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Article

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Gulliver, Medium and Technique

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Abstract. In the four Parts of Gulliver's Travels the narrator attends closely to the manual skills, crafts and techniques of the different countries visited and to the materials and instruments by which they are mediated. The patterned, motif-like presentation of these observations and their rich contextual background, historical and literary, indicate their special significance. These references to technique play an important, previously underappreciated roll in Gulliver. They form a thematic connection between its embodied, sensual, compulsive descriptions of the world and its socio-political satire, the latter focusing on technocratic, professionalized statecraft. They are crucial to the peculiar fullness with which Swift's writing imagines different communities of practice, different ecologies of mind.

I.

Readers of Robinson Crusoe (1719) have always complained about a perceived unfairness at the start of the novel's main island episode. Daniel Defoe gives his hero a head start on island life when he has him rescue various tools, materials and supplies from the wreck of his ship.¹ Even Crusoe becomes aware that the technological and logistical leg-up puts pressure on an idea that is crucial to his embattled sense of self. According to Crusoe, it is diligence and reason alone, unaided by social cooperation or prior technical knowledge, that have guaranteed his prosperity on the desert island. Mere rational labour has taught him how to make things: shelters and enclosures, tables and chairs, clothes and containers. 'By stating and squaring every thing by Reason', Crusoe says, 'and by making the most rational Judgment of things, every man may be in time Master of every mechanick Art':

I had never handled a Tool in my Life, and yet in time by Labour, Application, and Contrivance, I found at last that I wanted nothing but I could have made it, especially if I had Tools; however I made abundance of things, even without Tools...²

Despite his defensive special pleading about the tools, Crusoe is arguing on good authority. Joseph Moxon, the leading writer on manual arts in Defoe's lifetime, structured his Mechanick Exercises (1677-83) around a single technical principal: that a craftsman is master of his trade only when he can 'perform, or direct others to perform from the beginning to the end, all the Handy-works and Physical Operations' of a given technology, and not through the passive acquisition of trade skills, but 'by his own Judgement, from solid reasoning with himself'.³ By this way of thinking there is no mechanical process so hedged

around with craft mystery that it cannot be worked out by rational practice. Moxon's patron Robert Boyle had laid out the theory behind this idea in his treatise on The Usefulness of Experimental Natural Philosophy (1671), when he showed how the greatest intricacies of any tradesmen's work are explicable in terms of '*Corollaries deduc'd from some particular Physical Observations*'.⁴ Likewise, for Defoe there is no mystery in the mechanical arts. The social dimension of the knowledge that they entail – the communal aspect of their 'tacit component', as Michael Polanyi would call it – is by no means intrinsic to their practical function.⁵ Were Defoe around today he would agree with a characteristic maxim of twentieth-century cultural anthropology, that 'the social relations of production are not, nor can they be, technical relations'.⁶

For some time now critics of Robinson Crusoe have been exploring Defoe's representations of manual technologies and their contexts.⁷ But no comparable attention has been paid to a near-contemporary tale of shipwreck and technical improvisation, Jonathan Swift's Gulliver's Travels (1726).⁸ This is surprising, because the treatment of mechanical technique in Gulliver is far more deeply imagined than it is in Crusoe. There is a strict if troubled separation between Robinson's technical work (manufacture, horticulture, armed conquest) and his social practice (religious observation, home life with Friday), and the separation tends to impoverish both. In Gulliver, by contrast, Swift describes four worlds in which tools and techniques have many different degrees of entanglement with social organization and civil life. Defoe's treatment of doing and making is perhaps more modern, more scientific at a basic level, in its attempt to abstract manual processes from unreflective habit or inherited craft.

One feels that Defoe, like many of his contemporaries, would prefer to describe craft practice mechanically, in terms of quantifiable forces operating on measurable masses.⁹ Swift, on the other hand, makes Gulliver report on techniques and technologies that he finds intact as material, cultural and cognitive processes. ‘Technology is a science’, writes the ethnologist François Sigaut; ‘and because technical facts are facts of human activity, it is a human science, and branch of anthropology’.¹⁰ As a satirist of proto-anthropological travel writing Swift is hardly in the scientist’s business of observation or systematic description.¹¹ And yet in Gulliver he approaches ‘technical facts’ (even imagined ones) from something like an anthropologist’s perspective. Unlike Defoe, he sees that material techniques and processes are also social phenomena, and that they can be understood only in terms of the intentions of socialized humans.

