Introduction
Enlightenment Mock Arts and Industrial Enlightenment

The history of English literature has a problem with the Industrial Enlightenment. The global uplift in material production that gathered speed towards the end of the eighteenth century was an event of epochal significance.[1] It got under way in Great Britain before anywhere else. And yet British writers, at this moment of transformation, had their minds on other things. Their attention was turning inward. A new literary genre, the novel, narrowed the conventions of romance narrative into private, domestic settings.[2] Poets and philosophers framed the modern self as punctual, sentimental and increasingly fixed.[3] Agricultural and industrial labourers were changing the national landscape forever, but literary description was too nice to acknowledge their work.[4] All of this cultural tidying up matched a corresponding reorganisation in the intellectual realm. Enlightenment encyclopaedists, natural philosophers and educationalists engaged in huge efforts to break down, systematise and specify whatever was considered 'useful knowledge'.[5] It was an age, in short, of the division of science, and the division of labour. The apparent failure of literary authors to register how their world was recasting itself is one more sign of those ruptures.

There were some features of eighteenth-century British culture, however, that worked against the division of knowledge. This book is about one of them. It focuses on the 'Enlightenment mock arts', a distinctive group of satires, novels and poems that engaged closely and critically with proto-industrial ideology. The mock arts are satires on explication.[6] They burlesque the denotative conventions of handbooks, encyclopaedias and didactic literature, those useful cogs in the machinery of early-modern information culture. At the heart of the mock-art canon are pieces by Jonathan Swift, Alexander Pope and their circle. They include Swift's mock treatise 'The Mechanical Operation of the Spirit' (1704), John Gay's *Trivia, or the Art of Walking the Streets of London* (1716) and Pope's 'Peri Bathous: or, the Art of Sinking in Poetry' (1727).[7] Among

dozens of later examples, Jane Collier's *An Essay on the Art of Ingeniously Tormenting* (1753) is most widely read today. Each is a version of the same joke about elaborate false instruction. They give ironic directions to techniques that are completely unsuitable for verbal specification.

The Enlightenment mock arts explore the absurdity of trying to fix various human practices into mechanical discourse. They encumber the reader with idle instructions: how to indoctrinate a congregation using physical processes; how to navigate complex urban environments on foot; how to produce poetry at an industrial scale; how to torture domestic intimates in an age of politeness. What role, their authors ask, can any written specification play in the transmission of personal knowledge? How can it deal with knowledge, which is (like so much useful information) experience-based, environmentally specific, customary and embodied rather than abstractable? In the process of asking these questions, the mock arts show poets and wits thinking – across the modernistic division of knowledge and across the divisions of class and rank – about the ungentle world of manual arts and instruction.[8] There was a shift in ideologies of technical progress during the early years of the Industrial Enlightenment. This book shows how the social and psychological complexities of that shift are revealed especially clearly by an apparently non-descript group of literary satires. It delineates how the mock art idea was further extended and modulated in some of the most widely read fictions of the eighteenth century.

The problem of personal, practical knowledge – how should writers deal with it? – was not in fact a modern one. In the ancient world it had been central to the poetics of classical didactic and especially to Virgil's *Georgics*. Virgil taught precepts from the realm of personal knowledge by suggesting his truths 'indirectly, and without giving us a full and open view of it', as Joseph Addison explained, telling us 'just so much as will naturally lead the Imagination into all parts that lie conceal'd'.[9] Some of the eighteenth century's most widely distributed poems were modelled on the *Georgics*, and they developed from Virgil their own approaches to the transmission of tacit learning. This sort of eighteenth-century georgic poem makes up a second category of the Enlightenment mock arts – congruent with satire, but distinct from it. Among them were James Thomson's *Seasons* (1726–1746), John Armstrong's *Art of Preserving Health* (1744), John Dyer's *The Fleece* (1757) and William Cowper's *The Task: A Poem in Six Books* (1785). The oblique strategies of instruction deployed by their authors, elaborated from Virgil's techniques of mythography, thought experiment and digression, bring them within the pale of the mock

technical, even though their purposeful pragmatism forms a contrast with the more turbulent ironies of the Swiftian mock arts. That purposefulness is tempered by georgic's characteristic poetics of indirection and openness. Georgic poems cannot describe a skilful process, a productive landscape or a useful artefact without thinking about its opposite. Farms and battle-fields, workshops and gardens, embodied labour and instrumental technology: each is displayed as part of a larger natural or historical pattern.[10] Georgics belong to a peculiar category of eighteenth-century literary text in which ingenious industry and productive manufacture are represented in story, fable and image. In this book, they are read as a series of experiments, aligned with satire, in the poetics of useful knowledge.

The satirical and georgic mock arts are two groups of eighteenth-century writings that focus on practical expertise. They cluster around two simple and distinctive formal principles: mock-didactic burlesque and Virgilian imitation. There are other early-modern satires and poems, however, that touched on that topic in more oblique or self-conscious ways. A great variety of texts, all of them approaching the subject of useful knowledge in a spirit of literary experiment, anticipated and followed them. From the previous age came seventeenth-century utopian fictions, manuals of sport and travel and treatises written under the aegis of the 'History of Trades' project associated with the early Royal Society. Characteristically, these texts represented personal knowledge moving from the familiarly near-at-hand to more remote locations, from a point of intimacy to one of utopian distance. During the second and third decades of the eighteenth century those themes and motifs were returned to in two very widely circulated prose fictions, Daniel Defoe's *Robinson Crusoe* (1719) and Swift's *Gulliver's Travels* (1726). In the middle decades of the century mock-didactic satire was absorbed by a series of restlessly inventive prose fictions. They include Collier's *Art of Ingeniously Tormenting* (1753), Collier and Sarah Fielding's *The Cry: A New Dramatic Fable* (1754) and Laurence Sterne's *Life and Opinions of Tristram Shandy, Gentleman* (1759–1767). In the century's last decades, georgic personal instruction and mock-technical satire found new literary directions when they were taken up by a circle of writers who had first-hand experience of inquiry into useful knowledge, especially as it pertained to mechanical invention and educational technique. Those writers were associated with the Lunar Society of Birmingham. They include Richard Lovell Edgeworth, Thomas Day, Erasmus Darwin, Anna Seward and, most importantly for this study, the novelist Maria Edgeworth. Such, in outline, is the curriculum of the Enlightenment mock arts. When taken together, these peculiar literary texts represent an

informal but in many ways coherent response to eighteenth-century Britain's Industrial Enlightenment.

Refinements in Mechanical and Liberal Arts

The eighteenth-century acceleration of technical innovation and the broad culture of Enlightenment were global phenomena.[11] So the national framing for this study of their relationship – its focus on the British Isles – needs some explanation. The Industrial Revolution, an event of international significance, gained irresistible momentum in Great Britain before anywhere else. Every generation of historians approaches the question of how this happened in a different way.[12] During the nineteenth century it prompted tales of solitary inventors and heroic industry – 'about 1760', as T. S. Ashton's proverbial schoolboy summed it up, 'a wave of gadgets swept over England'.[13] During the twentieth, the emphasis fell on material factors. Britain's domestic supply of cheap coal meant that early blast furnaces and steam engines became affordable. Subsequently its high-wage economy drove a restless search for efficiency in those processes, through technological innovation.[14] More recently, historians of economics and science have stressed the social and cultural conditions for the jump forward. British manufacturers at the dawn of the Industrial Revolution, so the argument goes, had a small but crucial advantage over their European neighbours. The advantage was ideological – a matter of ideas and attitudes – and it was social – a matter of human capital. It depended on a network of institutions and associational groups dedicated to the cultivation of practical know-how and on improving rates of literacy, technical education and access to scientific information.[15] In eighteenth-century Britain an enlightened culture of useful knowledge, elite but widely diffused, aligned itself with the practical expertise of an already highly skilled workforce.

