pictorial technician.[13] Yet Reynolds's appetite for chemical experiment was both well known to and amply commented on by his contemporaries. The president's coloring, claimed one French observer in the early nineteenth century, "fades away, and disappears rapidly; — many of his pictures are now only black and white. He is said to have been fond of trying experiments in colors, and thought he had found the secret of rendering them more lasting."[14] Poet William Mason recalled an episode when Reynolds eagerly bought from "some itinerant foreigner . . . a



1 Joseph Wright of Derby, *The Alchymist, in Search of the Philosopher's Stone, Discovers Phosphorous, and Prays for the Successful Conclusion of His Operation, as Was the Custom of the Ancient Chymical Astrologers,* exhibited 1771, reworked and dated 1795, oil on canvas, 50 × 40 in. (127 × 101.6 cm). Derby Museum and Art Gallery (artwork in the public domain; photograph © 2015 Derby Museums, used by permission)

parcel of what he pretended was genuine ultramarine, which, in point of color, seemed fully to answer its title. Without bringing it to any chemical test, the artist ventured to use it, and by it spoiled, as he assured me, several pictures."[15] Former apprentice James Northcote prefaced his biography of the president with a study of an obscure Devonshire painter named Thomas Rennell. Like Reynolds, Northcote records, Rennell was "very fond of chemistry, to which he devoted a considerable portion of his time. Most of his colours, which he prepared himself, went through that operation: and he is said to have discovered the art of fixing those which are the most fading."[16] Painter Joseph Farington cast his colleague in darker terms. Driven "to obtain further knowledge of his art," Reynolds took risky shortcuts, making "experiments in using his colours, although he had not acquired, in the earlier part of his life, sufficient chemical knowledge to enable him to judge of the result."[17]

Reynolds, too, was cognizant of his chemistry's wayward wont and fugitive forms. "The truth is," he confessed to a viewer of an early portrait that had faded badly, "for many years I was extremely fond of a very treacherous colour called Carmine, very beautifull to look at, but of no substance." The painter refused to be gently released from responsibility for his pictures' volatility: "Tho you very kindly insinuate an apology for the fading of the Colour of Lord Errol's Picture, by its hanging in a Castle near the sea, yet I cannot in conscience avail myself to this excuse as I know it would have equally changed wherever it had been placed."[18] Employing assistants Giuseppe Marchi and William Doughty in the ongoing repair of his pictures, Reynolds might have imagined himself as a Hercules at the crossroads, torn between his fabulous commercial success and his experimental inclinations. At least, as Northcote asserted, "it was always his wish to have made these experiments on his fancy pictures, and if so, had they failed of success, the injury would have fallen only on himself … but that he was prevented from practising thus, by his being at the time perpetually employed in painting portraits."[19]

These compromised chemical portraits were not simply a bargain with the market, merely an experimentalist's

2 Peter Perez Burdett, *Two Boys Blowing a Bladder by Candlelight*, 1773, aquatint, 11¼ × 8⅜ in. (28.7 × 21.4 cm) (artwork in the public domain; photograph © The Trustees of the British Museum)

concession to the dominance of portraiture in eighteenth-century Britain. For, three years after Wright first exhibited his *Alchymist* in 1771, Reynolds delivered a public discourse to the Royal Academy redolent with chemical language and frankly alchemical ambition. In his *Discourse VI* (1774), the president set out to counter views whereby artistic creation was best advanced by relying on private cerebration and those ideas flowing from the inspired, untutored gift of genius.[20] Such notions were inimical to the fledgling Royal Academy's emulative pedagogy; they were also positively hostile to the industrious assembly and eclectic transformation of traditions that Reynolds saw as central to artistic innovation. To conceptualize the mechanism underpinning what he granted could appear a paradoxical production of novelty from practices of imitation, the president thus turned to the arts of fire. The aspiring painter should model his enterprise on "the mixtures of the variety of metals, which are said to have been melted and run together at the burning of Corinth, [when] a new and till then unknown metal was produced."[21] By borrowing, stealing, and appropriating from as many traditions as possible, Reynolds urges, the cunning, magpielike artist has to become a chemical scatologist: "He will pick up from dunghills what by a nice chymistry, passing through his own mind, shall be converted into pure gold."[22]

Statements like these may sound surprising to readers familiar with recent scholarship on British art. After all, as Royal Academy president, painter of over two thousand society portraits, and author of the famous *Discourses*, Reynolds often appears in scholarly narratives as a font of classicizing conservatism. A leading exponent of Addisonian politeness in Richard Wendorf's influential formulation, Reynolds was a staunch defender of aristocratic order in an age of middle-class ascendancy, according to David Solkin.[23] For John Barrell, Reynolds is a key modulator of a "civic humanist" tradition as well as a particularly stalwart advocate for timeless values: "The language of the *Discourses* repeatedly attributes value to what is fixed, settled, permanent, solid, as opposed to whatever is floating, fluctuating, fleeting, variable."[24] Imagining Reynolds—that crowning spokesman for a tradition of idealizing artistic emulation soon to be overshadowed by Romanticism—as a chemical experimentalist might sound even stranger if we recall the vociferous opposition to chemists voiced by his close friend Edmund Burke, critiques that only accelerated in the last, Revolutionary decades of the eighteenth century.[25] Indeed, since they have been largely unconcerned with the material volatility of his works, most interpreters have cast Reynolds as not just indifferent to, but veritably incommensurable with Enlightened science.[26] Contrasting the president with anatomist William Hunter (a fellow instructor at the Royal Academy), Martin Kemp has seen the proverbial "two cultures" parting: "Their notions of truth in the 'science' of 'nature' were not compatible. Indeed their definitions of the key terms were so different that they were effectively working with separate premises."[27] And if, as recent historians of science argue, it was the Enlightenment that consolidated the enduring view of alchemy as occulted gold making while opposing it to the newly respectable discipline of chemistry proper, then it is telling that Reynolds in *Discourse VI* gets the stereotype *wrong*. He recommends to the painter as "chymistry" the very chrysopoetic ambition that had become alchemy's defining attribute.[28]

What, then, did Reynolds and his contemporaries mean when they talked about the painter's "nice chymistry"? One available interpretation is strongly deflationary: if Joshua Reynolds was a chemist in any sense at all, then he was surely a very bad one. Contrary to the brilliant coloristic effects he hoped to achieve, this view would hold, the faded wrecks of pictures narrated by period commentators and still visible in museums materialize an almost Faustian tale. To test the contours of that interpretation, I explore this deflationary story by tracing the appeals made by Reynolds's key period interpreters to painting's then-recent history in Britain. Taking cognizance of the ways in which seventeenth-century painting was understood to bear material consequence on the president's pictorial facture then opens a broader view. Reassessing Reynolds's experimental engagements in light of the recent historiography of science (and of alchemy in particular) suggests how a tradition of making and thinking with chemical preparations changing visibly in time as cultivated among British scientific circles might productively inform our conception of the president's enterprise.[29]

This is not to simply join a recent conversation that has promoted a closer interface between art's technical and humanistic interpretation, for doing so necessarily reorients

3 Joshua Reynolds, *Self-Portrait as a Deaf Man*, ca. 1775, oil on canvas, 29½ × 24½ in. (74.9 × 62.2 cm). Tate, London (artwork in the public domain; photograph © Tate, London, 2015)

our conception of Reynolds's project and the ontology of those unstable painted objects it yielded.[30] "Shrinkage and consequent fracture," Michael Baxandall once wrote of Renaissance limewood sculpture, "is not a once for all problem of the seasoning process but one of continuing pulsation, an alternation of lesser shrinking and swelling in response to the changing humidity of the atmosphere: all wood-carvings remain slow-motion mobiles, but limewood more so than most."[31] I think Baxandall's terms offer an instructive model for grappling with Reynolds's "nice chymistry" and the alchemical penumbra of period response in which it moved. Building on the brilliant provocation, now over a decade old, of Neil De Marchi and Hans J. Van Miegroet that we should see the president's "views on ingenuity and facture . . . as important to an understanding of British visual culture," we can plot Reynolds at a dynamic crossroads of art, science, and commerce, with his paintings as the slow-motion chemical experiments run between and through them.[32]

Bad Chemistry

Joshua Reynolds's *Discourse VI* of 1774 coincides with a moment of dynamic chemical transformation in eighteenth-century Europe. The "Chemical Revolution" is the phrase used by historians of science to denote the recognition of matter's gaseous state; the conceptualization of oxygen and rejection of phlogiston theories of combustion; the formalization of standard nomenclature for chemical agents; and a host of other, affiliated advances well under way by the late 1770s in the hands of Antoine Lavoisier, Joseph Priestley, and their generation.[33] If historians have often stressed that chemistry found little sustained support from either Britain's ancient universities at Oxford and Cambridge or its leading scientific academy, the Royal Society of London, the establishment of William Cullen as the chair of chemistry at Edinburgh University in 1756 helped to change that picture. In a Scottish university at the forefront of European medical education, Cullen consolidated institutional support for a tradition of "philosophical chemistry" that would include Joseph Black and Thomas Beddoes.[34]

Practitioners in early Georgian London could benefit more materially from the Society for the Encouragement of Arts, Manufactures, and Commerce (or "Society of Arts"), which began holding its meetings on the Strand in 1754. From 1758, a Committee on Chymistry convened through

the institution to commission English translations of important chemical texts, including Pierre-Joseph Macquer's *Elémens de chymie-pratique* (1756) and Georg Ernst Stahl's *Fundamenta Chymiae dogmaticae et experimentalis* (1746–47).[35] The Committee on Chymistry also established and adjudicated prizes offered to manufacturers for the production in bulk of borax, bismuth, sal ammoniac, and other chemicals useful to the arts and industry.[36] Elected a member of the Society of Arts in 1756, Reynolds served on a committee in 1757 (alongside painter William Hogarth) charged with making trials of a batch of verdigris—the greenish blue pigment derived from the chemical action of acetic acid on copperplates—that had been delivered for prize consideration in twelve sacks weighing two hundred pounds.[37] If, as historian of science Lawrence Principe has recently proposed, transformations within chemistry's theory and practice in the decades between 1675 and 1725 "are so significant and so sudden that they bring the word revolution almost naturally to mind," then the Society of Arts's utilitarian projects might well be seen as building on revolutionary currents rather than anticipating them.[38]

An especially articulate spokesman for this consolidating status was William Lewis (1708–1781), lecturer on chemistry at the Society of Arts and skilled practitioner well versed in contemporaneous Continental theory.[39] Lewis saw the chemist as reckoning with altogether more elusive quarry than the "determinate forces, subject to mechanic laws, and reducible to mathematical calculation" of concern to the prestigious tradition of mechanical philosophy promulgated at the Royal Society of London since the later seventeenth century. "Chemistry," Lewis claimed,

> considers bodies as being composed of such a particular species of matter; dissoluble, liquefiable, vitrescible, combustible, fermentable, & c. impregnated with colour, smell, taste, &c. or consisting of dissimilar parts, which may be separated from one another, or transferred into other bodies. The properties of this kind are not subject to any known mechanism, and seem to be governed by laws of another order.[40]

Were it to properly complement Isaac Newton's mathematicized physics, Lewis's chemistry had to be advanced as an autonomous field of natural knowledge concerned with discrete methods, forces, and phenomena.[41]

Partisans in that chemical struggle for philosophical autonomy might well have shared sympathy with Britain's emergent school of painting in oil. Itself mythically produced from alchemical experimentation and embraced as a key strategy of image making among Charles II's restored Stuart court, oil painting in England had remained a province dominated by Continental masters.[42] Unlike the influential model of the Académie Royale de Peinture et de Sculpture in Paris as reformulated by Jean-Baptiste Colbert in Louis XIV's France, Britain had no centralized, state-sponsored institution for the promotion of the fine arts prior to the founding of the Royal Academy in 1768. Moreover, when seen against the "golden ages" of painting in Spain and the neighboring Dutch Republic, pictorial practice in the early modern British Isles looked oddly underdeveloped.[43] As late as 1685, Royal Society Fellow William Aglionby could complain, "A *Painter*, we never had, as yet, any of Note, that was an *English Man*, that pretended to *History-Painting*."[44]

Even if recent scholarship has underlined the role of institutionalized science at the Royal Society in driving what Iain Pears has called the "discovery of painting" in later seventeenth-century England, the collapse of traditional corporate bodies such as the Painter-Stainers' Company and the contemporaneous abandonment of large-scale artistic patronage by the Hanoverian court of George I left the business of painting in early eighteenth-century Britain facing an uncertain future.[45] "With no restrictions from guild, academy or court," as one scholar has put it, "artists were free to set themselves up and bid for work at all levels with or without formal training."[46] This unregulated commercial environment wherein painted products were increasingly simplified—shorn of their complex underlayers of dead coloring and glazes into easily replicable, quasicalligraphic marks—would be cast in far bleaker terms by Reynolds's contemporaries.[47] Echoing Horace Walpole's influential account of the dire state of British painting in the early eighteenth century, Joseph Farington minced few words. By the early 1740s, "the Art was at its lowest ebb. What might be called an English school had never been formed."[48]