This essay focuses on four instances of technical mediation described in this way in Gulliver’s Travels. Initially they may seem rather diverse. First is the deployment of strings, ropes and cables in Part I, the voyage to Lilliput. Second (which I discuss only briefly) is the use of carpentry and cabinetmaking in Part II, the voyage to Brobdingnag. Third is the operation of machines in Part III, especially those designed to simulate speculative reasoning. And fourth is the very primitive, pre-mechanical manufacturing – wattling, sledge-making, shelter-building – that Gulliver encounters among the Houyhnhnms in Part IV. All four of these cases involve ‘techniques’ in the basic sense of that term – ‘an ensemble of movements or actions’, as Marcel Mauss defined it, ‘in general and for the most part manual, which are organized and traditional, and which work

together towards the achievement of a goal'.¹² The instances that I have selected from Parts I (strings) and III (machines) draw attention to the mediation of techniques through materials or instruments, while the instances from Parts II (carpentry) and IV (primitive craft) are more ends-orientated, more practical and productive. But I do not want to dwell on the satirical patterning of Swift's book. It is the differences between Gulliver's various 'socio-technical imbroglios' – to use Bruno Latour's phrase – that must be stressed here, because each is intended to express the particularity of a different social grouping.¹³

But to say this only goes so far towards explaining why Jonathan Swift, a clergyman and writer who does not seem otherwise to have had any special interest in artisanship, returned so insistently to descriptions of material processes in Gulliver's Travels.¹⁴ The argument of this essay is that the attention Swift pays to technique plays a crucial part in his depiction of different ecologies of mind in each of the four Parts of the satire. Technical intelligence brings together both the most ordinary physical experiences of the world and, at the same time, the most large-scale reflections on the cultures and political organizations that we inhabit. Assembling a steady three-legged stool is one kind of making, adjusting the balance of powers within a national constitution is another. In classical political theory these two spheres of activity – the *techne* of the craftsman, the *praxis* of the statesman – were always kept apart.¹⁵ Swift loved the classical moral order that produced this socio-ethical distinction. He hated those who thought themselves superior to 'the Vulgar and Illiterate', although he was never shy of expressing contempt for them himself (271).¹⁶ Nevertheless, his writing is instinct with what the human geographer Nigel

Thrift has called ‘a poetic of the common *practices and skills* which produce people, selves, and worlds’.¹⁷ Gulliver is vividly imagined at the level of touch, smell, gesture and general ‘bodily attention’, as some of the best recent Swift criticism has emphasised.¹⁸ It is a book much concerned with ‘embodiment’, with what the social psychologist Alan Radley has called our shared ‘capacity to take up and to transform features of the mundane world in order to portray a “way of being”, an outlook, a style of life that shows itself in what it is’.¹⁹ At another level, as Swiftians have always recognized, Gulliver is a book concerned largely with politics and social organization.²⁰ My contention is that, for Swift, technical practice fills in the gap between the embodied and the political realms. It reaches into both, and connects them.

A preliminary example of this sort of connection will open a way into my argument. The nearest equivalent to Crusoe’s rescuing of materials, perhaps, is in Part I of Gulliver, when two Officers of the king of Lilliput search the pockets of Swift’s hero. Their job is to compile an inventory. Gulliver gives us the text of the document they produce, which they try to make as neutral and denotative as possible. But description obliges them to conjecture, particularly with regard to function: Gulliver’s razor and dinner knife ‘might be dangerous Engines’, while his watch is either ‘some unknown Animal, or the God that he worships’.²¹ The episode exemplifies Swift’s strong socio-anthropological sense of how, as Arjun Appadurai puts it, ‘technical knowledge tends to be quickly subordinated to more idiosyncratic subcultural theories about the origins and destinations of things’.²² The objects named in the officers’ catalogue – handkerchief, snuff-box, comb, pistols etc. – lie close to Gulliver’s body, and

most of them have intimate functions. And yet even in this most personal inventory Swift makes us alert to political implication.

Among the belongings that Gulliver ‘did not think my self bound in Honour to discover’ to the officers are his spectacles. One of the few straightforward allegories in Gulliver is the equivalence that Swift draws between his hero’s visual faculty and his freedom of political agency, ‘the preserving mine Eyes, and consequently my Liberty’ (105). The protection the spectacles afford his eyes allows him to perform his greatest act of state heroism, the capturing of the Blefuscan fleet. It is important to note Gulliver’s craftsman-like repurposing of an instrument in this later episode: designed to sharpen his vision, he uses his spectacles as improvised goggles.²³ Visual and protective functions merge as Gulliver, exposed to Blefuscan archers, works minutely on a series of tiny hooks for towing away the fleet. When the Lilliputian rulers decide later on to blind him they remind him of this technical ‘Difficulty’, and reason that ‘it would be sufficient for you to see by the Eyes of Ministers, since the greatest Princes do no more’ (100). This dictat recognizes, in its own way, that Gulliver’s spectacles, as instrument and emblem, link together the sensitive functions of his body and the practical, improvised functions of technology. And they have further symbolic functions in the political realm: they also represent his liberty. This is the sort of range of meanings with which Swift is willing to invest so intimate and ordinary an object as a pair of spectacles.

II.

Ropes, Threads and Cables.

The fabulous part of Gulliver's Travels begins when shipwrecked Gulliver wakes up, half a mile from the shore of Lilliput, and realizes that he has been tied down on the grass where he has slept.