These human and cultural factors helped bring the Industrial Revolution to British manufacture before any other comparably productive Western nation. Rising numbers of patents for new inventions, proliferating discoveries in the mechanical sciences, encyclopaedias, bulletins from science journalists and lecturers. Such were the visible and outward signs of a knowledge economy that could have little effect, as Maxine Berg has pointed out, 'without the skilled worker who actually applied and adapted the technology'.[16] There was a revolution in the mediation and transmission of information, and it coincided with an artisanal enlightenment.[17] The story of the enlightened economy in eighteenth-century Britain turns on the relationship between theoretical knowledge and practical, often personal expertise.[18]

Where do eighteenth-century novels, poems, plays and essays fit in this historical picture? If the Enlightenment world of useful knowledge was underpinned by ideologies and attitudes, we might expect the age's biggest and noisiest cultural machine – the print trade and, more specifically, the world of polite letters – to have had some role in its development and communication.[19] But this was not obviously the case. Indeed, historians are only beginning to explore how imaginative writers in the eighteenth-century registered the proliferation of useful knowledge that was happening all around them.[20] The most acute contemporary commentators certainly saw a connection between literature and practical, mechanical knowledge.[21] The great advantage of 'industry and refinements in the mechanical arts', wrote David Hume in 1752,

> is, that they commonly produce refinements in the liberal; nor can one be carried to perfection, without being accompanied, in some degree, with the other. The same age that produces great philosophers and politicians, renowned generals and poets, usually abounds with skilful weavers, and ship-carpenters [. . .] The spirit of the age affects all the arts; and the minds of men, being once roused from their lethargy, and put into a fermentation, turn themselves on all sides, and carry improvements into every art and science.[22]

Technical modernisation, in other words, precedes and ultimately depends upon improvements in polite culture, including the world of letters.[23] Hume's image of a chain by which '*industry, knowledge* and *humanity* are linked together' resembles the old scholastic hierarchy of material expertise (technē), knowledge of unchanging things (epistemē) and active knowledge requiring judgement (praxis).[24] The difference in the modern order is that technological 'industry' is now the first to be mentioned, whereas for the ancients it had been the junior category of knowing.

But Hume's metaphor of a general 'fermentation' suggests that precedence is not really the point here. A concoction rather than a division of knowledge has occurred. 'The *literary*, as well as *mechanical* arts', wrote his friend Adam Ferguson in 1767, 'being a natural produce of the human mind, will rise spontaneously where-ever men are happily placed'.[25] What matters to both, and to both at once, is the underlying freedom and prosperity of civil society, not a perceived sequence of cultural developments. People of practical science agreed with philosophers like Ferguson and Hume on this point. When the chemist and physician William Lewis compiled his *Commercium Philosophico-Technicum* (1763) he made a conscious choice to include treatments of the 'merely curious and entertaining' arts, with the literary arts chief among them. He had a utilitarian rationale for doing so:

> for the division of knowledge into curious and useful, does not seem at all just or adequate: the useful, viewed in a proper light, has always something curious in it; and the curious, well pursued, seldom fails of affording something useful.[26]

The development of arts and sciences through the eighteenth century is described often in terms of disciplinary separation and purification, with the new profession of polite letters being one of its many distinct specialisations.[27] And yet it was against the theoretical or institutional division of knowledge that eighteenth-century writers asserted with such confidence a connection between literature and the mechanical arts. This was still the case in the last quarter of the century when, for the members of the Lunar Society of Birmingham, 'science and art were not separated', as Jenny Uglow comments. 'You could be an inventor and designer, an experimenter and a poet, a dreamer and an entrepreneur all at once without anyone raising an eyebrow.'[28] The unfortunate thing is that neither Hume, Ferguson or Lewis nor the Birmingham scientists and manufacturers explained how exactly they thought the imaginative world of literary authors interacted with the practical world of useful knowledge. They noticed the concoction, but offered only conjectures about its cause.

This book begins again with these conjectures. It investigates how the authors of eighteenth-century poems, novels and essays wrote and thought about the knowledge of mechanics, artisans, agriculturalists and other skilled working people. It traces how that engagement deepened across the long eighteenth century. What bothered a wide range of eighteenth-century writers was the nature of practical expertise itself. The British Enlightenment in both its moderate and progressive manifestations abounded with explorers of its haptic, cognitive and extended social dimensions.[29] They experimented with new literary and didactic mechanisms for its communication. They produced as they did so many of the period's most curious and distinctive satires, didactic poems and fictions. Their thinking about the practical intelligence with which working people designed, cultivated, manufactured and operated things fed back into reflections on the nature of their own skilfulness as writers.[30]

Cognitive Value, Satire and Book History

To explore these themes in eighteenth-century literature is not to make any special claims about the impact of imaginative writing on the economic or social world. The authors discussed in these pages were among the most prominent in eighteenth-century letters, and their writings

caused changes in the intellectual weather. It is likely that these changes had indirect effects on the worlds of science, invention and commerce. But this book does not propose that they caused or contributed to the Industrial Enlightenment in a way that can be documented directly. What literary history can do is to show how rich the discussion of artisanal, craft and mechanical knowledge was in an age when that knowledge powered enormous social and economic transformations. It can trace some of the networks of textual exchange across which that discussion played out.

Modern scholarship on the history of technology makes careful distinctions between embodied technique, tacit know-how and explicit knowledge.[31] The evidence of literary texts shows that eighteenth-century writers were carrying out correspondingly subtle analyses of these themes at the start of the Industrial Revolution. Poems, essays, satires and novels provide valuable evidence of the words, images and ideas that educated people used during the Enlightenment period when they discussed useful knowledge. Indeed, the full range of their conceptual affordance can be traced especially clearly in literary texts, where they are free from narrowly instrumental deployment. Still, it is difficult to demonstrate how even the experimental sciences or the most specialised associational organisation impacted on the rate of technological invention during the early Industrial Revolution.[32] Any attempt at such demonstration based on the evidence of literary culture would be unconvincing, and the texts themselves offer no temptation to make the experiment.

The texts examined in the following chapters show, on the contrary, that when eighteenth-century literary authors wrote about mechanical art their framing was invariably satirical, sceptical and oblique. Their doubtful, critical perspective offers the constantly renewed promise of a broad and analytical discussion. Eighteenth-century writers submitted to a general paradox: that the nature of human skilfulness obliged them to write in an indirect and sometimes unpractical way about the practical world. Their explorations of useful knowledge produced little in the way of direct descriptions of the mechanical trades, let alone useable handbooks for its processes. Eighteenth-century literary authors left us scant social intelligence about mechanical workers in Burslem, Colebrookedale and Birmingham. They wrote instead a long and peculiar line of books that took apart the very idea of a literature of useful knowledge. These are the Enlightenment mock arts.

Three aspects of the thinking of these authors are especially significant. First, writers became more open to the idea that there might be cognitive (rather than purely material) value and interest in the work of skilled

technicians. Both the mechanical and the literary arts, it was understood, have an ineffable dimension. The haptic intuition and unspecifiable finesse of the craftsman correspond with the similarly indefinable je-ne-sais-quoi of the poet. The Enlightenment mock arts functioned as ironic models for what that relationship should be.