Oil painting's recent, volatile history in Britain served as a crucial point of reference when close affiliates interpreted Reynolds's unusual pictorial facture. Heir to a commercialization of the color industry that historians of science date to the mid-eighteenth century, Reynolds's former apprentice James Northcote (1746–1831) saw the Restoration as a fulcrum.[49] Since artists in Renaissance Italy had made "most of their colours themselves, or at least under the inspection of such as possessed chymical knowledge," as Northcote put it, their technical competence "... excluded all possibility of those adulterations to which the moderns are exposed."[50] In Northcote's view, Lübeck-born painter Godfrey Kneller had changed all that for British artists. Arriving in London in 1676, Kneller established one of his assistants as "the first that kept a colour-shop in London, [and] occasioned the practice of it as a trade."[51] Once alienated from artisanal knowledge of color making and forced to buy commodified pigments "off the rack," Reynolds and his contemporaries were thus easily victimized by specious chemists and their fraudulent wares. Although Northcote's account of the trade in artists' pigments is not supported by modern scholarship, the transactional tensions he envisions certainly resonated with Restoration-era observers.[52] Experimental philosopher Robert Hooke opens his famous diary of 1672 detailing a story in which "a Waggish Painter" contrives an elaborate ruse to torture a color merchant.[53] Former apprentice to leading portrait painter Peter Lely, Hooke learned this story from an apothecary named Whitchurch, who no doubt knew the tale's probable victim, Charles Beale. Not only was Beale Lely's "color-man," but he was also author of a technical manuscript entitled *Experimentall Seacrets found out in the way of my owne painting*.[54]

That testy, Restoration-era traffic in chemical materials and techniques figured significantly in the account of Reynolds's pictorial facture penned by his friend poet William Mason

(1724–1797). Appealing directly to "the pocket-book of old Beale . . . from whence it appears that *Lely* paid large sums to that colorman for the sole article of ultramarine," Mason contrasts the solid, technical grounding of Lely's pictures with the bevy of novel pigments deployed by Reynolds.[55] Instead of high-quality, expensive pigments like ultramarine, Mason tells us, Reynolds preferred cheaper, industrially enhanced substitutes such as smalt. The poet then sets out an account of smalt worthy of period natural history. "A highly vitrified substance," smalt is

> compounded chiefly of zaffir, and therefore full as difficult of levigation as lapis-lazuli; but as the art of enamelling, and that of making china, have of late years been carried to so great a perfection at Dresden, France, England and various parts of Europe, that we see even a pottery in Staffordshire is able to produce a blue equal to that of Nankin china, I see no reason why such smalt should not equal ultramarine in point of durability, nor why a glass, covered throughout so as to become one blue mass, may not retain that color as eternally as a native blue fossil, especially as it has received that color by a mineral combined with it by heat—by the highest power that a continued white heat can achieve.[56]

This appetite for novel materials and attention to their technical properties is narrated by Reynolds himself in the "Ledger Books" now preserved at the Fitzwilliam Museum, Cambridge (Fig. 4). Outwardly, these folio-sized ledgers offer a parade of Georgian Britain's great and good; the painter lists his sitters' names according to alphabetical order of patronymics and chronology of their payments.[57] At the back of each volume, social rank and financial expenditure are recast as recipes for the material composition of the paintings themselves—procedures Reynolds tabulates in a curious mixture of pidgin Italian, Latin, and English.[58] Around the time of his *Discourse VI*, the painter exemplifies his process with *Young Fortune-tellers* (his double portrait of Lord Henry and Lady Charlotte Spencer painted about 1774–75 for George, 4th Duke of Marlborough). The pigments are to be mixed first with oil; next, with wax without oil.[59] Then, the ledger lists the names of sitters whose portraits follow derivatively from the stipulated process: "Mr. Weyland, Mrs Mardaunt, Ditto Mrs Morris, Ditto Viscount Tyrconnel."[60]

These are hardly recipes for making enduring objects. Encountering Reynolds's description for the fabrication of *Young Fortune-tellers*, one modern conservator wrote to the Huntington Art Gallery in outright astonishment: "I was wondering, if you have any evidence that this is indeed the case and how the painting has survived consequently!"[61] How are we to read these strange, iterative procedures and the volatile works that followed from them? According to conservator Rica Jones, Reynolds should be seen as synthesizing post-Restoration British painting's unstable social and material underpinnings in revolutionary ways. Trained though he was in the most solid technical tradition on offer in eighteenth-century London through the portrait studio of Thomas Hudson, Reynolds engineered a fusion of elevated artistic theory and obsessive material experimentation that, in Jones's view, would transform British practice. "It was not sufficient for Reynolds to introduce the grand style into portraiture by iconographic means alone," she argues: "In order to achieve the glowing colours and varied textures he had seen in old master paintings in Italy, he invented new techniques using a combination of materials whose inability to withstand the test of time has become legendary."[62]

The problem, astutely perceived by period observers like Mason, was that Reynolds's exuberant and ever-changing chemical mixtures were rarely accompanied by the shrewd critical sensibilities required to navigate through London's profusion of color commodities. On Reynolds's painting table, the poet reports:

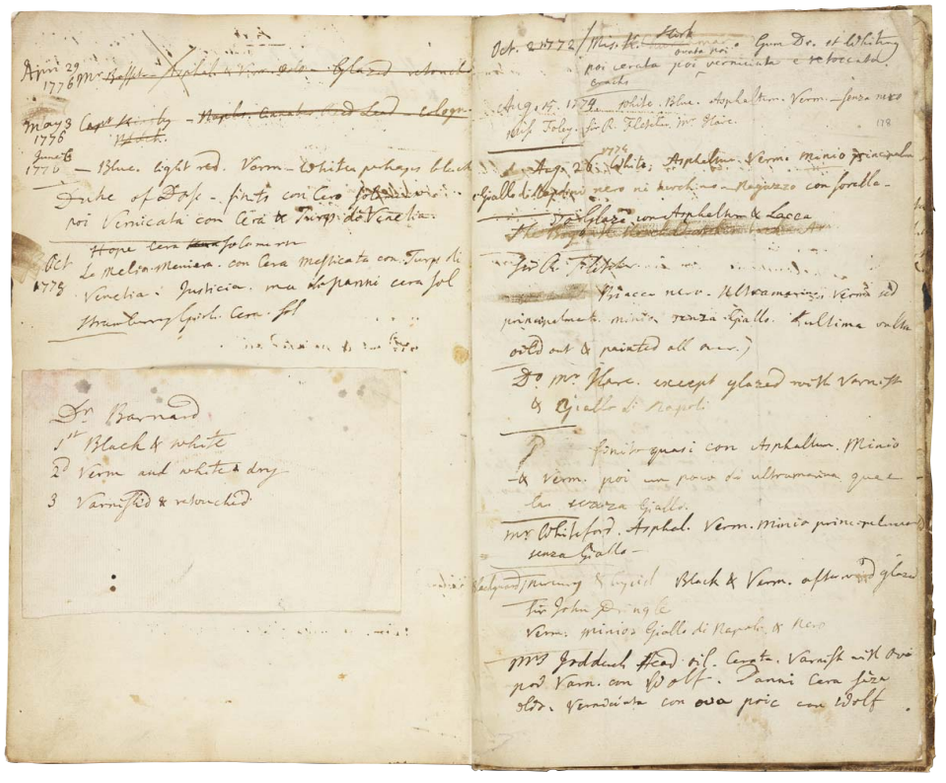
> there always stood two large gallipots of color, under water: one of a deeper, one of a lighter tinge, composed of vermilion and white . . . the durability of which, he however, afterwards doubted, and used in its stead the best he could find of English manufacture. . . . Yet, when he first saw it, after it was hung up in the Exhibition room at the Academy, he told me he felt much surprised, and a little temporary chagrin, to see its effect so much lessened from that which it had on his easel.[63]

Moving in a global entrepôt of far-flung, far-out industrialized colors purportedly embraced by the London art world during the Restoration, Reynolds was equipped neither with chemical knowledge nor the requisite critical consumerism.[64]

For some sympathetic commentators, Reynolds's flaking, fading works revealed the chasm separating his artistic aims from the capacities of mere pigments. Writing in the wake of the 1813 landmark exhibition *Pictures by the Late Sir Joshua Reynolds* mounted by the British Institution for Promoting the Fine Arts in the United Kingdom, painter Martin Archer Shee took a conciliatory stance. "The ambition of Reynolds," he claimed, "was to produce fine colouring, not fine colours. His was the chastened glow—the subdued splendor—the 'deep toned brilliancy of the ancients;' which he so elegantly recommends in theory, and so successfully illustrates in practice."[65] Artistic imagination and ambition, not durable industrial products, were the proper subject on show. As Shee put it: "The magnificent assemblage of his works so lately before the public, did not indeed . . . excite the idea of 'a chemist's window.'"[66] If readings like these might be imagined to pledge a precocious "dematerialization" of art, the accounts by intimates like Mason and Northcote also commensurately posit Reynolds as a naïf, a bumbler, a benighted victim of his chemical suppliers. Given "the fortuitous nature of his practice," Farington observed in this mood, Reynolds was effectively shooting in the dark: "Every picture was an experiment on some project of improvement suggested by his incessant endeavours to reach something yet unattained either by himself or others."[67] If Reynolds had succeeded through his dilettantish chemistry in forging what he called "sublime inventions," such a deflationary reading might conclude, that pictorial art had little to do with science.

Reynolds's Experiments and the Philosophy of Experiment

Was Joshua Reynolds really so naive in his approach to painting's material chemistry, so alienated from scientific



4 Joshua Reynolds, Ledger Book II, two pages showing recipes of Reynolds's paint compositions and techniques, ca. 1772–78. The Fitzwilliam Museum, Cambridge, MS 1.1916, vol. 2, fols. 177v–178r) (artwork in the public domain; photograph © The Fitzwilliam Museum, Cambridge)

practice? An instructively different view is offered by the anonymous author of the catalog to the British Institution's retrospective in 1813, when nearly one hundred fifty of Reynolds's works were put on show. Confronting the susceptibility of Reynolds's pictures to "destruction and deterioration," the British Institution's cataloger points, as William Mason and James Northcote had done, to the destitute state of pictorial art in early eighteenth-century Britain.[68] The president's enterprise "was not only slow and interrupted, but necessarily insecure; and his experiments not only unguided by any safe theory founded in previous experience, but constantly misguided by the false theories of others founded on bad practice, sanctioned by false taste and perverted fashion."[69] Given the artist's training in such a degraded artistic environment, this cataloger concludes, a viewer should be surprised not so much that Reynolds's pictures had lost their coloration and physical integrity but rather that so many had survived at all.

Thanks to that ignominious, Restoration legacy, the president had had to resort to extreme measures like "reverse engineering" specimens from his collection of old masters with powerful chemical solvents. Biographer Edmond Malone describes how Reynolds was so intent to "discover the methods used by the Venetian painters, that he destroyed some valuable ancient pictures by rubbing out the various layers of colour, in order to investigate and ascertain it."[70] As the British Institution catalog writer allows, Reynolds's trials also "failed in some instances of success, through want of sufficient regularity and attention in observing and recording the results."[71] Yet it was precisely by means of his acute perception and experimental commitment that Reynolds had passed beyond thresholds of time and space to access knowledge utterly incommensurable with the traditions in which he had been trained. There was, in short, a science to Reynolds's art. The cataloger puts it this way: "The only objects of comparison, which he could wish to rival or resemble were those, of past ages, to whose methods he was a stranger; and the recent effects of which he could only separate from the alterations of time, by the analogy of repeated experiments, verified by long observation."[72]

Two of these "experiments" by Reynolds were known to Charles Lock Eastlake when writing his pioneering history of painters' materials in the 1840s; one was acquired in 1878 by the Royal Academy of Arts, where it is currently titled *Studio Experiments in Colour and Media* (Fig. 5).[73] Paint in all its promiscuous potential is here on show. It clots together as clustered clumps of impasto at upper left, dribbles in parallel vertical veins at left and upper right, and fractures into a scalar web of crimson craquelure in the left-central swatch. As with his Fitzwilliam Ledgers, Reynolds has annotated these chromatic events as discrete trials conducted over time—frequently linking sample and text together with intercepting circles—all the while rotating the canvas to exploit the surface at different orientations. The encircled legend "White with Picard's [or Head's?] Varnish" issues from the ivory splotch at center, and a preparation with orpiment becomes legible as the object is rotated ninety degrees to read between the twin, rusty bands descending from the canvas's right upper edge. Even if this object does not rise to the level of notational clarity exemplified by a leading experimentalist in the arts of Reynolds's ken, such as Josiah Wedgwood, it nonetheless forces the question: If the president could be seen by near contemporaries as making chemical experiments and using those trials to draw inferences about the material causes of elusive, volatile phenomena, might his scientific credentials not warrant a more sympathetic consideration?[74]

Reynolds himself certainly gives much to support such a view. To the dismay of contemporaries like William Blake, he