Second, writers grew confident in their use of satire and burlesque to get around the cultural and intellectual barriers that cut off the work of their predecessors from the world of useful knowledge. Their open and critical approach to practical expertise allowed for a new sort of investigative engagement with the operational world. In some cases it was positively satirical. In others it was didactic, though in an oblique or digressive way. Enlightenment thinkers understood that cultures of mechanical ingenuity have an historical tendency towards atrophy. As specialists in satire and wit, the authors of the mock arts put themselves forward as experts in curiosity, invention and communication. They presented themselves as people with enough crooked cultural energy to jolt productive society out of its natural inclination to dullness. 'Ingenium', 'inventio', ingenuity and wit were distinct ideas at the start of the seventeenth century, but they had become entangled by the start of the eighteenth.[33]

Third, writers became more subtle in their assumptions about the medium of print and the suitability of books as tools that might contribute towards the communication of personal knowledge. Since convention defined that sort of knowledge precisely by the impossibility of pinning it down in written texts, this opened another field for irony and indirection. It also made eighteenth-century literary writers think about their role in processes of making – particularly the making of books – that were material and commercial as well as cultural.

These three aspects of the mock arts – their interest in what skilled practices can tell us about the cognitive unconscious, their distinctive satirical (or otherwise critical) framing, their special connection with the commercial and mechanical processes of the book trade – mark out points of contact and exchange between polite letters and the broader ideology of the industrial Enlightenment. The following three sections deal with each in turn.

Manuary Opificers

Of these three trends, the gradual softening of older literary attitudes to the mechanical trades was especially productive of new ideas – incomplete as it remained, and always subject to reverses. In 1749, for example, Lord Chesterfield steered his son, who was looking into architecture, away from

the technical enthusiasms of an earlier generation: 'and for the minute and mechanical parts of it, leave them to masons, bricklayers, and Lord Burlington', he advised, 'who has, to a certain degree, lessened himself, by knowing them too well'.[34] The Enlightenment mock arts reflect the prejudices, intellectual and social, that educated people had throughout the early-modern period against those who worked ingeniously with their hands. They also represent the point at which those prejudices started to break down and reform into more positive configurations. Intellectual bridges were built between progressive civic elites, learned natural philosophers and practising artisans.[35]

As we might expect, the main causes of this softening were cultural factors external to the world of belles-lettres. The gestures of support made by early-modern natural philosophers and learned societies towards the applied and mechanical sciences, however intermittent they became at the end of the seventeenth century, were regular enough to create a long-term cultural trend. The 'History of Trades' project for assembling a comprehensive record of mechanical techniques and innovations, which passed between Samuel Hartlib, William Petty, John Evelyn and Robert Hooke during the 1650s and 1660s, may never have produced the encyclopaedic compilation those men originally planned.[36] But several of its offshoots were published and reprinted into the eighteenth century, such as Edward Somerset, Marquis of Worcester's *Century of Inventions* (1662; 1710); Robert Boyle's treatises *Touching the Usefulnesse of Experimental Naturall Philosophy* (1663; 1744); Hooke's Cutlerian lectures (published 1705); and Joseph Moxon's *Mechanick Exercises* (1677–1680; 1703). These publishing milestones coincided with changes in several material and economic factors that are commonly adduced as causes for the Industrial Revolution in the British Isles: a national economy powered by high wages, cheap energy (in the form of abundant coal) and an emerging consumer society; the advantage in technological expertise that Britain enjoyed from (for example) its pre-existent watch-making, ship-building and hand cotton industries; the reorganisation of the agrarian economy's institutions through enclosure and capitalisation; the growth of empire and international trade; and the constitutional consolidation of Britain's relatively liberal representational government.[37] Given the weight of these extra-cultural forces and the importance to them of Britain's wealth in human capital (that is, the numeracy, literacy and technical accomplishment of skilled workers), it is if anything remarkable that the softening of high-culture attitudes to artisans happened as slowly and gradually as the evidence in this book suggests it did.[38]

The older negative attitudes to mechanical expertise had deep roots in classical and Humanist thought.[39] For Socrates in Xenophon's *Oeconomicus* it is a given that people in 'so-called banausic occupations' have low status, since their sedentary and time-consuming work leaves them too weak to serve as soldiers and too busy for deep friendship or public service.[40] The social consequence, spelt out by Henry Peacham in *The Compleat Gentleman* (1622), is that mechanical arts and artists can have 'no share at all in Nobilitie or Gentry [. . .] because their bodies are spent with labour and trauaile'.[41] (It is worth noting, however, that Peacham's brief account of ancient Greek geometry and machine building was an inspiration for the Marquis of Worcester's engineering career and ultimately for his *Century of Inventions*).[42] In 1717 Lady Mary Wortley Montagu drew a case in point from the community of Greek nobles that she found clinging on in the Fener district of Ottoman Instanbul, women of royal blood reduced to weaving,

> In mean Mechanic Arts obscurely lost,
> Those Eyes a second Homer might inspire,
> Fix'd at the Loom, destroy their useless Fire.[43]

Drudgery destroys beauty, but the intellectual damage done by repetitive work, however skilled it may be, was understood to be even more severe. It was the apparently limited quality and scope of artisanal knowledge that lowered the social status of artisans. As Ralph Cudworth explained in his *Intellectual System of the Universe* (1678), paraphrasing Aristotle, 'We account the Architects in every thing more honourable than the Manuary Opificers, because they understand the Reason of the things done, whereas the other, as some Inanimate things, only Do, not knowing what they Do.'[44] The only difference between the fall of a lead weight and the fall of the workman's hammer is that one is caused by its nature, the other by unreflective habit. Neither belongs to the realms of rational judgement or deduction, and one is as inarticulate as the other. 'In a workshop it is the moment that speaks, and not the artisan', wrote the mathematician and encyclopaedist Jean D'Alembert, a man more committed than any of his British contemporaries to the business of interviewing skilled mechanics and engineers.[45] When writers like Hume and Ferguson draw analogies between the literary and the mechanical arts, they oppose themselves conspicuously to these sorts of long-established negative attitudes.

Placed beyond the pale of beauty, reason and eloquence, the skilled manual worker was triply disqualified, it seems, from the realm of poetry. And yet the excluding contrast between literary invention and manual craft

had always been a source of ambiguity in Humanist critical thought. Sir Philip Sidney was at his most conceited when he used the parallel to argue that poems are real essences, not mere imitations or fictions: 'for euerie vnderstanding', he pointed out, 'knoweth the skill of ech Artificer standeth in that Idea, or fore conceit of the worke, and not in the worke it selfe'.[46] The aphorism is pointed with paradox. The defining characteristic of skilled artificers (as opposed to Cudworth's architect) is their instrumental focus on producing the work itself. Sidney's figurative language is self-consciously over-wrought. Indeed, the metaphor of the artificer-as-thinker made just as much sense the other way around. 'Many a fair Precept in Poetry', wrote John Dryden, reflecting on his attempts to follow rules set out by Wentworth Dillon, Earl of Roscommon, in his *Essay on Translated Verse* (1684), 'is like a seeming Demonstration in the Mathematicks; very specious in the Diagram, but failing in the Mechanick Operation.'[47] In both cases, however, the implied point is one about technical completeness and the essential balance between work and idea. Samuel Johnson, who used Dryden's line on poetical precept when defining the word 'Mechanick' for his *Dictionary* (1755), shone a characteristically harsh light on that balance in *The Rambler* no. 9: 'The philosopher may very justly be delighted with the extent of his views, and the artificer with the readiness of his hands; but let the one remember, that, without mechanical performances, refined speculation is an empty dream, and the other, that, without theoretical reasoning, dexterity is little more than brute instinct.'[48] For all its symmetry, the framing of Johnson's equation offers a tough judgement on the integrity of mechanical knowledge.

Other eighteenth-century commentators added a significant qualification to these commonplace denigrations of artisanal expertise. Often the slighting of mechanical knowledge emphasised a question of ownership. Expert technicians, it was argued, worked on materials that did not belong to them properly. Thomas Hobbes, always a sceptic when it came to the encouragement of useful arts, thought the attribution of material agency to technicians involved a kind of usurpation. 'Arts of publique use', Hobbes observed,

> are Power: and though the true Mother of them, be Science, namely the Mathematiques; yet, because they are brought into the Light, by the hand of the Artificer, they be esteemed (the Midwife passing with the vulgar for the Mother,) as his issue.[49]

This doubting line of thought was relevant to the literary arts as well. Writing a century later, the poet Edward Young used it to assert personal

creativity as the basis of literary ownership. Truly original works must grow organically from the root of genius. Mere poetic 'Imitations', by contrast, 'are often a sort of *Manufacture* wrought up by those *Mechanics, Art*, and *Labour*, out of pre-existent materials not their own'.[50] For Young neither art nor labour escapes servile status. Both are doomed to work on the creations of others.

Another strain of eighteenth-century commentary on this question was more relaxed, however, about what practitioners do not need to know at the level of theory. It was more interested in the kinds of practical knowledge that they use instead. The satirist and physician John Arbuthnot's 1701 defence of mathematic learning makes a point like that of Hobbes but with a slightly different emphasis:

> He, that should present to draw by the Geometrical Rules of Perspective, or Compose *Musick* meerly by his skill in Harmonical numbers, would shew but auwkward performances. In those Compos'd Subjects, besides the stiff Rules, there must be Fancy, Genius, and Habit. Yet nevertheless these Arts owe their being to *Mathematicks*, as laying the foundation of their Theory, and affording them Precepts, which being once invented, are securely rely'd upon by Practitioners. Thus many design, that know not a tittle of the reason of the Rules, they practice by.[51]

Unlike Hobbes, with whom he shares a confidence in the ascendancy of mathematical truth, Arbuthnot also takes seriously the claims of creative imagination and habituated, rule-based skill. In music or painting the composer's failure to understand the mathematical principles of the work at hand does not really matter. Indeed, it is necessary if stylistic stiffness is to be avoided. D'Alembert, another mathematician, made a similar point in his preliminary discourse to the *Encyclopédie* (1751). The practice of fine arts depends on personal talent, and 'the rules which have been written concerning these arts are, properly speaking, only the mechanical part. Their effect is somewhat like that of the telescope; they only aid those who see.'[52] As with Hobbes, Young and Arbuthnot, the identification of mechanical process as a separate component, essential but inferior, within any creative act that involves originality and inventiveness as well, allows D'Alembert to complete his account of the fine arts.[53] Technical rules have their place, though only in a system where the artist's accomplishment is a given. That skilfulness also has its prior sources – in iteration, imitation, instinct. The mock arts are distinctive in their recognition of how these necessarily extra-discursive elements of personal knowledge, experience and skill can still be co-located within a rational didactic.

One sign of the improving status of manual skill during the period was its regular appearance as a metaphor for human cognition. Quite apart from being a figure for thoughtlessness, as it had been for the ancients, mechanical dexterity helped early-modern writers to describe thought itself. At the beginning of the long eighteenth century philosophers of mind began to use the skilfulness of the artisan or mechanical performer to represent aspects of thinking that were recognisable as processes – artistic invention among them – but were otherwise difficult to explicate. In his essay 'Against Confidence in Philosophy' Joseph Glanvill wrote about the '*secret Art* of the Soul (if *that* direct) to which we are altogether strangers' but which allows us to understand, for example, how '*such* an *Image*' perceived by our senses '*signifies such an Object*'. At the heart of our thinking, wrote Glanvill, there is

> a Knowledg that we do *not know* [...] as we see an Artist will play an Instrument of Musick without minding it; and the Tongue will nimbly run divisions in a Tune without missing, when the Thoughts are engaged elsewhere.[54]

The structure of Glanvill's metaphor is revealing. He uses a function of what psychologists discuss in terms of automaticity and procedural knowledge in the cognitive unconscious – a musician's ability to uncouple conscious focus from complex haptic performance – to explain a more fundamental act of perception and understanding.[55] John Locke did something similar in his *Essay Concerning Human Understanding* (1690), showing how the ideas that we experience as immediate sense impressions are really shaped by 'experience, improvement, and acquired notions'.[56] A particular function of the mind is to create general ideas, a process which we experience as passive and natural, but which in fact involves the active plastic power of the judgement. So our capacity to classify natural things into species, and our 'sorting of them under Names', is attributed by Locke to the peculiar '*Workmanship of the Vnderstanding, taking occasion from* the *similitude* it observes amongst them, to make abstract general *Ideas*'.[57] With the artisanal 'workmanship' metaphor Locke puts an ironic emphasis on how willingly we take these wrought-up classifications to be real essences.

This touch of facetiousness was noticed by Locke's erstwhile pupil, the third Earl of Shaftesbury. In 'Soliloquy: or Advice to an Author', the third treatise collected in his *Characteristicks* (1711), Shaftesbury argues against Locke for the reality of an innate human moral sense.[58] One of the analogies he uses is with the special faithfulness that artisans have to the

'*Justness* and *Truth of* [their] *Work*' (however idle or dissolute, he sniffs, they might otherwise be). This 'natural Fidelity' of mechanics to the integrity of their arts is a perfect analogy, Shaftesbury argues, for the attachment of virtuous persons to the principles of '*Probity* and *Worth*':

> For is there not *a Workmanship* and *a Truth* in Actions? Or is *the Workmanship* of this kind less becoming, or less worthy our notice; that we shou'd not in this Case be as surly at least as the honest *Artizan*, who has no other *Philosophy*, than what *Nature* and his *Trade* have taught him?[59]

Shaftesbury's point is about personal morality and knowledge. The 'zeal and honesty' that he identifies with craftspeople he finds missing from the work of professional philosophers like Locke. Isaac Watts, who admired Locke for managing 'to break our philosophical fetters, and to give us farther release from the bondage of ancient authorities and maxims', went some way in *The Improvement of Mind* (1741) towards reconciling these two positions by further elaborating Locke's 'workmanship' metaphor, giving it a pragmatic and mercantile spin.[60] Whatever improvements of mind a person attains through their own reasoning, 'these may be called his proper Manufactures', wrote Watts; 'and whatsoever he borrows from Abroad these may be termed his *foreign Treasures*: both together make a wealthy and happy Mind'.[61] The evolution of Locke's 'workmanship' metaphor from a way of describing simple cognitive functions into a larger figure for the morality of knowledge seems especially characteristic of the age of Enlightenment political economy. Writing slightly later in the century on the cognitive division of labour in a manufacturing nation, Ferguson predicted that 'thinking itself, in this age of separations, may become a peculiar craft'.[62] The idea of the artisan has this peculiar affordance, its capacity to make sense of connective personal thought within larger social and material divisions.