5 Joshua Reynolds, *Studio Experiments in Colour and Media*, ca. 1770–ca. 1790? oil and other media on canvas, 24 × 20 in. (60.9 × 50.9 cm). Royal Academy of Arts, London (artwork in the public domain; photograph by Prudence Cuming Associates Limited © Royal Academy of Arts, London)

frequently cited the works of Francis Bacon, leading English exponent of seventeenth-century "new science," throughout his *Discourses*.[75] Whereas biographer Malone quotes a conversation between Reynolds and his friends Edmund Burke and Dr. Samuel Johnson comparing the ideal, emulative path of the artist to Lord Verulam's notoriously magpie ways, contacts to seventeenth-century experimentalism also ran in Reynolds's family.[76] The painter's great-grandfather was Thomas Baker (ca. 1625–1690), a mathematician affiliated with Oxford's Wadham College in the era of the English Civil War, when it became a leading center for experimental-philosophical activity under John Wilkins. Baker subsequently published *The geometrical key; or, The gate of equations unlock'd* (1684), an English/Latin algebraic text that he dedicated to Seth Ward and Joseph Williamson, then president of the Royal Society.[77] For his own part, Reynolds saw his artistic accomplishments as following principles congruous with the careers variously plotted for him by his father as an apothecary (where he would have been placed "with my wife's kinsman, Mr. Baker, of Bideford") or as a surgeon.[78] Whatever path he had taken, Northcote reported in 1771, "he should not have been obscure, for . . . it is his opinion that a man who makes a great advancement in any art or science would have done the same in any other if chance had thrown it in his way."[79]

Some of the most compelling links connecting Reynolds to scientific and technical culture in the early 1770s can indeed be found through Northcote himself. With their introduction brokered in 1771 by Reynolds's lifelong friend Dr. John Mudge (a neighbor of Northcote's family in Devonshire), the young apprentice wrote frequently to his elder brother Samuel Northcote, who, like their father, was a maker of watches and optical instruments in Plymouth.[80] These letters show James Northcote variously requisitioning metal casting,[81] fitting and shipping optical instruments,[82] and even commissioning a telescope from his brother for Reynolds to use at his new country house in Richmond.[83] Northcote clearly saw the technical expertise required for crafting precision optics as relevant to the production of experimental paint effects. Explaining to his brother how Reynolds "uses his colours with varnish of his own because the oils give the colours a dirty yellowness in time," Northcote lamented the procedure's consequence: "This <method> of his has an inconvenience full as bad which is that his pictures crack, sometimes before he had got them out of his hands." He then

posed a query for their father: "I should be glad if my father would let me know if he thinks it is oweing to the varnish, and if so the reason that varnish should crack sooner than oil."[84] A month later, the apprentice cast a skeptical eye on the preparations his brother had recommended: "The camphire will not do for painting because it only keeps the Varnish moist a longer time but when it drys as it will in time the consequences will be the same."[85] In the summer of 1772, Northcote then thanked his brother for passing along a now-lost varnishing technique, which he promised to attempt when "I am perfect enough to try experiments but as yet I know no more of varnishes than that the colour is apt to change and the paint to crack."[86]

Even if Northcote held but a lowly status in the atelier, Reynolds and his circles also recognized this commerce between knowledge inculcated by Plymouth's technical culture and that relevant to ambitious painting.[87] To Burke, the president avowed that his penchant for philosophical and painterly generalization had been formed through early contact with Mudge's father, the Rev. Zachariah Mudge.[88] These relationships were substantial and sustained. As Burke related to biographer Malone:

> I have seen Mr. Mudge the clergyman, at Sir Joshua's house. He was a learned and venerable old man; and as I thought, very conversant in the Platonic Philosophy, and very fond of that method of philosophizing. . . . Sir Joshua Reynolds had always a great love for the whole family, and took a great interest in whatever related to them.[89]

That family included Thomas Mudge, watchmaker and author of several treatises on the longitude problem, and, of course, Reynolds's childhood friend John.[90] A fellow of the Royal Society, John Mudge won the institution's Copley Prize in 1777 for a treatise on mixing metals to craft the parabolic mirrors required for Newtonian reflecting telescopes—a feat accomplished "in some measure by accident," as Mudge put it, when he discovered that forging scrap metal from church bells with tin yielded an alloy surprisingly free from the microscopic pores otherwise compromising image resolution.[91]

For his part, Burke was not only far from subscribing to the image of Reynolds as a hapless dilettante, but he cast his friend as a veritable exemplar of the taxonomic drive subtending Michel Foucault's classical episteme:

> He was a great generalizer, and was fond of reducing every thing to one system, more perhaps than the variety of principles which operate in the human mind and in every human work, will properly endure. But this disposition to abstractions, to generalizing and classification, is the great glory of the human mind, *that* indeed which most distinguishes men from other animals; and is the source of every thing that can be called science. I believe his early acquaintance with Mr. Mudge of Exeter, a very learned and thinking man, and much inclined to philosophize in the spirit of the Platonists, disposed him to this habit.[92]

If "science," defined primarily in the *Dictionary* (1755–56) of Reynolds's close friend Dr. Johnson, was the divine knowledge professed by the Rev. Mudge, Johnson also offered expanded conceptions; science could be "Art attained by precepts, or built on principles."[93] Indeed, the possibility that the president's "science" might have been informed both by Mudge *père* and by the interests in precision-crafted chronometric instruments espoused by the brothers Mudge is compellingly suggested by one of the painter's earliest publications. In the last of three essays he submitted to the *Idler* in 1759, Reynolds asserts that Nature aims to achieve "a fixed and determinate form" within each living creature. Despite his well-known reservations about painting's "mechanical" aspects, Reynolds elaborates this point by appealing to a telling model: "It may be compared to pendulums vibrating on different directions over one central point: and as they cross the centre, though only one pass through any other point, so it will be found that perfect beauty is oftener produced by nature than deformity."[94] Reynolds's timing for articulating this clockwork conception of the mechanism yielding aesthetic beauty may not have been entirely coincidental. In 1760, he was proposed as a "Gentleman of learning, a lover of Philosophical enquiries" and then elected fellow of the Royal Society of London in the following year.[95]

Moving amid this network of familial, social, and institutional contacts to experimental philosophy; possessing a keen propensity for the generalization underpinning "every thing that can be called science" while using leading mechanical models to conceptualize aesthetic problems; and deploying experimental trials to infer the chemical behavior of unknown, painterly preparations, Joshua Reynolds merits more robust consideration as an informed interlocutor with contemporaneous natural-philosophical concerns than existing scholarship has allowed. Prompted, then, by the Restoration contexts through which close affiliates interpreted the material substrate of his project, what might we learn of Reynolds's chemical experiments by placing them in dialogue with the pictorial chemistries cultivated in the early Royal Society of London?

As practitioners in the broader alchemical tradition had done, early Royal Society fellows took extensive interest in the chemistry of artists' pigments and materials.[96] In late 1667, founding Fellow Thomas Povey delivered a discourse to the Royal Society on "a secret in the use of painting," explaining his experiments with painter Robert Streeter, Dutch emigré artist Hendrik Danckerts, and Sir Robert Moray in developing a "powerful Salt" with which to improve egg tempera painting.[97] "The Juyce or Milk thereof so prevailes upon the Egge," Povey explains, "which in its own disposition is Viscous and ropy, that it becomes instantly thin and fluid, as water."[98] Son of painter Mary More and assistant to Robert Hooke, Richard Waller was also closely attuned to pigments' chemical composition when designing an ingenious color table in 1686—a tool that was to serve the Royal Society's far-flung contributors as a standard reference when making observations or writing histories of natural entities.[99] Philosopher William Petty's research into industrial dyeing practices, meanwhile, brought him into contact with chemical materials whose unstable properties could only be fixed through extremely complicated artisanal processes.[100] Petty detailed how brazilwood (*Caesalpinia sappan*), chopped, soaked in water, and combined with a few drops of acid, yields a volatile extract

> the colour of Canary-Sack; in which particular it agreeth with Cochineil. This colour soon staineth as may appear by the easie change which so small a quantity of acid liquor makes upon it. A drop of Spirit of Vitriol turneth the infusion of Brasil into a purplish violet-colour, even although it hath been made yellow before.[101]

Petty's aim was to disclose dyers' fixative processes, "infinite, and almost unteachable by words" though they were.[102] Other experimentalists took the visual and philosophical prospects of chemical volatility as worthy of consideration on their own terms. Around 1684, a Bristol customs officer named William Cole began communicating with experimental contacts in London and Oxford on his methods for producing colors from murex shellfish. Cole was convinced that his murex preparation would not only be able to rival the Tyrian purple used to dye the robes of ruling classes in Mediterranean antiquity but also could serve the imperial projects of Stuart monarchs Charles II and James II.[103] After sending to metropolitan interlocutors several swatches dyed in "the Prince's colour" and emblazoned with the motto of the Royal Society, Cole explained the preparation and evolution of his dye in the following, remarkable manner:

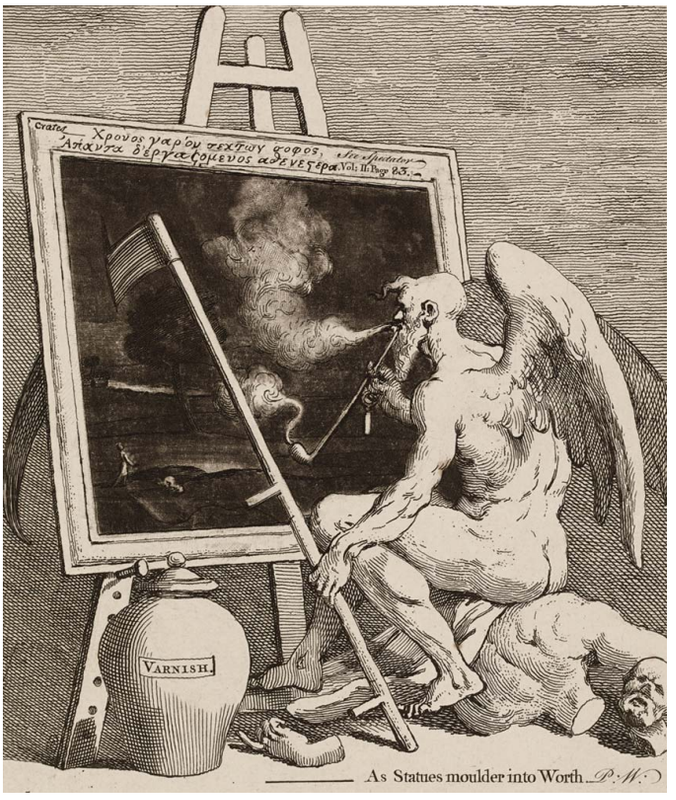
> When the sunn is gotten higher, ... [I] make a few lettres hastily and clap the clout in a booke whilest wett and white, then to take another clout, and lett the lettres dry soe as to become of a fine yellowish greene, then to carie out the next into the sunn and hold it till itt turnes of a faire deepe sea greene, and soe putt itt into the Booke, the next soe long in the sunn till itt be of a deepe watchett blew, the next untill itt be of a sullen purple, the last untill itt turne into a deep darke sanguine, and there twill rest untill washt in scalding water with soape, and then being presently dryed in the sunne will shew the bright and beautiful Tyrian purple.[104]

Where Robert Boyle was contemporaneously developing techniques of color response as indicators of chemical composition, Cole was watching a parade of colors produced in time by the photosensitive dye's exposure to sunlight. There he saw what he called "soe manie pleasant scenes."[105]

Cole's interest in the visual and philosophical dimensions of temporally evolving chemical preparations was richly shared among Restoration experimentalists. In 1665–66, Henry Oldenburg had published a paper in his fledgling *Philosophical Transactions* entitled "An Experiment of a Way of Preparing a Liquor, That Shall Sink into, and Colour the Whole Body of Marble, Causing a Picture, Drawn on a Surface, to Appear Also in the Inmost Parts of the Stone."[106] According to this recipe, sourced from the research of Jesuit polymath Athanasius Kircher, the image maker was to combine aqua fortis, aqua regia, sal ammoniac, and spirit of wine with silver and gold, paint the same design on a marble block over several days, and then cut the stone open to reveal the interpenetrated, liquid picture. Expanding on arguments of Lincean naturalist Francesco Stelluti in *Trattato del legno fossile minerale* (1637), Royal Society secretary Nehemiah Grew explained the formation of fossils in stone not from organic petrifaction but from the chemical exhalation of "Salts of Plants, or Animal Bodies, washed down with Rains, and lodged under ground ... in a colder place; and where therefore the Work not being done in a hurry, but more slowly, may be so much the more regular."[107] Grew imagined exceedingly slow chemical actions, carried down into the earth's clammy depths, that could form fossils, or what he called "Pictures ... in time petrify'd."[108] And while Hooke was modeling the behavior of comets by manipulating an iron-covered ball slowly evolving a tail of hydrogen gas bubbles suspended in a bath of diluted sulfuric acid, other Royal Society fellows in the later 1670s were marveling at the newly discovered phenomenon of artificial phosphorous.[109] In a particularly stunning application of that invention, fellows saw how inert phosphorous rubbed on the body of one experimentalist "made not only his own Face to shine, but the luster of his Face discovered three or four other faces not far distant."[110]

This, of course, is the very Restoration-era chemical heritage that Joseph Wright was reimagining and exhibiting in 1771 to such spectacular effect as *The Alchymist, in Search of the Philosopher's Stone, Discovers Phosphorous, and Prays for the Successful Conclusion of His Operation, as Was the Custom of the Ancient Chymical Astrologers* (Fig. 1). But what light might the early Royal Society's traditions of making and thinking with the visual possibilities of chemical materials that change in time shed on Reynolds and his approach to painterly experiment in the 1770s? First, we can note that the likelihood—often the desirability—of oil pictures to alter, evolve, or otherwise transform through aging was well known to Reynolds and his close associates. Studying Anthony Van Dyck's *The Ecstasy of Saint Augustine* (1628) when in Antwerp on his first trip to the Netherlands in 1781, Reynolds jotted in his notebook: "The colour must have suffer'd some change and is not now such as Vandyck left it. Van Dyck's eye was too good to leave a picture of this colour."[111] Fascinated by Netherlandish painting techniques and au courant with scholarship on their facture, Reynolds and his circle accumulated stories about the northern old masters' volatile works.[112] James Northcote recounts a tale told by an old woman who "well remembered, that, at the time when she sat to Vandyke, for her portrait, and saw his pictures in his gallery, they appeared to have a white and raw look, in comparison with the mellow and rich hue which we now see in them, and which time alone must have given to them, adding much to their excellence."[113] Northcote avowed a commensurate disappointment on his own first sight of Reynolds's pictures fresh off the easel. The apprentice was repulsed by "the sight of the raw, crude, fresh appearance of his new pictures, which ... seemed to me by no means equal to those I had before seen and so much admired."[114]

In a work Reynolds later credited as confirming his artistic vocation, early eighteenth-century theorist Jonathan Richardson had contrasted theater's "moving, speaking Pictures" with those made from unctuous pigments. Where theatrical performance was transient, "Painting remains, and is always at hand."[115] By the end of the century, Northcote was hardly alone in embracing pictorial change through an aesthetic of patina—preferring the chemical darkening of paintings caused by temporal oxidation—a taste contemporaneously satirized by Hogarth as Father Time blowing an inky, discoloring cloud of smoke on a



6 William Hogarth, *Time Smoking a Picture*, 1761, etched and engraved subscription ticket, image, 9¼ × 7¼ in. (23.5 × 18.4 cm); sheet, 9⅞ × 8¼ in. (25.1 × 20.8 cm) (artwork in the public domain; photograph © The Trustees of the British Museum)

recently finished canvas (Fig. 6).[116] Yet seen in light of Restoration experiments with temporally evolving chemical images, Reynolds's volatile works might also support a more expansive reading if we take into consideration the range of philosophical responses garnered by their material vicissitudes. That is, a well-worked trope in the period posited an isomorphism between Reynolds's dynamic, pigmented objects and the visages of his sitters.[117] Reynolds, as one wit put it, "'paints so very naturally that his colours fade as fast as those in the natural face.'"[118] Walpole described Reynolds's fugitive pigments as betraying an equally telling hold on their target of depiction: "Of the Duke of Cumberland by Reynolds, the colours . . . are as much changed as the original is to the proprietor."[119] According to a celebrated legend recounted by J. T. Smith along these lines, an Irish aristocrat sat for Reynolds early in life and then departed for the Continent. There "he ran into excesses, became bilious, and returned to Ireland with a shattered constitution. He then found that the portrait and original had faded together, and corresponded, perhaps, as well as when first painted."[120] Certainly, it is true that variations on this homology between the transient material being of sitter and painting were often mustered to critique the president's work. But, as the seventeenth-century experimentalists had done, these responses indicate contemporaries' capacity to reflect on Reynolds's unstable chemical facture, to meditate on its complex semantic possibilities.

Chrysopoeia, Commerce, Conjuration

In his influential writings on political economy, Nicolas Barbon, physician and premier property developer of late seventeenth-century London, targeted alchemists as operating under a grave misunderstanding of value. What would happen to those adepts "searching after the *Philosopher's Stone*," Barbon queried,

> if they should at last happen to find it? For, if they should make but so great a Quantity of Gold and Silver, as they, and their Predecessors have spent in search after it, it would so alter, and bring down the Price of those Metals, that it might be a Question, whether they would get so much *Over-plus* by it, as would pay for the Metal they changed into Gold and Silver.[121]

Taking gold's value to inhere in the material itself, a practitioner who had actually been able to transmute base metals successfully would only thereby find the precious product devalued by its very profusion. The alchemist's error taught a lesson crucial to the rapidly changing *Umwelt* of Enlightenment Britain amid a "consumer revolution" that recent historians have seen preceding and propelling the classical Industrial Revolution.[122] As Barbon put it: "Nothing in it self hath a certain Value; One thing is as much worth as another: And it is time, and place, that give a difference to the Value of all things."[123]

Targeting their wares at broadening swaths of urban consumers who purchased goods in pursuit of fashions that fluctuated at ever greater frequency but with diminishing duration, British industrialists effectively manufactured this world of finite, differentiated temporalities. Adam Smith trenchantly surveyed such an ephemeral landscape in *The Theory of Moral Sentiments* (1759):

> Cloaths and furniture are not made of very durable materials. A well-fancied coat is done in a twelve month, and cannot continue longer to propagate, as the fashion, that form according to which it was made. The modes of furniture change less rapidly than those of dress; because furniture is commonly more durable. In five, or six years, however, it generally undergoes an entire revolution.[124]

If Smith allowed that music and poetry might endure substantially longer, those arts of taste were nonetheless subject to fashions and customs no less conventional than the wildest fripperies.[125] How, then, was value to be assayed amid this built environment of calculated obsolescence?

Questions like these were asked by Reynolds and his patrons alike. In a celebrated episode, Reynolds's supporter Sir George Beaumont confronted patron Oldfield Bowles, who was then assessing the field of candidates for painting his daughter's portrait. Having heard tell of the president's fugitive pictures, Bowles was prepared to pass the commission to Reynolds's rival George Romney. "No matter, take the chance," Beaumont countered, "even a faded picture from Reynolds will be the finest thing you can have."[126] In a crucial article, economic historian Neil De Marchi and historian of art Hans J. Van Miegroet have used calculations like this to draw suggestive links between Reynolds's practice and

Smith's political economy. Far from being some irksome flaw in his pictures, they propose, the potential for ongoing, unexpected change might more productively be seen as a kind of calculated risk hedged by Reynolds and his clients alike. As De Marchi and Van Miegroet put it: "Even if only 10 or 20 percent of Reynolds's pictures cracked badly, lost paint, or faded . . . would-be buyers were necessarily entering into a wager when purchasing a picture by him."[127] Instead of purchasing a reliably crafted, durable object that would (in the words of Richardson) make the sitter "never die, never decay, or grow older," Reynolds's chemical experiments could be attractive to an elite client precisely because they offered risky, high-stakes gambles. Commissioning a Reynolds—even one that ultimately faded—distinguished those at the apex of London's luxury market, which the president vigorously pursued and effectively commanded for nearly four decades, from a patron of the ascendant "middling sort" by his or her willingness to take a chance on greatness. Critical of the fact though he was, Walpole underscored this fundamental difference as he outlined how Reynolds's unstable pictures required a discrete model of artistic remuneration. "If Sir Joshua is satisfied with his own departed pictures," Walpole observed, "it is more than the possessors or posterity will be. I think he ought to be paid in annuities only for so long as his pictures last. One should not grudge him the first fruits."[128]

Negotiating this unstable alloy of painting as emulative imitation and arresting novelty, as timeless art and risky event, as commanding gold's longevity and its debasing commercial value: these, I think, are the challenges Reynolds takes on through the alchemical penumbra that is his *Discourse VI* of 1774. On the one hand, the "nice chymistry" by which he envisions the painter transmuting existing pictorial slag into artistic gold is an act of studious, rational intent: "He will pick up from dunghills what by a nice chymistry, passing through his own mind, shall be converted into pure gold; and, under the rudeness of Gothick essays, he will find original, rational, and even sublime inventions."[129] Contesting the doctrine of untutored genius and the tendency of "those who are unacquainted with the *cause* of any thing extraordinary, to be astonished at the *effect*, and to consider it as a kind of magick," the president outlines a chemical method by which an artist can select and carefully mix existing elements, while still deriving a composite with novel, valuable properties.[130] "The fire of the artist's own genius operating upon these materials which have been thus diligently collected," as he puts it, "will enable him to make new combinations, perhaps, superior to what had ever before been in the possession of the art."[131] Art is Art because its innovative, dazzling effects are nonetheless produced by intended causes, inaccessible and mystified though those may appear to an ignorant public. Able to speak to the mind and not merely the senses, this art could potentially be taught.

Yet, as Wright of Derby had done when depicting phosphorous's unintended discovery, Reynolds also models artistic invention as chemical accident. Appealing to a legend he likely knew from Pliny, he explains the creation of pictorial novelty from miscellaneous dross to the chance mixture by which various "metals . . . are said to have been melted and run together at the burning of Corinth" in 146 BCE.[132] Artistic innovation, then, is an intentional, teachable science founded on studiously assembled precedents and guided by trained, mental chemistry toward the production of lasting value. But it also unfolds by felicitous accidents that emerge as the artist collaborates with and profits from unexpected material happenstance.[133] "A painter should have two pictures in hand . . . and should work on them alternately," so Reynolds apparently told Northcote, "by which means, if chance produced a lucky hit, as it often does, then instead of working upon the same piece, and perhaps by that means destroy the beauty which chance had given, he should go on to the other and improve upon that."[134]

That Reynolds would attempt to grapple with the crucial problem of how to produce modern, artistic inventions capable of holding enduring value through ancient transmutation of metals suggests he may have been far better versed than has been supposed in long-standing traditions privileging the chemical arts with the ability to change—even perfect—nature, not simply to imitate her.[135] Although sustained exposition of that alchemical context within Reynolds's ambit is a task that awaits twenty-first-century scholarship, it is essential to note that those undercurrents were quickly recognized by the president's audiences. Following Reynolds's death in 1792, his chemical language would resurface in obituaries trumpeting his ability to transform and idealize contemporary sitters. Beset by women desiring to see themselves "transmitted like Angels, and men who would be habited like Heroes," proclaimed the *General Evening Post*, ". . . the apotheosis was the simple operation of the painter's mind, glowing with grandeur and with grace." Once fired by those mental operations into spectacular, pictorial visions, such sitters often found the spell of their chemical transformation to be only temporary. "We have perpetually lamented," this obituary observed, "that what is technically called the *Vehicle* should have led him to chemic experiments, which, whatever brilliancy they may lend his colours for the present day, certainly will add to the fading powers of time upon the finest tints."[136]

In the immediate wake of his 1774 *Discourse*, however, Reynolds and his chemical commitments garnered more direct, critical exposition. Less than five months after *Discourse VI* was read, Irish painter Nathaniel Hone (1718–1784) submitted *The Pictorial Conjuror, Displaying the Whole Art of Optical Deception* to the Royal Academy's 1775 summer exhibition (Fig. 7). Perched on the rim of a terrestrial globe, an owl gazes outward from the inky darkness at upper right. Turning from this winged companion and the profile of St. Paul's Cathedral visible beyond the massy columns at left, a bearded figure sits cloaked in crimson housecoat and fur-lined vest, a hexagram pendant dangling from his neck. Identifiable to contemporary viewers as George White, one of Reynolds's favored models, this would-be conjuror grasps a page of the massive volume at lower right as a young girl looks on, her crossed arms folded into the old man's lap. The action of the picture, contrasting with this dense, corporeal darkness of fur, hair, and leather, is organized around the elegant flick of illuminated wrist with which the conjuror wields his wand. Down that slim, diagonal span our eyes are directed, drawn in by an arch inscribed with zodiacal symbols, to the site of combustion at extreme lower left. There, fire leaps forth as though under order from the

7 Nathaniel Hone I, *The Conjuror*, 1775, oil on canvas, 57⅛ × 68⅛ in. (145 × 173 cm). National Gallery of Ireland, Dublin (artwork in the public domain; photograph © National Gallery of Ireland)

conjuror's wooden wand, consuming a cascade of copperplate prints after old master pictures.