By the middle of the eighteenth century, it was increasingly common to see a further softening in the old critical positions that denigrated mechanical expertise (interestingly, it was proto-Romantic 'Moderns' like Young who were most likely to toe the older line). Edmund Burke's *Philosophical Enquiry into the Sublime and the Beautiful* (1757) often reads like a mock art delivered with a Newtonian straight face. At one point Burke justifies his book's stiff inductive theorising by comparing artists who work without a critical method to mechanical engineers who work without scientific knowledge (as had Arbuthnot before). The simile is now carefully balanced:

> Poets, and orators, and painters, and those who cultivate other branches of the liberal arts, have without this critical knowledge succeeded well in their several provinces, and will succeed; as among artificers there are many machines made and even invented without any exact knowledge of the principles they are governed by [. . .] Men often act right from their feelings, who afterwards reason but ill on them from principle; but as it is impossible to avoid an attempt at such reasoning, and equally impossible to prevent its having some influence on our practice, surely it is worth taking some pains to have it just.[63]

The mood here is heuristic and pragmatic. Burke adds the criterion of philosophical justness almost as an afterthought. By comparing the liberal arts with those of mechanical artificers, he positions his theory of the sublime, rather incongruously, in the realm of useful knowledge – of an Enlightenment culture that 'spent an enormous amount of intellectual energy', as Joel Mokyr puts it, 'on describing what it could not understand' – or on theorising where it had no 'exact knowledge' of principles. Burke's friend Sir Joshua Reynolds strikes a similar note in the sixth of his fifteen *Discourses on Art* (delivered 1769–1790, complete edition 1797), a sceptical broadside against theories that locate artistic 'Genius' beyond the rules of art, as 'a power which no precepts can teach, and which no industry can acquire'. The rules by which creative artists work are 'of such a nice texture as not easily to admit being expressed in words', Reynolds writes. But this does not make them any less real to the mind of the artist, who works from them 'with as much certainty, as if they were embodied, as I may say, on paper'.[64] Genius, according to Reynolds, is the child of industry and imitation, not of inspiration. This is an argument that would later horrify William Blake and William Hazlitt, but which seems an especially clear expression of the spirit of the British Industrial Enlightenment and its acute sense of the cognitive depth of expert mechanical work.

Satire and Industrial Enlightenment

It is important to stress here that any softening in elite attitudes to the mechanical trades during the eighteenth century was partial and incomplete. Writings by or about expert artisans could have only so much relevance to a polite culture that remained, until the Romantic period at least, almost entirely in thrall to aristocratic norms. In the second half of the century, poets and novelists began to pay a little more attention to such expertise, focusing usually on displays of curious mechanical objects, rather

than on the engineers who made them, or on more everyday applica-
tions.[65] Tristram Shandy seeks out Lippius's astronomical clock in Lyons
cathedral, and his father and uncle get excited about the sailing chariot
made by the Flemish mathematician Simon Stevin.[66] Frances Burney's
Evelina is doubtful about the various automata she sees at James Cox's
mechanical museum, and Seward wraps Abraham Darby's foundries at
Ironbridge in Cyclopean gloom.[67] These well-known examples help illus-
trate a second more general point about the mock arts. There was a
contemporary literary response to the Industrial Enlightenment, and it
was complex and engaged. Its prevailing modes, however, were oblique,
ironic, doubtful and often satirical.

Poems or other literary writings that were straightforwardly positive in
their investigations of mechanical innovation did appear. Robert and
James Dodsley's publishing house, which since 1735 had built its reputa-
tion on literary miscellanies and high-profile poetry, was notably support-
ive of such work during the 1750s and 1760s, as we will see in Chapter 5.
Dodsley began his writing career as one of the labouring-class poets who
emerged during the 1730s after the popular success of the thresher-poet
Stephen Duck. Writers of this kind, whose works are collected in John
Goodridge's *English Labouring-Class Poets* anthologies, represent a trad-
ition of exceptions that prove the point about satire and irony.[68] Their
patrons promoted them invariably as examples of a 'natural genius' that
connected directly with high literary culture. Poets like Duck, Mary
Collier and Ann Yearsley had good financial reasons for cleaving to those
high-culture norms.[69] But the consequence was that the literary writers
who had the most direct experience of mechanical processes – those from
the labouring classes – wrote little about the skills content or technical
development of the work they described. Correspondingly, the prevailing
tendency among educated eighteenth-century authors who did notice the
rising tide of mechanical invention and sensed its wider significance was to
engage with it as an object of irony and satire, rather than of personal
identification or professional pride. For better or worse, they wrote mock
arts instead of technical treatises.

The satirical postures adopted by eighteenth-century writers when they
dealt with the mechanic arts were shaped by older, seventeenth-century
squabbles between scholastic humanism and the new science, between
cavalier wits and round-head reformers, between the ancients and the
moderns. In 1610 Ben Jonson had exposed mechanical tricks played by
alchemists – 'Of coz'ning with a hollow coal, dust, scrapings; [. . .] And
taking in of shadows, with a glass', and so on.[70] Jonson's most faithful

follower in the Restoration period, Thomas Shadwell, adapted this line of dramatic satire in 1676 for the new breed of 'virtuoso', represented by his 'rare Mechanick Philosopher' Sir Nicholas Gimcrack, whose experiments always have an absurd practicality about them – learning to swim on a table by imitating a frog in a basin, bottling country air for later inhalation, and so on.[71] Somewhere between Jonson's alchemist and Shadwell's virtuoso, Samuel Butler introduced to the second part of his mock-heroic poem *Hudibras* (1664) the character Sidrophel, a composite based partly on the astrologer William Lilly and partly on the astronomer and Royal Society founding fellow Sir Paul Neile.[72] These comic characters mark the early establishment of a convention that looked at scientists as the butts of satire – for their craftiness, their delusions, their theatrical tendencies. The chief satirist was the Royal Society's patron himself, Charles II, who according to Samuel Pepys 'mightily laughed' at Sir William Petty and his Gresham College friends 'for spending time only in weighing of ayre, and doing nothing else since they sat'.[73]

It was significant that this sort of ridicule was noticed and resented by natural philosophers. It quickly provoked counterattacks against the wits and satirists themselves and, before long, became involved with methodological doubts about acuteness and celerity of creative intelligence more generally. In his *History of the Royal-Society* (1667) Thomas Sprat wrote a contemptuous admonition of 'this pleasant but unprofitable sort of men', pointing out that while satirists occupy themselves only with the '*deformity* of things', real philosophers enjoy 'a nobler and more masculine pleasure, which is rais'd from beholding their *Order* and *Beauty*'.[74] Hooke, who believed himself to be the target of Shadwell's satire, proposed a new 'philosophical Algebra' for natural philosophers, which would effectively exclude quick thinking from experimentation and observation: 'so that henceforward the business of Inventing will not be so much the Effect of acute Wit, as of a serious and industrious Prosecution'.[75] The *Reflections upon Ancient and Modern Learning*'s three-page conclusion was dedicated by William Wotton to answering the 'sly Insinuations of the *Men of Wit*' that experimental philosophy would always be fruitless.[76] In 1700 Sir Richard Blackmore made a blunt statement of the business case against the satirists: 'A Wit's an idle, wretched Fool of Parts, | That hates all Liberal and Mechanick Arts.'[77] At the turn of the eighteenth century the quarrel between the wits and the mechanical philosophers had become something of a zero-sum engagement.

As was sometimes the case with early-modern culture wars, more nuanced and ambivalent commentary emerged later, in this case towards

the end of the seventeenth century.[78] Satire and mechanical science were not irreconcilable. After all, satirical wit had a natural affinity with Daedalean mechanical 'ingenium', as Juvenal himself had indicated in his programmatic first satire.[79] The invention of artisans is more about cognitive adroitness than rational rigour, and this is something it has in common with the skill of the satirist. Both deal in what a disapproving Thomas Hobbes called 'that Crooked Wisdome, which is called CRAFT', distinguished from '*acquired Wit*, (I mean acquired by method and instruction)' – of which there is 'none but Reason'.[80] Isaac Barrow in his *Several Sermons Against Evil Speaking* (1678) defined satirists in mechanic terms as '*dexterous* men', who raise admiration for 'a rare quickness of parts, that one can fetch in remote conceits applicable; a notable skill, that he can dexterously accommodate them to the purpose before him'.[81] These sorts of statement are in the background of Locke's more famous distinction between wit and judgement. In the *Essay Concerning Human Understanding* Locke figures the former as a kind of deft material construction, 'the assemblage of *Ideas*, and putting those together with quickness and variety', and the latter as a slower analytical process in which ideas are separated out.[82]

All of these identifications of wit with the dexterity of mechanical operations are critical. They are consistent, however, with the positive descriptions that satirists made of their chosen mode of writing. The well-known statement on 'fine raillery' that Dryden wrote for his 'Discourse Concerning the Original and Progress of Satire' (1693) is based on an extended analogy between satire and the accurate motor skills of an expert artisan. As an element of the art of satire, raillery is 'the Mystery of that Noble Trade; which yet no Master can teach to his Apprentice: He may give the Rules, but the Scholar is never the nearer in his practice'.[83] Dryden boasts of how he managed to ridicule so powerful a man as the Duke of Buckingham – 'Zimri' in his *Absalom and Achitophel* (1681) – without getting into serious trouble: 'If I had rail'd, I might have suffer'd for it justly: But I manag'd my own Work more happily, perhaps more dextrously. I avoided the mention of great Crimes, and apply'd my self to the representing of Blind-sides, and little Extravagancies.'[84] This alignment of satirical deftness, represented here by diplomatic dexterity, with mechanical expertise is the basic principle of the Enlightenment mock arts, and it runs through nearly all the texts discussed in this book.

These figurative usages suggest that writers like Dryden saw an affinity between satire and mechanical ingenuity. But did that perception include a sense of its relevance to the advancement of human knowledge more

generally? Can the energetic wit of the satirist help to boost larger movements of cultural or practical improvement? The received conjecture about technical progress for much of the seventeenth century was set out by Francis Bacon, who put it down as a maxim that the mechanical arts are opposed to natural philosophy, because in the sciences 'the first Author goeth furthest, and time leeseth and corrupteth'. In the mechanical arts, by contrast,

> we see that the opposite happens – which, as if they were partaking of a certain breath of life, grow and get better by the day, and with their first authors they mostly seem primitive, burdensome as a rule, and ugly, but afterwards they acquire new virtues and a certain handiness.[85]

The 'idols' of philosophy and science are broken as they pass from master to pupil, whereas the mechanical sciences propagate and multiply – irregularly, but steadily.

Looking at the historical record, Bacon's followers noticed his conjecture was easy to falsify. History shows that technical progress is more likely to break down after isolated periods of invention. The artisanal trades are subject to their own kind of atrophy. After all, the triumphs of ancient classical technology were lost for a millennium.[86] In 1648 John Wilkins allowed that a comparison between the engineering works of Rome and their gothic equivalents 'may seeme to inferre a decay in these Mechanicall Arts'. He insisted only that the conclusion is not a necessary one:

> Wee shall finde that it is not the want of art that disables us for them, since these Mechanicall discoveries are altogether as perfect, and (I think) much more exact now, then they were heretofore; but it is, because we have not either the same *motives*, to attempt such works, or the same *means* to effect them as the Ancients had.[87]

An early-modern example was that of the cluster of transformative innovations that happened in fifteenth-century Germany, with the printing press, the compass, gunpowder and iron production. Despite initially wide-ranging social and economic benefits, this surge of inventions slowed down once local knowledge bases were exhausted. 'It is not laudable', Gottfried Wilhelm Leibniz admitted in 1669, 'that we Germans were the first in the invention of mechanical, natural, and other arts and sciences, but are now the last in their expansion and betterment.'[88] Looking at this technological slowdown from a satirist's perspective, Swift made a gnomic observation in his 'Thoughts on Various Subjects' (1711): 'The greatest Inventions were produced in times of Ignorance; as the Use of the Compass, Gunpowder, and Printing; and by the dullest Nation, as the

Germans.'[89] This is one of Swift's maxims in the manner of La Rochefoucauld, a style of writing that represents formally the fragmentation of human knowledge. So the ambiguity of the statement is certainly intended. There is not only a Houyhnhnm-ish hint at the ephemerality of all modern inventions but also a wry acknowledgement of the unfruitfulness of cultures that value wit and deprecate dullness. This is all wrapped up in a presentation that is, above all, self-consciously witty.

The complexity of Swift's maxim lies in its refusal to claim a direct relation between the general advancement of civilisations (as displayed in the neo-classical culture of politeness and wit that Swift himself valued deeply and subverted compulsively) and the specific advancement of technological invention. A later generation of enlightened Scottish commentators were, as we have seen, more straightforward in making that connection. In a well-known letter of 1755 to the editors of the *Edinburgh Review*, Adam Smith noted how once-inventive nations like Italy and Spain, where 'the first dawnings of modern genius appeared', have suffered their learned culture to be 'extinguished altogether', largely through state-imposed limitations on the print trade. Meanwhile the failure of the Germans to cultivate their language in the manner of the French and English has confined them to 'sciences which require only plain judgment joined to labour and assiduity, without demanding a great deal of what is called either taste or genius'.[90] Early modern France's disposition to 'judgment, propriety and order' has evolved, according to Smith, into an enlightened culture of systematisation represented by D'Alembert and Denis Diderot's *Encyclopédie*. But the British alone have prized 'imagination, genius and invention' above all other qualities. It seemed obvious to Smith that the scientific advances of Bacon, Newton and Boyle have a deep connection with the literary achievements of Shakespeare, Spenser and Milton. In the works of these representative British poets

> there often appears, amidst some irregularities and extravagancies, a strength of imagination so vast, so gigantic and supernatural, as astonishes and confounds their reader into that admiration of their genius, which makes him despise, as mean and insignificant, all criticism upon the inequalities in their writings.[91]

Literary irregularity and extravagance – associated conventionally with the inventive energies of satire and by many, including Smith, with Swift's satire in particular – belong to the same set of cultural tendencies that also produce the tragic and epic sublime.[92] The culture of invention is represented as something powerful, disorderly and nationally specific. Smith's

descriptions of these connections were impressionistic and conjectural, but he placed them at the heart of the Enlightenment's narrative of its own unfolding.

Eighteenth-century literary writers who looked at the question of technological progress agreed that any threat to these lucky cultural connections between thinking and inventing – between literature, science and technological practice – was a problem. They felt that the intellectual and material poles of society needed to be brought closer together. This was a matter of communication, and eighteenth-century satirists set themselves to berating natural philosophers for failures to adapt their discoveries to practical and mechanical applications. Arbuthnot wrote his serious *Essay on the Usefulness of Mathematical Learning* (1701) to make this point.[93] A quarter of a century later his friend Swift structured the third part of *Gulliver's Travels* (1726) around the idea of a nation ruled by mathematicians on a flying island and the consequences of their indifference to the absurd mechanical inventions carried out in their name on the mainland below them.[94] Voltaire amplified Swift's earlier observation about the late-medieval invention of gunpowder, looking-glasses, copperplates and so on – that 'all these great Changes happen'd in the most stupid and barbarous Times' – in his *Lettres Philosophiques* (1734), but with a reservation built into his satire: 'I am far from inferring from hence, that we are to confine our selves merely to a blind Practice, but happy it were, wou'd Naturalists and Geometricians unite, as much as possible, the Practice with the Theory.'[95]

In Swift's circle it was Pope who wrote best about the literary side of this task – that is, about what relation modern science and mechanical trade might have to his own creative powers. Throughout his career he returned to the image of delicate cultural mechanisms put into regular motion by dead weights:

> As, forc'd from wind-guns, lead itself can fly,
> And pond'rous slugs cut swiftly thro the sky;
> As clocks to weight their nimble motion owe,
> The wheels above urg'd by the load below:
> Me Emptiness, and Dulness could inspire,
> And were my Elasticity, and Fire.[96]

After offering similes drawn from the mechanics of projectiles and of clockwork, Pope caps the passage with a reference to 'Elasticity, and Fire', a conjunction of words associated with Boyle's celebrated experiments with the air pump, but which refers here to his own inspiration as a

poet.[97] The wind-gun was itself a much-investigated instrument in trials of the extreme compressibility of air.[98] As ever, there is a clear indication of the seriousness of Pope's engagement with the mechanical sciences built into his satire on the dullness of the broader modernistic culture that surrounded them. And behind it there is a bolder claim: that to set the discoveries of the scientific revolution into motion, and to make that motion orderly and meaningful, the imaginative elasticity of the poet and the fire of the satirist remain indispensable.