An erudite, modern literature has cataloged the complex array of artistic appropriations and thefts with which Hone's satire saddles Reynolds.[137] Period viewers were no less savvy. According to "A Lover of Wit" commenting in London's *Public Advertiser* in May 1775, the picture was not a lampoon but a compliment to the president: "The Conjuror, therefore, which represents Sir Joshua Reynolds, is supposed to be attracting by his Magic Wand, the various Excellencies which are dispersed in the various Works of other Masters." Displaying a keen reading of Reynolds's sixth *Discourse*, this wit continues, Hone had rendered concrete the "Fire of Genius with which his Works are animated, and which is considered (as the President has observed) by those who see not the Means by which Art is accomplished as miraculous, the Effect of supernatural Powers, Witchcraft, Conjuration, or whatever you will please to call it."[138] Although allowing that Hone was frustrated in his commercial interests by Reynolds's domination of the London art market, *The Conjuror* is thus read as a complex metapictorial argument. Not only does it allegorize the emulative strategies Reynolds had recommended to the Royal Academy five months earlier, but it also makes light of the vulgar error critiqued by the president himself of mistaking artistic skill for magic. Farington outlined a more direct interpretation: "The principal figure in the composition was supposed to be a wizard who had discovered by his skill in the black art there proofs of Sir Joshua's plagiarism."[139]

Whether understood as visualizing a ready misapprehension of Reynolds's model of "grand manner" emulation or exposing the cynical, money-grubbing ends of the president's self-proclaimed pictorial chrysopoeia, Hone's picture mobilizes a rich ambit of alchemical ideas and visual tropes current in the early 1770s.[140] Like Wright's *Alchymist*, Hone depicts his conjuror as an elder adept at work with arts of fire in a sinister space surrounded by the apparatus of inscrutable learning and a youthful entourage. Moreover, as Johan Zoffany would do when portraying Reynolds's friend David Garrick in 1770 as Abel Drugger—a painting that Reynolds actually owned (Fig. 8)—in Ben Jonson's *The Alchymist*, which the actor had reprised for decades on the London stage, Hone equally places his practitioner in a darkened interior surrounded by voluminous writings, globes, and nocturnal winged creatures.[141] That period viewers could connect this alchemical penumbra of Hone's painting to Reynolds's chemically unstable paint experiments is clearly evident in a ludic lament from the decade to come. "It is a pity," so one wag claimed in 1785, "the pencil of Sir *Joshua Reynolds* does not possess an equal power of *magic* with that of *Hone's Conjuror!*—he might else do something to remove a *spell* which will be fatal to his reputation ages hence." In this view, Hone's critique of the president's silver-tongued, underhanded ability to mint money by lifting from old masters would endure long after "the objects of the ridicule are lost in that general confusion of tints, which the progress of a few years only, occasion in Sir Joshua's works!"[142]

More needs to be said about the agency of alchemy at Enlightenment Britain's intersection of commerce, high art, and the species of foreseeable obsolescence manifested by Reynolds's work. However, the crucial point to underscore is that, bemoaned though it may have been by clients seeking stable, durable works, the vogue for chemical experimentation ushered into British practice by Reynolds quickly became a norm rather than an exception. "With the foundation of the Royal Academy Schools, which eschewed formal teaching of technique," Rica Jones has observed, "the traditions of studio training largely disappeared. As a result many painters outdid Reynolds in technical disasters."[143] Certainly,

the reclamation of ancient encaustic painting encouraged by the comte de Caylus in the 1750s and the fascination with experimental facture among French artists active in Rome, including Anne-Louis Girodet, serve to underscore that these developments were hardly peculiar to the British.[144] Nonetheless, recent scholarship is now allowing us to grasp an evolving cult of "magilphs and mysteries" in the Anglo-American ambit of Joshua Reynolds and Benjamin West, his successor as president of the Royal Academy.[145] From forays into the "chemo-mechanical" replication of oil paintings to abstruse entanglements with the Masonic meanings of paint preparations, this fevered appetite for recherché techniques surfaced spectacularly in the episode of the late 1790s known as "the Venetian Secret."[146] Therein, West and other leading academicians fell victim to an ignominious hoax perpetrated by confidence artists peddling a fraudulent manuscript purporting to contain Titian's long-lost secrets of glazing.[147] Thus, if critics around 1800 could complain of the "infinite resources of chemistry" to divert the mixed, urban audiences for popular science with the trifling spectacles of "a small bit of potassium thrown in a glass of water, or upon a piece of ice," we need to better understand how those scintillating, dazzling, temporally evolving chemical techniques had already come to be embedded in the theory and facture of painting itself.[148]

Resisting Ruin

In the late 1840s, when Joshua Reynolds's slippery methods were earning him the epithet "Sir Sloshua" among a Pre-Raphaelite vanguard, future Royal Academy president Charles Lock Eastlake put the problem to systematic inquiry.[149] Acknowledging the superior patience of painters in sixteenth-century Venice and seventeenth-century Netherlands when performing "operations which were calculated to insure the durability of their productions," Eastlake's monumental study of painters' materials contended that Reynolds and "his experiments were not, as has been sometimes supposed, entirely novel." By synthesizing Netherlandish and Italianate painterly traditions, Reynolds could in fact be seen to have realized in material practice that precarious alloy of eclectic traditions he prescribed to the aspiring artistic adept in his *Discourse VI*. "The method of Reynolds," Eastlake concludes, "... presents a judicious and generally successful union of the Italian and Flemish practice; inclining, on the whole, to the latter."[150]

Others in Eastlake's ken took a different view. With plans afoot for the founding of Scotland's National Gallery in the late 1850s, Francis Charteris, Lord Elcho, penned a strongly worded letter warning *against* acquiring pictures by Sir Joshua.[151] "I think it would be a bad investment unless you are flush of money," Elcho wrote of a pending purchase: "For 5 or 600 pounds you get such a lot of good pictures by looking out amongst the London sales and dealers. Certainly you ought to get three good Italian pictures for the money."[152] To preempt such an acquisition while reinforcing his point, Elcho also donated to the nascent gallery a startling portrait of London financier James Coutts begun and then apparently abandoned by Reynolds in the early 1770s (Fig. 9). Brother to the head of an important London bank and counselor to George III whose interests had expanded exponentially through the British imperial victories over the French in the Seven Years' War (1756–63), Coutts sat for several portraits by Reynolds, and the two men mingled personal and professional relations.[153]

8 Johann Zoffany, *David Garrick with William Burton and John Palmer in "The Alchemist" by Ben Jonson*, 1770, oil on canvas, 41 × 39 in. (104 × 99 cm). Private collection (artwork in the public domain; photograph © Bridgeman Art Library)

If it amply exemplifies what Elcho then called Reynolds's "mode of trialing a head and his style of painting," the picture is extraordinary. Painted on the unusual period support of unprimed mahogany, likely sourced from the Caribbean, the portrait has been sketched in (possibly during a single sitting) with coarse black outlines visible at the right shoulder, neck, and above the crown of illuminated forehead.[154] Reynolds used his then-characteristic, initial campaign of ivory black, lead white, and red lake to block in the face and to scumble the wisps of hair up from the turgid, gray mud of paint film framing the head. With a second, thicker campaign—its inception almost visible as a purplish, vertical scar strafing the left cheek—Reynolds built a fleshy geography of nostril, lip, and chin, even allowing the mahogany to read through as a kind of dead coloring along the side of the nose. But the panel is a complete wreck. Massive flakes tear through the forehead, eye, and cheeks, piercing the ear visible to us and tattering the sitter's ivory cravat. Although the precise condition of the picture when donated in 1859 is unknowable, Lord Elcho clearly intended it to teach a moral lesson as much about the mission of the new gallery as about the superiority of Florentine *disegno* to the fugitive, Venetian *colorito* that had so seduced Reynolds. "The National Gallery should be a school for art," Elcho claimed, "as well as an exhibition. Sir Joshua is the *worst* model one can place before a student. For, with all his extraordinary beauties and power, he has *ruined* the English School by his loose careless painting and inaccurate drawing."[155]

Elcho's moral outrage and shrewd calculations are compelling if we imagine Reynolds's work as committed to

9 Joshua Reynolds, *Portrait of James Coutts*, ca. 1771, oil on mahogany panel, 29 × 24 in. (73.7 × 61 cm). Scottish National Gallery, Edinburgh (artwork in the public domain; photograph © Scottish National Gallery)

producing timeless pictures—a view itself amply supported through the *Discourses*. Yet the president's experimental, chemical facture, its period response, and the unstable theoretical terms in which Reynolds attempted to grapple with that enterprise suggest other possibilities. Guided by the shadow of post-Restoration painting's troubled history that key interpreters saw cast across his canvases, I have placed Reynolds's project within literary, familial, and institutional circuits of British experimentalism that had cultivated a robust tradition of making and thinking with the visual possibilities of chemical preparations that change in time. Timeless pictures made by rational, chemical mixture, Reynolds's works could also be understood as temporally evolving chemical objects. Seen in that way, it is beside the point to protest that Reynolds could never have intended the effects of age in the Coutts panel that we see now (or that Elcho might have observed in the 1850s), for that unpredictable interface between intent and accident had, as it were, already been made fundamental to the "nice chymistry" he theorizes. And yet, although the painter envisioned through chrysopoeia an emulation-based artistic practice informed by both the studied, rational action of a maker and the potential for unanticipated properties to body forth from felicitous encounters with dynamic materials, Reynolds's chymistry was also quickly cast as a flashy cheat redolent of his own money-hungry cunning. Tellingly, that risky mixture of picture and unstable object—of action and accident, valuable novelty and cloudy theft—forged at the interface of artist and materials is aptly anticipated by Reynolds himself in a juvenile borrowing from Alexander Pope. "The gay Colouring which Fancy gave at the first transient glance we had of it," he writes, "goes off in the Execution; like those various figures in the gilded clouds, which we gaze long upon, to separate the parts of each imaginary Image, the whole faints before the Eye and decays into confusion."[156]

Matthew C. Hunter is author of Wicked Intelligence: Visual Art and the Science of Experiment in Restoration London *(Chicago, 2013), an editor of* Grey Room, *and assistant professor at McGill University [Department of Art History and Communication Studies, McGill University, 853 Sherbrooke Street West, Montreal, QC, H3A 0G5, Canada, matthew.hunter3@mcgill.ca].*

Notes

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1. See Benedict Nicholson, *Joseph Wright of Derby: Painter of Light* (London: Routledge and Kegan Paul, 1968), vol. 1, 3.
2. On the chronology of research on phosphorous, see Jan Golinski, "A Noble Spectacle: Phosphorous and the Public Cultures of Science in the Early Royal Society," *Isis* 80, no. 1 (1989): 11–39.
3. For the detailed description and sketch of an alchemical laboratory that Burdett apparently made for Wright's painting, see Judy Egerton, *Wright of Derby* (London: Tate, 1990), 84–88. For a concise overview of alchemical iconography, see Lawrence Principe and Lloyd DeWitt, *Transmutations—Alchemy in Art: Selected Works from the Eddleman and Fisher Collections at the Chemical Heritage Foundation* (Philadelphia: Chemical Heritage Foundation, 2002).
4. See Martin Hopkinson, "Printmaking and Print Collectors in the North West 1760–1800," in *Joseph Wright of Derby in Liverpool*, ed. Elizabeth E. Barker and Alex Kidson (New Haven: Yale University Press, 2007), 85–103. For a further account of Burdett's various aquatint processes, see idem, "Burdett, Wedgwood and Bentley," *Print Quarterly* 25, no. 2 (June 2008): 132–46.
5. Quoted in Nicholson, *Joseph Wright*, vol. 1, 17–18.
6. David Fraser, "Joseph Wright of Derby and the Lunar Society: An Essay on the Artist's Connections with Science and Industry," in Egerton, *Wright of Derby*, 15–23; Jenny Uglow, *The Lunar Men: Five Friends Whose Curiosity Changed the World* (New York: Farrar, Strauss and Giroux, 2002); and Rica Jones, "Wright of Derby's Techniques of Painting," in Egerton, *Wright of Derby*, 263–71. Matthew Hargraves has also saliently pointed out to me the potential significance of the development of these chemical practices in the Society of Artists of Great Britain, an institution that (unlike the Royal Academy of Arts) offered pedagogy in chemistry and artists' pigments from the early 1770s; see Hargraves, *"Candidates for Fame": The Society of Artists of Great Britain, 1760–1791* (New Haven: Yale University Press, 2005), esp. 102–3.
7. See, for example, M. Kirby Talley, "'All Good Pictures Crack': Sir Joshua Reynolds's Practice and Studio," in *Reynolds*, ed. Nicholas Penny (New York: Harry N. Abrams, 1986), 55–70; Hélène Dubois, "'Use a Little Wax with Your Colours, but Don't Tell Anybody': Joshua Reynolds's Painting Experiments with Wax and His Sources," *Hamilton Kerr Institute Bulletin* 3 (2000): 97–106; Rachel Morrison, "Mastic and Megilp in Reynolds's *Lord Heathfield of Gibraltar*: A Challenge for Conservation," *National Gallery Technical Bulletin* 31 (2010): 112–28; and Helen Brett et al., "'I Can See No Vermilion in Flesh': Sir Joshua Reynolds' Portrait of *Francis Beckford* and *Suzanna Beckford*, 1755–1756," in *Studying Old Master Paintings: Technology and Practice*, ed. Marika Spring et al. (London: Archetype, 2011), 201–8.
8. Joyce Townsend, technical report, August 1998, conservation file of Tate Gallery, acc. no. 4505.
9. For this picture, see David Mannings and Martin Postle, *Sir Joshua Reynolds: A Complete Catalogue of His Paintings* (New Haven: Yale University Press, 2000), 485–86.
10. "Report before Cleaning," November 1947, conservation file of Tate Gallery, acc. no. 5750.
11. "Report on the Cleaning," January–February 1948, conservation file of Tate Gallery, acc. no. 5750. On the supposed frailties of Reynolds's drawing, see Luke Hermann, "The Drawings by Sir Joshua Reynolds in the Herschel Album," *Burlington Magazine* 110 (1968): 650–58.
12. Technical report, November 11, 1994, conservation file of Huntington Art Gallery, San Marino, Calif., acc. no. 44.108.
13. For this characterization, see Talley, "'All Good Pictures Crack,'" 55.
14. Louis Simond, *Journal of a Tour and Residence in Great Britain during the Years 1810 and 1811: Second Edition* (Edinburgh: J. Ballantyne, 1817), vol. 1, 49.
15. William Mason, "Anecdotes of Sir Joshua Reynolds, Chiefly Relating to His Manner of Coloring," in *Sir Joshua Reynolds' Notes and Observations on Pictures*, ed. W. Cotton (London: J. R. Smith, 1859), 54. Among numerous chemical tests of pigments' purity that Mason and Reynolds could have known, Robert Dossie (a leading chemist active in London's Society for the Encouragement of Arts, Manufactures and Commerce) quotes the following trial for vermilion in his influential *The Handmaid to the Arts*: "'Take a small, but known quantity of the vermillion suspected to be adulterated, and put it into a crucible, having first mixed with it about the same quantity, in bulk, of charcoal dust; put the crucible into a common fire . . . the crucible, being taken out of the fire, should be well shaken, by striking it against the ground. If the suspected adulteration has been practiced, the lead will be found reduced to its metalline state in the bottom of the crucible, and being weighed and compared with the quantity of cinnabar that was put into the crucible, the proportion of the adulteration may be thence certainly known'"; Dossie, *The Handmaid to the Arts* (London: Printed for J. Nourse, 1764), 47. On Dossie, see F. W. Gibbs, "Robert Dossie (1717–1777) and the Society of Arts," *Annals of Science* 7, no. 2 (1951): 149–72.
16. James Northcote, *The Life of Sir Joshua Reynolds*, 2 vols. (London: Henry Colburn, 1810), vol. 1, 5. For more on the relationship between Reynolds and Rennell, see Donato Esposito et al., *Sir Joshua Reynolds: The Acquisition of Genius* (Bristol: Sansom, 2009), 18. Interestingly, when relaying to his brother techniques he had learned in Reynolds's studio, apprentice James Northcote instructed his sibling, "I would not have you mention to Rennell any thing of what I have said concerning Sir Joshua"; James Northcote to Samuel Northcote, September 21, 1771, Royal Academy of Arts, London (hereafter RAA), MS NOR 5, [fol. i r]. For a salutary reminder of the complexity and generic conventions of eighteenth-century artists' biographies, see Karen Junod, *"Writing the Lives of Painters": Biography and Artistic Identity in Britain 1760–1810* (New York: Oxford University Press, 2011).
17. Joseph Farington, "Memoirs of the Life of Sir Joshua Reynolds with Observations on His Talents and Character," in *The Literary Works of Sir Joshua Reynolds: Fifth Edition*, by Joshua Reynolds, ed. E. Malone, 3 vols. (London: T. Cadell and W. Davies, 1819), vol. 1, ccix.
18. Joshua Reynolds to Sir William Forbes, August 6, 1779, in *The Letters of Sir Joshua Reynolds*, by Joshua Reynolds, ed. John Ingamells and John Edgcumbe (New Haven: Yale University Press, 2000), 84. The portrait by Reynolds in question depicts James Hay, 15th Earl of Erroll (1762, private collection), which had hung at Slains Castle in Aberdeenshire; see Mannings and Postle, *Sir Joshua Reynolds: A Complete Catalogue*, 249.
19. Northcote, *The Life of Sir Joshua Reynolds*, vol. 2, 21.
20. *Discourse VI* was read as a lecture on December 10, 1774, and then sold by the Royal Academy's bookseller in the following year as *A discourse delivered to the students of the Royal Academy, on the distribution of the prizes, Dec. the 10th, 1774: By the president* (London: Thomas Davies, 1775). All references to the *Discourses* are from the standard, modern edition: Joshua Reynolds, *Discourses on Art*, ed. Robert W. Wark (New Haven: Yale University Press, 1997).
21. Reynolds, *Discourse VI*, 106. Classic studies of Reynolds's emulative practice include Edgar Wind, *Hume and the Heroic Portrait*, ed. Jaynie Anderson (New York: Oxford University Press, 1986); and E. H. Gombrich, "Reynolds's Theory and Practice of Imitation," *Burlington Magazine* 80, no. 467 (February 1942): 40–45.
22. Reynolds, *Discourse VI*, 107.
23. Richard Wendorf, *Sir Joshua Reynolds: The Painter in Society* (London: National Gallery, 1996); and David H. Solkin, "Great Pictures or Great Men? Reynolds, Male Portraiture, and the Power of Art," *Oxford Art Journal* 9, no. 2 (1986): 42–49.
24. John Barrell, *The Political Theory of Painting from Reynolds to Hazlitt: "The Body of the Public"* (New Haven: Yale University Press, 1986), 80. Of Reynolds's thought more broadly, Robert R. Wark has written: "The *Discourses* are considered one of the most eloquent, as well as one of the last presentations of ideas that dominated European art criticism from the mid-fifteenth to the mid-eighteenth century"; Wark, introduction to Reynolds, *Discourses on Art*, xxi.
25. See Maurice Crosland, "The Image of Science as a Threat: Burke versus Priestley and the 'Philosophic Revolution,'" *British Journal for the History of Science* 20, no. 3 (July 1987): 277–307.
26. Important exceptions to this tendency include Mark Hallett, "Reynolds, Celebrity, and the Exhibition Space," in *Joshua Reynolds: The Creation of Celebrity*, ed. Martin Postle (London: Tate, 2005), 34–47; and especially Neil De Marchi and Hans J. Van Miegroet, "Ingenuity, Preference, and the Pricing of Pictures: The Smith-Reynolds Connection," in *Economic Engagements with Art*, ed. De Marchi and Craufurd D. W. Goodwin (Durham, N.C.: Duke University Press, 1999), 379–412.
27. Martin Kemp, "True to Their Natures: Sir Joshua Reynolds and Dr. William Hunter at the Royal Academy of Arts," *Notes and Records of the Royal Society of London* 46, no. 1 (January 1992): 77–88, at 78. For the classic statement of the "two cultures" story, see C. P. Snow, *The Two Cultures and the Scientific Revolution* (New York: Cambridge University Press, 1959), 1–22.
28. See William R. Newman and Lawrence M. Principe, "Alchemy v. Chemistry: The Etymological Origins of a Historiographic Mistake," *Early Science and Medicine* 3, no. 1 (1998): 32–65; and Bruce T. Moran, *Distilling Knowledge:*

Alchemy, Chemistry and the Scientific Revolution (Cambridge, Mass.: Harvard University Press, 2005), esp. 119–24. The differentiation of chemical domains described by Newman and Principe answers well to linguistic usage in Reynolds's immediate circles. In his *Dictionary*, Dr. Samuel Johnson defined "Alchymy" as "the more sublime and occult part of chymistry, which proposes for its object, the transmutation of metals, and other important operations." Citing the work of Herman Boerhaave, meanwhile, Johnson gives "Chymistry" as "an art whereby sensible bodies contained in vessels, or capable of being contained therein, are so changed, by means of certain instruments, and principally fire, that their several powers and virtues are thereby discovered, with a view to philosophy, or medicine"; Johnson, *A Dictionary of the English Language: Second Edition* (London: W. Strahan et al., 1755–56), vol. 1, n.p.

29. A note is warranted on the term "science" (and its derivatives) as used here. As historian of science Steven Shapin has influentially argued, science (from the Latin *scientia*) in early modern Europe denoted the knowledge of necessary universal truths taught in universities, while the often extramural, empirical inquiries into natural particulars were typically referred to as "natural philosophy" or "natural history." Labeling practitioners in the latter domains with the nineteenth-century term "scientist" is thus anachronistic. However, I follow the dominant trend of recent historiography of science (including Shapin himself) in using the term in a broad, ecumenical sense; where specific meanings of the term are important, I aim to situate them by appealing to sources in Reynolds's immediate historical context. On this approach, compare Shapin, *The Scientific Revolution* (Chicago: University of Chicago Press, 1996), esp. 5–8; and Deborah E. Harkness, "A Note about 'Science,'" in *The Jewel House: Elizabethan London and the Scientific Revolution* (New Haven: Yale University Press, 2007), xv–xviii.

30. For recent scholarship advocating this reconciliation, see, for example, Michael Yonan, "Toward a Fusion of Art History and Material Culture Studies," *West 86th* 18, no. 2 (2011): 232–48; and "The Clever Object," ed. Matthew C. Hunter and Francesco Lucchini, special issue, *Art History* 36, no. 2 (May 2013): 478–676.

31. Michael Baxandall, *The Limewood Sculptors of Renaissance Germany* (New Haven: Yale University Press, 1982), 36.

32. De Marchi and Van Miegroet, "Ingenuity," 386.

33. A useful overview is William H. Brock, *The Fontana History of Chemistry* (London: Fontana, 1992), esp. 84–127. More broadly, see Jan Golinski, *Science as Public Culture: Chemistry and Enlightenment in Britain, 1760–1820* (New York: Cambridge University Press, 1992); and Archibald Clow and Nan L. Clow, *The Chemical Revolution: A Contribution to Social Technology* (London: Batchworth, 1952).

34. For the claim that "during the early years of the eighteenth century there was little evidence of any general interest in chemistry—the most fundamental science of the industrial arts," see Gibbs, "Robert Dossie," 149. On the Scottish tradition of chemical theory, see Arthur L. Donovan, *Philosophical Chemistry in the Scottish Enlightenment: The Doctrines and Discoveries of William Cullen and Joseph Black* (Edinburgh: Edinburgh University Press, 1975).

35. For this proposed list from November 17, 1758, see Royal Society of Arts, London (hereafter RSA), MS RSA/AD/MA/104 PT: 2.

36. For an example of the advertisement of these prizes and the financial incentives, see "Continuation of the Premiums Offered by the Society for the Encouragement of Arts, Manufactures and Commerce," *London Evening Post*, May 17–19, 1759, n.p.

37. See RSA/AD/MA/100/12/01/01, fol. 227. On this committee, see D. G. C. Allan, "Artists and the Society in the Eighteenth Century," in *The Virtuoso Tribe of Arts and Sciences: Studies in the Eighteenth-Century Work and Membership of the London Society of Arts*, ed. Allan and John L. Abbott (Athens: University of Georgia Press, 1992), 97. On methods of testing verdigris developed by a chemist closely aligned with the Society of Arts, see Dossie, *Handmaid to the Arts*, 112–15.

38. See Lawrence M. Principe, "A Revolution Nobody Noticed? Changes in Early Eighteenth-Century Chemistry," in *New Narratives in Eighteenth Century Chemistry* (Dordrecht: Springer, 2007), 2.

39. On Lewis, see F. W. Gibbs, "William Lewis, M.B., F.R.S. (1708–1781)," *Annals of Science* 8, no. 2 (1952): 122–51; idem, "A Notebook of William Lewis and Alexander Chisholm," *Annals of Science* 8, no. 3 (1952): 202–20; and Larry Stewart, "Assistants to Enlightenment: William Lewis, Alexander Chisholm, and Invisible Technicians in the Industrial Revolution," *Notes and Records of the Royal Society of London* 62, no. 1 (March 2008): 17–29.

40. William Lewis, M.B., F.R.S., *Commercium Philosophico-Technicum; or, The Philosophical Commerce of Arts* (London H. Baldwin, 1763), iv.

41. On chemistry's struggle for autonomy from dominant Newtonian currents, see Lawrence M. Principe, *The Aspiring Adept: Robert Boyle and His Alchemical Quest* (Princeton: Princeton University Press, 2000), 15.

42. For a longer history of alchemy and painters' practice, see Spike Bucklow, *The Alchemy of Paint: Art, Science and Secrets from the Middle Ages* (New York: Marion Boyars, 2009).

43. Compare Thomas Crow, *Painters and Public Life in Eighteenth-Century Paris* (New Haven: Yale University Press, 1985); Ellis Waterhouse, *Painting in Britain, 1530–1790* (New Haven: Yale University Press, 1953); and Lucy Gent, ed., *Albion's Classicism: The Visual Arts in Britain, 1550–1660* (New Haven: Yale University Press, 1995).

44. William Aglionby, *Painting Illustrated in Three Dialogues* (London: John Gain, 1685), sig. b, fol. 2v. More broadly, see David H. Solkin, *Painting for Money: The Visual Arts and the Public Sphere in Eighteenth-Century England* (New Haven: Yale University Press, 1992).