Machines of Books and Works

Satire mixes incongruous elements. Satires or 'saturae' are 'full of various Matters', as Dryden wrote in the 'Discourse Concerning Satire', 'and are also Written on various Subjects'.[99] One of the effects of miscellaneity is that it draws attention, in the absence of any other defining principle, to whatever vessel contains the mixture. In the banqueting metaphor used to describe ancient satirical writings the vessel is a 'satura lanx' – 'in English', Dryden explained, 'a Charger, or large Platter' – where different foods are tumbled together.[100] In the case of modern satire, the combination happens in the printed or written medium itself, and it draws attention to the material text. The most characteristic media for eighteenth-century satires – verse or prose miscellanies, manuscript centos, periodicals, mock books, parallel-text editions – were mixed, rather than monographic, formats. They suited a literary mode that 'displays the cloven hoof, or lengthen'd ear' – a mode dedicated, that is, to revealing impurity in things which seem unadulterated, diversity in apparent conformity, and hybridity in things that seem simple or ideal.[101]

This leads to a third point about the Enlightenment mock arts, the peculiar sub-category of satire and didactic under discussion here. The mock arts were part of a more general softening, as we have seen, in the old division between mechanical knowledge and the liberal arts. This softening coincided with a new self-consciousness among writers – and among satirists especially – about the mediation of their literary works in printed books and pamphlets.[102] It is unsurprising that many of the Enlightenment mock arts involve experiments in the material form of the printed page or feature satire that plays on ideas about the mechanical reproduction of literary texts. Often mock arts were the result of close collaborations between literary authors (usually belonging to the educated classes) and the printers and booksellers who made their books (usually belonging to the artisanal classes – though often very learned). Some of

those collaborations had technical, artistic and ideological significance, as well as more straightforwardly commercial ends.

The material peculiarities of Enlightenment mock art satires correspond with a growing self-consciousness among eighteenth-century authors about the role of printed texts in the communication of useful knowledge. Looking at seventeenth-century sources, it is striking how many commentators thought of books as material instruments for doing things, rather than as neutral media for acts of essentially verbal communication.[103] Often they classified products of the press as belonging to the same technological order with machines and tools.[104] Sometimes printed texts were compared unfavourably with machines in terms of their productivity and effectiveness; sometimes books were placed above them in an historical scale of technical progress. In *The Advancement of Learning* Francis Bacon listed among the major defects of early-modern universities and colleges their focus on education through printed texts. He encouraged chemists and other experimentalists to swap books for tools in their search for knowledge:

> to sell their Bookes, and to build Fornaces, quitting and forsaking *Minerva*, and the *Muses*, as barreyne virgines, and relying vpon *Vulcan*.[105]

This passage was much alluded to in eighteenth-century encyclopaedia entries for 'Books'. Both James Harris in his *Lexicon technicum* (1704–1710; supplementary vol. 1744) and Ephraim Chambers in his *Cyclopaedia* (1728; supplementary vols. 1753) paraphrased it, reporting it as a common complaint that '*books* have turned other instruments of knowledge out of doors, as experiments, observations, furnaces, and the like'.[106]

The opposition of books to apparatuses prompted writers to swap them around in their figurative language and in their theoretical thinking as well. Another seventeenth-century thinker, Sir Kenelm Digby, gave books a more conspicuous place in the progressive order of '*Opera* or *labores hominum*; as houses, Townes, Tillage, Handicrafts, Armes, shippes, Commonwealthes, Armies, Bookes, and the like'. Digby's philosophical method was to begin with an anatomy of simple human perceptions and to

> goe on by degrees, compounding them, till we come to faddome those great and admirable machines of bookes and workes, which he (as I may say) weaueth out of his owne bowels.[107]

Digby's mixed metaphors place books and their textual content with machines at the top of a scale of advancing human knowledge that is originally and, he implies, essentially technological. When a slightly later

generation of natural philosophers led by Boyle looked to the experimental sciences for new knowledge about chemical or physical processes, they promised (as Glanvill explained) to 'inable a man to perform those things *Physically*, that seem to require *Books*, and *dexterity* of hand proper to *Artificers*'.[108] Literary and mechanical knowledge may seem like opposites, but the larger contrast with natural philosophy shows that they belong to analogous categories of artificial human learning. When Boyle's follower Moxon published his encyclopaedic magazine of *Mechanick Exercises, Or, the Doctrine of Handy-works* (1677–1680) he began with a description of basic iron-smithing, proceeding to various artisanal processes in an ascending scale of complexity. The most complicated mechanical process of all, occupying a whole second volume (1683) in the collected version, was the production of books. Although less intricate than watchmaking or loom design, and less grand than shipbuilding, at the turn of the eighteenth century the work of printers and booksellers retained joint status as exemplary advanced mechanic practices, in a way that the work of industrialists and operators of spinning jennies, steam engines, water frames and coke smelting furnaces would seventy or eighty years later.

The willingness of seventeenth-century writers to classify books and machines together in a common category – both are 'instruments of knowledge' – provides a context for later eighteenth-century debates about copyright and the nature of authorship. Both were subject to a characteristically enlightened conflict of arguments. On the one hand, restrictions on intellectual property clashed with Baconian ideas of useful knowledge as essentially common and cooperative, and smacked of commercial monopoly. On the other, pragmatism dictated that invention should be incentivised and protected. Justice demanded that ingenuity be rewarded.[109] At the beginning of the century, printing patents were disputed more often in courts of law than patents for mechanical inventions, and the concept of intellectual property formed itself more rapidly around developments in literary copyright.[110] When Jethro Tull worked out methods for regularised cereal cultivation, for example, he protected them and profited from them through self-publication of his book *The New Horse-Houghing Husbandry* (1733), rather than through patents on his hoe and seed-drill hardware.[111]

In 1762 Adam Smith asserted the force of copyrights and patents by yoking the two together, since 'the property one has in a book he had written or a machine he has invented, which continues by patent in this country for fourteen years, is actually a real right'.[112] Fifteen years earlier, William Warburton had been at great pains to define the difference between books and machines in his *Letter from an Author, to a Member*

of Parliament, Concerning Literary Property (1747).[113] Warburton was a defender of booksellers' monopolies who had his own lucrative interests in the copyrights to Pope and (as editor) Shakespeare. Movable property may be divided into two kinds, according to Warburton: products of the hand, or products of the mind, 'as an *utensil* made; a *book* composed'. A particular utensil can only be a property in itself, whereas the property in a book 'extends to the *doctrine* contained in it', which the owner has an exclusive right to copy. Warburton drew a sub-distinction, however, between simple utensils and more complex mechanical engines:

> Yet because the Operation of the Mind is so intimately concerned in the Construction of these Works [i.e., mathematical machines], their Powers being effected and regulated by the right Application of geometric Science, all States have concurred in giving the Inventors of them a Licence of Monopoly, for a Term of Years, as on a Claim of Right.[114]