45. For this phrase, see Iain Pears, *The Discovery of Painting: The Growth of Interest in the Arts in England, 1680–1768* (New Haven: Yale University Press, 1988). For accounts that have foregrounded the role of the Royal Society and a longer virtuoso tradition in the growth of British art, see especially Craig Ashley Hanson, *The English Virtuoso: Art, Medicine, and Antiquarianism in the Age of Empiricism* (Chicago: University of Chicago Press, 2009); and Ann Bermingham, *Learning to Draw: Studies in the Cultural History of a Polite and Useful Art* (New Haven: Yale University Press, 2000), esp. 33–73.

46. Rica Jones, introduction to *Paint and Purpose: A Study of Technique in British Art*, ed. Stephen Hackney et al. (London: Tate Gallery, 1999), 11.

47. For an excellent account of these procedures in the Restoration practice of Peter Lely, see Ella Hendriks and Karen Groen, "Lely's Studio Practice," *Bulletin of the Hamilton Kerr Institute* 2 (1994): 21–38. For their extension in the eighteenth century, see Rica Jones, "The Artist's Training and Techniques," in *Manners & Morals: Hogarth and British Painting 1700–1760*, ed. Elizabeth Einberg (London: Tate Gallery, 1987), 19–28.

48. Farington, "Memoirs of the Life of Sir Joshua Reynolds," cxxxiii. Compare Horace Walpole, *Anecdotes of Painting in England* (Strawberry-Hill: Thomas Kirgate, 1771), vol. 4, esp. 1–3.

49. See Robert Fox and Agustí Nieto-Galan, eds., *Natural Dyestuffs and Industrial Culture in Europe, 1750–1880* (Canton: Science History Publications, 1999). For an interesting reading of Reynolds's engagement with Restoration portrait painting, see David Mannings, "Reynolds and the Restoration Portrait," *Connoisseur* 183 (July 1973): 186–93.

50. Northcote, *The Life of Sir Joshua Reynolds*, vol. 2, 21–22.

51. Ibid., 22.

52. For an authoritative overview of studio practice and the color trade in seventeenth-century London and Antwerp, see Jo Kirby, "The Painter's Trade in the Seventeenth Century: Theory and Practice," *National Gallery Technical Bulletin* 20 (1999): 5–49. More broadly, see Ian Bristow, "Ready-Mixed Paint in the Eighteenth Century," *Architectural Review* 161 (1977): 246–48; and, especially, Thierry de Duve, "The Readymade and the Tube of Paint," *Artforum* 24 (1986): 110–21.

53. For this story, see Guildhall Library, London, MS 1758, fol. 131v. More broadly, see Matthew C. Hunter, *Wicked Intelligence: Visual Art and the Science of Experiment in Restoration London* (Chicago: University of Chicago Press, 2013), 1–4.

54. On Beale, see Tabitha Barber, *Mary Beale: Portrait of a Seventeenth-Century Painter, Her Family and Her Studio* (London: Geffrye Museum, 1999).

55. Mason, "Anecdotes of Sir Joshua Reynolds," 53.

56. Ibid., 54. On period accounts of zaffir, compare Dossie, *Handmaid to the Arts*, 287.

57. For a transcription of the Ledgers, see Malcolm Cormack, "The Ledgers of Sir Joshua Reynolds," *Walpole Society* 42 (1968–70): 105–69.

58. On this bilingual practice, see Talley, "'All Good Pictures Crack,'" 57.

59. On this painting, now at the Huntington Art Gallery, see Mannings and Postle, *Sir Joshua Reynolds: A Complete Catalogue*, 425.

60. Joshua Reynolds, Ledger Book, vol. 2, Fitzwilliam Museum, Cambridge, MS 2.1916, fol. 178v.

61. Helen Brett to Shelley M. Bennett, February 2, 2002, conservation file of Huntington Art Gallery, acc. no. 23.62.

62. Jones, *Paint and Purpose*, 12.

63. Mason, "Anecdotes of Sir Joshua Reynolds," 55–56.

64. See Maxine Berg and Helen Clifford, eds., *Consumers and Luxury: Consumer Culture in Europe, 1650–1850* (Manchester: Manchester University Press, 1999).

65. Martin Archer Shee, *The Commemoration of Reynolds, in Two Parts, with Notes, and Other Poems* (London: J. Murray, 1814), 14.

66. Ibid., 13.

67. Farington, "Memoirs of the Life of Sir Joshua Reynolds," cclxxxvii–cclxxxviii.

68. British Institution for Promoting the Fine Arts in the United Kingdom, *Catalogue of Pictures by the Late Sir Joshua Reynolds: Exhibited by the Permission of the Proprietors, in Honor of the Memory of That Distinguished Artist and for the Improvement of British Art* (London: W. Bulmer, 1813), 12.

69. Ibid., 12–13.

70. Malone, "Some Account of the Life of the Author," in Reynolds, *The Literary Works of Sir Joshua Reynolds*, vol. 1, lvi. See also Talley, "'All Good Pictures Crack,'" 56–57.

71. British Institution, *Catalogue of Pictures*, 13.

72. Ibid.

73. Charles Lock Eastlake gives a partial transcription of Reynolds's notation on one of these canvases, noting that many of its experiments were made in 1772; Eastlake, *Materials for a History of Oil Painting* (London: Longman, Brown, Green and Longmans, 1847), vol. 1, 444. For the object's modern exhibition as "Experiments with varnishes and oil pigments on canvas," see Penny, *Reynolds*, 335. According to correspondence documenting the object's provenance, the Royal Academy artifact is one of two such canvases by Reynolds purchased from the sale of Sir Thomas Lawrence's collection in the 1830s, lent to Eastlake in the 1840s, and eventually sold to the institution for fifty pounds sterling in 1878; see George Barker to the president and Council of the RA, October 29, 1877, RAA, Conservation File 03/576.

74. For an overview of Wedgwood's experimentation, see Hilary Young, *The Genius of Wedgwood* (London: Victoria and Albert Museum, 1995); and Adrian Forty, *Objects of Desire: Design and Society 1750–1980* (New York: Pantheon Books, 1986), 17–41.

75. On page 31 of his copy of the *Discourses*, Blake wrote, "Bacon's Philosophy has Ruin'd England!" See Reynolds, *Discourses*, 295.

76. Malone, "Some Account," xxxi, quotes Reynolds this way: "Instead of patching up a particular work on the narrow plan of imitation, [the artist should] rather endeavor to acquire the art and power of thinking. . . . In reality indeed it appears to me, that a man must begin by the study of others. Thus Bacon became a great thinker by entering into and making himself master of the thoughts of other men."

77. On Reynolds's relation to Baker, see ibid., iv. On Baker, see *Biographia Britannica; or, Lives of the Most Eminent Persons Who Have Flourished in Great Britain and Ireland* (1747; Hildesheim: Georg Olms Verlag, 1973), vol. 1, 422. For Wadham College in the era of the Civil War, see Charles Webster, *The Great Instauration: Science, Medicine, and Reform, 1626–1660* (New York: Holmes and Meier, 1976). On the amateur scientific interests of Reynolds's father, see Frederick Whiley Hilles, *The Literary Career of Sir Joshua Reynolds* (Cambridge: Cambridge University Press, 1936), 4.

78. For this proposed placement, see Charles Robert Leslie and Tom Taylor, *Life and Times of Sir Joshua Reynolds*, 2 vols. (London: John Murray, 1865), vol. 1, 16.

79. J. Northcote to S. Northcote, London, September 21, 1771, RAA MS NOR 5, [fol. i v].

80. For a reproduction of Reynolds's *Dr. John Mudge, F.R.S.* (1752, oil on canvas, private collection) and an illuminating discussion of these networks of friendship, see Robyn Asleson et al., *British Paintings at the Huntington* (New Haven: Yale University Press, 2001), 290–93.

81. In the spring of 1772, he writes: "I have receiv'd the Box with the brass patterns and have them all cast except the mettals which could not be cast 'till the man had more to cast them with but you may be sure I shall send them by the first opportunity"; J. Northcote to S. Northcote, April 8, 1772, RAA MS NOR 9, [fol. i r].

82. See, for example, J. Northcote to S. Northcote, June 25, 1771, RAA MS NOR 1.

83. As Northcote explains to his brother: "Sir Joshua is now building a very beautiful house at Richmond where he intends to go often in the summer[;] from it there is a very fine prospect. Now he has not got any telescope and very probably has never look'd through a reflex lens[?]. If you at particular times now and then. .. would fit up one of any size even small and in the plainest manner as he might be told the whole excellence was in the metals and give it him as your own making and I will always consider myself in your debt for it 'till it is in my power to make a return"; J. Northcote to S. Northcote, December 21, 1771, RAA MS NOR 7, [fol. i v]. Although this object is now untraced, a subsequent letter sent by Northcote to his brother in 1776 suggests that the telescope was indeed given; see J. Northcote to S. Northcote, June 30, 1776, RAA MS NOR 25, [fol. i r–i v].

84. J. Northcote to S. Northcote, August 23, 1771, RAA MS NOR 4, [fol. i v].

85. J. Northcote to S. Northcote, September 21, 1775, RAA MS NOR 5, [fol. ii v].

86. J. Northcote to S. Northcote, July 27, 1772, RAA MS NOR 11, [fol. i v–ii r].

87. On Northcote's lowly status, see Martin Postle, "Northcote, James (1746–1831)," in *Oxford Dictionary of National Biography* (Oxford: Oxford University Press, 2004), online ed. 2008, http://www.oxforddnb.com/view/article/20326 (accessed January 27, 2014).

88. For this claim, see Malone, "Some Account," xxxiii.

89. Ibid., xxxiii–xxxiv.

90. See, for example, Thomas Mudge, *Thoughts on the Means of Improving Watches and more particularly those for the Use of the Sea* (London, 1765); and Thomas Mudge Jr., *A Narrative of Facts relating to some Time-Keepers constructed by Mr. Thomas Mudge* (London: Thomas Payne, 1792).

91. John Mudge, *Directions for Making the Best Composition for the Metals of Reflecting Telescopes* (London: W. Bowyer and J. Nichols, 1777), 7.

92. Quoted in Malone, "Some Account," xcviii. For more on Burke's scientific ideas, see Aris Sarafianos, "Pain, Labor, and the Sublime: Medical Gymnastics and Burke's Aesthetics," *Representations* 91 (Summer 2005): 58–83.

93. Samuel Johnson, *Dictionary of the English Language*, vol. 2, n.p. This last usage coincides closely with the lesson Reynolds would subsequently profess to have learned from experimental philosophy. In *Discourse XIII* of 1786, the president directs his auditors to avoid making art either a matter of imitation alone or of mere "experiment, as to exclude from it the application of science, which alone gives dignity and compass to any art. But to find proper foundations for science is neither to narrow or to vulgarise it; and this is sufficiently exemplified in the success of experimental philosophy"; Reynolds, *Discourses*, 231–32.

94. [Joshua Reynolds], "To the Idler," *Idler* 82 (November 10, 1759): 237. For an illuminating account of Reynolds's conception of "the mechanical," see Joel Snyder, "Res Ipsa Loquitur," in *Things That Talk: Object Lessons from Art and Science*, ed. Lorraine Daston (New York: Zone Books, 2004), 195–221, esp. 200–202.

95. See RSA EC/1760/14. Although we have no evidence of his activity in the institution, Reynolds still had some cognizance of its activities; in a letter of 1770, he congratulated Sir William Hamilton "on the honour you have acquired by the account you have given to the Royal Society of Vesuvius and Aetna"; Reynolds to Hamilton, June 17, 1770, in Reynolds, *Letters*, 33.

96. See, for example, Hugh Trevor-Roper, "Mayerne and His Manuscript," in *Art and Patronage in the Caroline Courts: Essays in Honour of Sir Oliver Millar*, ed. David Howarth (Cambridge: Cambridge University Press, 1993), 264–93.

97. [Thomas Povey], "An Account of a Secret in the Use of Painting in Answer to the Command of the R. Society Brought in by Mr. Povey, and read before the Society Dec. 19, 1667," Royal Society of London, Register Book Original, vol. 3, fols. 259–64. For Povey's broader chemical interests, see Povey, "The Method, Manner and Order of the Transmutation of Copper into Brass, etc.," *Philosophical Transactions of the Royal Society of London* 22 (1700–1701): 474–75.

98. Povey, "An Account of a Secret," fol. 263.

99. See Richard Waller, "A Catalogue of Simple or Mixt Colours, with a Specimen of Each Colour Prefixt to Its Proper Name," *Philosophical Transactions of the Royal Society of London* 16 (1686): 24–32.

100. On Petty and his broader alchemical interests, see Ted McCormick, *William Petty and the Ambitions of Political Arithmetic* (New York: Oxford University Press, 2009).

101. William Petty, "An Apparatus to the History of the Common Practices of Dying," in *The History of the Royal Society of London: Third Edition* by Thomas Sprat (London: J. Knapton et al., 1722), 297–98.

102. William Petty, "General Observations on Dying," in Sprat, *History of the Royal Society*, 306.

103. See William Cole, "A Letter from Mr. William Cole of Bristol, to the Philosophical Society of Oxford, Containing His Observations on the Purple Fish," *Philosophical Transactions* 178 (December 1685): 1285–86. For a broader reading of Cole's dye experiments, see Edward Eigen, "On Purple and the Genesis of Photography or the Natural History of an Exposure," in *Ocean Flowers: Impressions from Nature*, ed. Carol Armstrong and Catherine de Zegher (New York: Drawing Center, 2004), 270–87.

104. William Cole to Robert Plot, February 5, 1685, in *Early Science at Oxford*, vol. 12, *Dr. Plot and the Correspondence of the Philosophical Society of Oxford*, ed. R. T. Gunther (Oxford: Printed for the Subscribers, 1939), 263–64.

105. See William Eamon, "Robert Boyle and the Discovery of Colour Indicators," *Ambix* 27, no. 3 (November 1980): 204–9; and Cole to Plot, 264.

106. See Henry Oldenburg, "An Experiment of a Way of Preparing a Liquor, That Shall Sink into, and Colour the Whole Body of Marble, Causing a Picture, Drawn on a Surface, to Appear Also in the Inmost Parts of the Stone," *Philosophical Transactions* 1 (1665–66): 125–27.

107. Nehemiah Grew, *Musaeum Regalis Societatis; or, A Catalogue & Description of the Natural and Artificial Rarities belonging to the Royal Society and preserved at Gresham Colledge* (London: W. Rawlins, 1681), 254. For more on Stelluti's theories, see Andrew C. Scott and David Freedberg, *Fossil Woods and Other Geological Specimens: The Paper Museum of Cassiano dal Pozzo*, Series B, Natural History, pt. 3 (Turnhout: Harvey Miller, 2000).

108. Grew, *Musaeum Regalis Societatis*, 253.

109. For a discussion of Hooke's acid model, see Matthew Hunter, "Experiment, Theory, Representation: Robert Hooke's Material Models," in *Beyond Mimesis and Convention: Representation in Art and Science*, ed. Roman Frigg and Hunter (New York: Springer, 2010), 193–219.

110. [Frederick Slare], "An Account of Several Experiments made with the Shining Substance of the liquid and of the Solid Phosphorous, Prepared and Communicated to the Collector, by Dr. Frederick Slare, Fellow of the Royal Society, and one of the Collegde of Physicians," *Philosophical Collections* 3 (December 10, 1681): 48.

111. Yale Center for British Art, New Haven, MS Reynolds 38, n.p. In the manuscript, Reynolds has struck out the last line of this quotation.

112. Studying Jan van Eyck's *Virgin and Child with Canon Van der Paele* (1436; now in the Groeningemuseum, Bruges) on June 28, 1781, Reynolds wrote the following in his notebook: "This Picture claims perhaps more attention from its being the work of the man who has been said to be the first inventor of the art of Painting in oil, than from any intrinsic merit in the work itself[,] however this mistake which was first published by Vasari and from his authority propagated in the world, has been lately <rectified> by the learned antiquarian Mr. Raspe who has proved beyond all contradiction that this art was invented <and practiced> many ages before Van Eyck was born"; Yale Center for British Art, MS Reynolds 38, n.p. This is an unambiguous reference to the erudite study published that year by R. E. Raspe as *A Critical Essay on Oil-Painting; Proving that the Art of Painting in Oil was Known before the Pretended Discovery of John and Hubert Van Eyck* (London: H. Goldney, 1781).

113. Northcote, *The Life of Sir Joshua Reynolds*, vol. 2, 40.

114. Ibid.

115. Jonathan Richardson, *An Essay on the Theory of Painting: Second Edition* (London: Printed for A. C. and sold by A. Bettesworth in Pater-Noster-Row, 1725), 4. On the importance of Richardson's work to Reynolds, see Malone, "Some Account," vii.

116. For William Hogarth's expanded critique of patina, see Hogarth, *The Analysis of Beauty*, ed. Ronald Paulson (New Haven: Yale University Press, 1997), 91–92. More generally, see the articles on patina by Randolph Starn, Eileen Cleere, and Darcy Grimaldo Grigsby in *Representations* 78, no. 1 (Spring 2002): 86–144.

117. On the semantic ambiguities between sitters' makeup and Reynolds's pigments, see Aimee Marcereau Degalan, "Dangerous Beauty: Painted Canvases and Painted Faces in Eighteenth-Century Britain" (PhD diss., Case Western Reserve University, 2007).

118. Corsican general Pasquali Paoli, as cited in Reynolds, *Letters*, 94.

119. *Horace Walpole's Correspondence*, ed. W. S. Lewis and Ralph S. Brown Jr., vol. 10 (New Haven: Yale University Press, 1941), 79.

120. J. T. Smith, *Nollekens and His Times* (London: Henry Colburn, 1828), vol. 2, 291–92.

121. N. B., M.D. [Nicholas Barbon], *A Discourse of Trade* (London: Thomas Milbourn, 1690), 26.

122. See especially Neil McKendrick, John Brewer, and J. H. Plumb, *The Birth of a Consumer Society: The Commercialization of Eighteenth-Century England* (Bloomington: Indiana University Press, 1982); and John Brewer and Roy Porter, *Consumption and the World of Goods* (New York: Routledge, 1993).

123. Barbon, *A Discourse of Trade*, 27.

124. Adam Smith, *The Theory of Moral Sentiments* (1759), ed. D. D. Raphael and A. L. Macfie (Oxford: Clarendon Press, 1976), pt. 5, sec. 4, 228.

125. In a letter to Bennett Langton of September 12, 1782, Reynolds reported having heard Adam Smith's ideas on the pleasure of imitation in the arts and giving them his full agreement; in Reynolds, *Letters*, 110–11.

126. Leslie and Taylor, *Life and Times of Sir Joshua Reynolds*, vol. 2, 134. On Reynolds's resulting picture, *Miss Bowles* (ca. 1775, Wallace Collection, London), see Mannings and Postle, *Sir Joshua Reynolds: A Complete Catalogue*, 101–2.

127. De Marchi and Van Miegroet, "Ingenuity, Preference," 401.

128. *Horace Walpole's Correspondence*, ed. W. S. Lewis et al., vol. 33 (New Haven: Yale University Press, 1965), 571–72.

129. Reynolds, *Discourse VI*, 107. For an interesting examination of the alchemical traditions informing theories of mind on which Reynolds could be drawing, see Antonio Clericuzio, "The Internal Laboratory: The Chemical Reinterpretation of Medical Spirits in England (1650–1680)," in *Alchemy and Chemistry in the 16th and 17th Centuries*, ed. Piyo Rattansi and Clericuzio (Boston: Kluwer, 2002), 51–83.

130. Reynolds, *Discourse VI*, 94. For recent scholarship on early modern attempts to reckon with the production of artistic novelty through emulation, see Maria H. Loh, "New and Improved: Repetition as Originality in Italian Baroque Practice and Theory," *Art Bulletin* 86, no. 3 (September 2004): 477–504; and Paul Duro, "'The Surest Measure of Perfection': Approaches to Imitation in Seventeenth-Century French Art and Theory," *Word & Image* 25, no. 4 (October–December 2009): 363–83.

131. Reynolds, *Discourse VI*, 106.

132. For ancient sources and alchemical connections of this mythical story, see David M. Jacobson, "Corinthian Bronze and the Gold of the Alchemists," *Gold Bulletin* 33, no. 2 (2000): 60–66.

133. This reciprocal dialogue with artistic and chemical tradition seems to subtend Reynolds's claim in preparatory notes for *Discourse VI* that "when I recommend . . . enriching & manuring the mind with other mens thoughts I suppose the Artist to know his Art so as to know what to choose and what to reject"; quoted in Hilles, *Literary Career*, 224.

134. Northcote, *The Life of Sir Joshua Reynolds*, vol. 2, 7.

135. On this tradition, see William R. Newman, *Promethean Ambitions: Alchemy and the Quest to Perfect Nature* (Chicago: University of Chicago Press, 2004).

136. "Sir Joshua Reynolds," *General Evening Post*, February 25, 1792, n.p.

137. See, for example, John Newman, "Reynolds and Hone: 'The Conjuror' Unmasked," in Penny, *Reynolds*, 344–54.

138. "A Lover of Wit," *Public Advertiser*, May 15, 1775, n.p.

139. Farington, "Memoirs of the Life of Sir Joshua Reynolds," ccxiii.

140. For more on the iconography of alchemy in the northern European tradition, see Principe and DeWitt, *Transmutations*.

141. For an account of this picture, see Mary Webster, *Johan Zoffany 1733–1810* (New Haven: Yale University Press, 2011), 206–10. For Reynolds's purchase of it, see Martin Postle, "Johann Zoffany: An Artist Abroad," in *Johann Zoffany RA: Society Observed* (New Haven: Yale University Press, 2011), 25.

142. *Morning Herald and Daily Advertiser*, March 2, 1785, n.p.

143. Jones, "Artist's Training and Techniques," 27.

144. On the encaustic revival, see Danielle Rice, "The Fire of the Ancients: The Encaustic Painting Revival, 1755 to 1812" (PhD diss., Yale University, 1979). For Anne-Louis Girodet's technical experimentation, see Thomas Crow, *Emulation: Making Artists for Revolutionary France* (New Haven: Yale University Press, 1995), 171–88; and idem, *Modern Art in the Common Culture* (New Haven: Yale University Press, 1996), 119–21.

145. See John Gage, "Magilphs and Mysteries," *Apollo* 80 (July 1964): 38–41.

146. Compare David Saunders and Antony Griffiths, "Two 'Mechanical' Oil Paintings after de Loutherbourg: History and Technique," in Spring, *Studying Old Master Paintings*, 186–93; David Bjelajac, *Washington Allston, Secret Societies and the Alchemy of Anglo-American Painting* (Cambridge: Cambridge University Press, 1997); and Lance Mayer and Gay Myers, *American Painters on Technique: The Colonial Period to 1860* (Los Angeles: Getty Museum, 2011).

147. See Mark N. Aronson and Angus Trumble, *Benjamin West and the Venetian Secret* (New Haven: Yale Center for British Art, 2008).

148. For popular chemistry, see Simond, *Journal of a Tour and Residence*, vol. 1, 43. For the artistic context, see Leslie Carlyle, "The Artist's Anticipation of Change as Discussed in British Nineteenth Century Instruction Books on Oil Painting," in *Appearance, Opinion, Change: Evaluating the Look of Paintings* (London: United Kingdom Institute for Conservation, 1990), 62–67.

149. Compare Eastlake, *Materials for a History of Oil Painting*, vol. 1, 545–46; and Elizabeth Prettejohn, *The Art of the Pre-Raphaelites* (Princeton: Princeton University Press, 2000), 38.

150. Eastlake, *Materials for a History of Oil Painting*, vol. 1, 538, 546.

151. For exchanges between Eastlake and Lord Elcho, see Jaynie Anderson, "The First Cleaning Controversy at the National Gallery 1846–1853," in *Appearance, Opinion, Change*, 5.

152. Francis Charteris, Lord Elcho, to unidentified recipient, June 9, 1859, National Gallery of Scotland, File NG 338, fols. 1r–2r.

153. For art historical engagement with the Coutts bank, see Albert Boime, *Art in an Age of Revolution, 1750–1800* (Chicago: University of Chicago Press, 1987), 267. On the relations of Reynolds and Coutts, see Mannings and Postle, *Sir Joshua Reynolds: A Complete Catalogue*, 148–49. From 1781 (admittedly, after James Coutts's death in 1778), Reynolds paid his sister, Frances Reynolds, a quarterly allowance from an account with the Coutts bank; see Reynolds, *Letters*, 104.

154. On uses and sources of mahogany in Reynolds's portraiture, see Rica Jones, "Joshua Reynolds's *George VI when Prince of Wales*," in Stephen Hackney et al., *Paint and Purpose*, 146. I thank Mark N. Aronson, who has trenchantly observed that, visually attractive though it is, the "flame" of grain directly below the sitter's cravat is a signature of the wood's instability; an experienced painter on wood would never have selected such a panel. Spike Bucklow has kindly alerted me that unprimed mahogany was also used by seventeenth-century Dutch painters, including Pieter Saenredam.

155. Francis Charteris, Lord Elcho, June 9, 1859, fols. 2r–v. In this sense, I take the point made to me in correspondence by conservator Alex Gent that the currently visible damage to the panel is most likely the product of overcleaning rather than faulty facture by Reynolds. However, Elcho was clearly interested in deploying the painting's decayed state to teach a lesson about Reynolds's practice in general.

156. Reynolds, Commonplace Book, Yale Center for British Art, MS Reynolds 33, fol. 44v. As this paragraph in particular will suggest, the title and argument of this essay take inspiration from Walter Benn Michaels's "Action and Accident: Photography and Writing," in *The Gold Standard and the Logic of Naturalism: American Literature at the Turn of the Century* (Los Angeles: University of California Press, 1987), 215–44.