The license is limited because the claim is an imperfect one. The mathematical machine is a hybrid, but it is still more thing than idea, a 'utensil' defined by its intrinsic material purpose rather than as a vehicle for a higher 'doctrine'. Warburton's legal argument hangs on an analogy between the common process of licensing by which a mathematical instrument maker secures his or her imperfect right in court and the similar process by which a proprietor with a perfect right to a thing (for example, owners to the copyrights of Shakespeare or Pope) might apply to a court or to the legislature to better secure that right.[115]

It is important to stress, however, that Warburton's arguments seemed dubious to contemporary commentators and were ultimately rejected in the legal case that later undermined the old claims of literary copyright proprietors, *Donaldson v. Beckett* (1774). The anonymous author of *An Enquiry into the Nature and Origin of Literary Property* (1762) – identified by Donald Nichol convincingly although without final proof as the journalist and lawyer Arthur Murphy – was especially impatient with Warburton's 'many frivolous Distinctions [. . .] between a Book and a Machine'.[116] Warburton's contrast between works of the mind and works of the hand is 'false and ridiculous':

> the End of the Inventor is not fuller obtained in the first individual Machine [produced according to his or her design], than the End of the Author in the first Individual Book.[117]

In both books and machines, according to the Enquirer, the value of the original composition or device greatly outweighs the value of the materials used to reproduce it. Both kinds of object are hybrids. Both are more idea

than thing. These arguments and the legal decisions that were soon to ratify them indicate a significant eighteenth-century shift in the ontological status of ingenious inventions. Even though the 'end' of the instrument maker's design terminates in the machine itself, the conceptions that the design represents are as real and ideal as the literary component (or external 'doctrinal part') of an author's book. Once again, the differences between these two kinds of 'instruments of knowledge' have been flattened out, and it has become slightly easier to see machines, like books, as objects that encode and mediate human invention and ingenuity.

As printed satirical texts, the Enlightenment mock arts perform a corresponding movement of convergence, from the world of books towards the world of manufactured objects.[118] Of the three eighteenth-century authors connected most directly by modern book historians to typographic experiment and book-trade innovation – William Congreve, Pope and Sterne – two wrote mock arts, and all three were dedicated to comic and satirical modes.[119] Many of the mock arts mentioned already were also mock books. They appeared, that is, in texts whose material design was a burlesque of particular codex formats.[120] Swift's 'Mechanical Operation of the Spirit' appeared in the *Tale of a Tub* miscellany, which satirised and then mimicked the ponderous prefatory materials and scholarly furniture of a learned treatise collection. Arbuthnot's *Art of Political Lying* presented itself as a publisher's prospectus. Collier's *Art of Ingeniously Tormenting* and Sterne's *Tristram Shandy* both adapted the formats of humanistic enchiridions or handbooks, as is argued in Chapter 6. It was fitting that mock technical and mock didactic satires should appear in material formats that burlesque the design features of more serious publications. That they did so often suggests increasing self-consciousness among early eighteenth-century authors and readers about technical mediation and authorial intention. Recent work by book historians has taken an anti-intentionalist turn in its reading methods, investigating the contingent meanings generated by irregular forms and waste fragments that survived the early-modern print shop.[121] The satires explored in this book indicate that self-consciousness and doubt about instrumental intention were features of the discourse of useful knowledge as well.

Literature and Useful Knowledge

The special interest satirists took in the workings of the print trade has been commented on often.[122] It is worth adding to these comments that commercial and associational structures of the eighteenth-century

publishing businesses brought literary texts and practical books of useful knowledge together in a new way on the lists of the century's most successful booksellers. The family of James, John and Paul Knapton provides an example. John Knapton (1696–1770) rose, like his father James, to be master of the Stationers' Company three times in the 1740s.[123] When John first served out his term of apprenticeship to his father in the early 1720s and their names began appearing together on title page imprints, the Knapton list was dominated by religious–philosophical titles and high-profile dramatic authors.

From the 1720s onward that list grew much stronger in two areas. The first was literary. In 1728 the Knaptons became lead proprietors of the ten-volume *Works of Mr William Shakespeare* in Pope's edition of 1725, and they were co-publishers of Pope's letters in 1737.[124] The association continued after the poet's death. John Knapton worked closely with Warburton, publishing his nine-volume edition of *The Works of Alexander Pope* in 1751.[125] The second, contrastingly, was the area of popular mechanical science and useful knowledge. The first imprint to feature the names James, John and his brother Paul together appeared when they acquired the copy for John Lowthorp's abridgement of the Royal Society's *Philosophical Transactions* in 1722 and Bishop Sprat's *History of the Royal-Society* in the same year. The lead share in Harris's *Lexicon technicum* followed in 1723, when the Knaptons published its second volume in a second edition. They were lead proprietors of the expanded third edition of the georgic *Dictionarium rusticum* in 1726 and of Chambers's *Cyclopaedia* ('the pride of booksellers, and the honour of the English nation', according to the printer William Bowyer) when it first appeared in 1728.[126] These commissions and acquisitions set a pattern for the rest of John's and Paul's careers, culminating with their publication of Malachy Postlethwayte's two-volume translation and expansion of Jacques Savary des Brûlons's *Universal Dictionary of Trade and Commerce* in 1750.[127] The point is that in this prominent eighteenth-century booksellers' list the most prestigious literary (and often satirical) titles sat alongside the most solidly practical tomes of the Industrial Enlightenment, as two corresponding pillars of the trade. As we will see in Chapter 3, the publisher's list of the Knaptons' collaborator and rival for Pope's patronage, Robert Dodsley, shows a similar profile, with a more demonstrable ideological pattern.

The chronological sequence plotted out in the following six chapters makes an historical argument, to which the stories of the Knaptons and the Dodsleys give contextual support. British literary writers became

increasingly sophisticated over the course of the eighteenth century in their thinking about the function of books as tools for developing and communicating useful knowledge. By the final quarter of the century, it was common to see machines, literary minds and productive hands as belonging to a single entangled network – notwithstanding the subsequent efforts of the first Romantic generation to divide them out again. When the Enlightenment successors to Moxon sat down to write comprehensive accounts of the bookselling trades, they called their books *Printer's Grammars*, not *Printer's Manuals* or *Handbooks*. This choice was 'deliberate in its allusion to ordered discipline', David McKitterick comments, 'and also claimed for printers a place in the literary establishment'.[128] In 1778 the essayist Vicesimus Knox described the triangulation between mechanical printing, scholarly institution and enlightened literary society in his disquisition 'On the Art of Printing':

> From the ingenuity of the contrivance, it [printing] has ever excited mechanical curiosity; from its intimate connection with learning, it has justly claimed historical notice; and from its extensive influence on morality, politics, and religion, it has now become a subject of the most important speculation.[129]

By this point the interdependence between mechanical, scientific and literary–cultural worlds as represented by the print trade has become almost a matter of course. Only a few years later, the revolutionary expressive potential – and practical limits – of this combination find their ultimate representative in Blake. In the year of Knox's essay Blake made the unusual transition from apprentice mechanical engraver to student-artist at the Royal Academy. The illuminated books that he produced over the following decades proved that one artist (or artistic household) could join the mechanical roles of printer, engraver and bookseller to those of poet, artist, philosopher and prophet – albeit in a combination that was commercially unsustainable.[130] It is consistent with this book's argument that Blake made his main statement on that combination in his most satirical work. The wildest mock-book of them all is Blake's *Marriage of Heaven and Hell* (1790), with its satire on the Swedenborgian church and its surreal vignette of 'a Printing House in Hell'. In the margin of his copy of Reynolds's *Discourses* Blake scrawled, 'Mechanical Excellence is the Only Vehicle of Genius.'[131] That he wrote this in a spirit of irony and defiance brings him closer for a moment to the satirists of the early eighteenth century than to his own contemporaries. Blake's words provide a fitting coda to the paradoxical history of the Enlightenment mock arts.