For as I happened to lay on my Back, I found my Arms and Legs were strongly fastened on each Side to the Ground; and my Hair, which was long and thick, tied down in the same Manner. I likewise felt several slender Ligatures across my Body, from my Armpits to my Thighs. (34)

At this point in the story Gulliver is still unaware of his good fortune. Of all the undiscovered islands peopled by six-inch midgets on which he might have been shipwrecked, this one is run by midgets with a real talent for logistics. His arrival is celebrated by an extraordinary display of socio-technical choreography. In less than a day they have subdued him by arms, built a rostrum from which to harangue him ('I heard a Knocking for above an Hour, like People at Work'), dressed food enough to satisfy his hunger, secured a contract of submission, winched him (using eighty Lili-foot-long poles, pullies, cords and bandages) onto a specially adapted twenty-two-wheeled juggernaut, and transported him to their capital, still bound. 'These People are the most excellent Mathematicians', Gulliver explains with his usual blandness, 'and arrived to a great Perfection in Mechanics' (39).

As technicians, administrators and diplomatists Swift's Lilliputians are impressive operators. But it is worth looking again at the relatively simple technology of ropes, stakes and staples with which Gulliver is first pinned down. Gulliver calls the strings that fasten him to the ground 'Ligatures'. This is a surgeon's term of art, a slip into trade jargon to remind us that Swift's narrator is a plain man, not a polite one.²⁴ It conveys the closeness of Gulliver's bonds well, along with a suggestion of medicalized cruelty.²⁵ The most poignant detail for our sense of Gulliver's physical suffering, and for the vividness of the episode as a tableau, is the tethering of his hair. Gulliver's gigantism in Lilliput, like his miniaturization in Brobdingnag, has the effect of instrumentalizing his body. The apposition of ligaments and hairs in his binding is the first instance of that process. We are not told (because Gulliver cannot see) whether the strands of his hair have been stapled individually, or whether they have been woven into ropes, which would secure them more efficiently. The equivalence here of bonds for body-parts is certainly enough to bring such questions of techniques and materials home to the reader. Marcel Mauss wrote that 'the body is man's first and most natural instrument. Or more accurately, not to speak of instruments, man's first and most natural technical object, and at the same time technical means, is his body'.²⁶ Similarly, Swift depicts Gulliver's body as tool and thing, as actant and passive object all at once. Later in the same essay Mauss observed that 'the first raw material to be spun appears to be hair'.²⁷ Swift is writing satire, and his transformation of Gulliver's hair into a technical accoutrement – into ligaments or ropes – while it is still attached to his head adds a meaningful note of absurdity, as though he were flagging something particularly significant about Gulliver's posture. The absurdity is echoed and further distorted in Part II, when

Gulliver makes a woven chair-back with strands of the queen of Brobdingnag's hair, and a comb from the bristles of the king's beard (176). Each of these episodes anticipates Mauss's observation about the equivalence of bodies and tools, describing a return to archeo-technical basics as they do so.

Ropes, threads and cables of different kinds appear so often in Part I of Gulliver that they constitute a sort of motif.²⁸ Lilliputian court life is especially full of them. Whenever an office of state becomes vacant the candidates petition 'to entertain his Majesty and the Court with a Dance upon the Rope... which is no thicker than a common Packthread in *England*' (57). There may be the ghost of a familiar Shakespearean pun of 'rope tricks' on 'rhetorics' here, given the commonplace connection between eloquence and courtly dexterity.²⁹ In any case, the same tautened material that deprives Gulliver of his liberty in Chapter 1 becomes the platform for political display in chapter 3. The prizes in another competition are 'three fine silken Threads of six Inches long. One is Blue, the other Red, and the third Green'.³⁰ As a motif, these threads and strings draw equivalence between the restraint of the subject and the frivolous accomplishment of the courtier. The cords that winch Gulliver onto the twenty-two wheeled 'Machine' are likewise 'the bigness of Packthread', and this variety of rough twine is mentioned on several other occasions in Gulliver (40; cf. 57, 74, 233). There is no more significance to these references, perhaps, than the mundane handiness of packthread. One can imagine how familiar its coarse fibres must have been to the fingers of Swift's original readers.³¹ This kind of string is mentioned to similar effect in Joseph Addison's Spectator no. 407 (17 June 1712), which features a lawyer who fiddles compulsively with a length of

packthread whenever he pleads: ‘The Waggs of those Days’, says Mr. Spectator, ‘used to call it the Thread of his Discourse’.³² The strings of Part I come readily to hand, they bind and they bundle, they enclose or present. They are threads that run between our experiences of touch, the sphere of action and performance, and on into the symbolic realm.

The dryness of Swift’s style makes it hard to know for sure whether the correspondence between these threads, cables and tightropes is an effect of conscious art, and one must be cautious about assigning it meaning. But there is an associative texture shared by the various references to ropes and strings in Part I. They usually accompany significant gestures or operations, and these, like the courtiers’ rope-dances, tend to involve some sort of manual or technical accomplishment. This is evidently the case when Gulliver reports on the world of women’s work, to which he is often attentive. Throughout Gulliver’s Travels we find threads deployed in sewing and stitching.³³ Glumdalclitch, Gulliver’s ‘handy’ Brobdingnagian nurse, is ‘very dextrous at her Needle’, and manages to sew seven tiny shirts for him (135). In Lilliput Gulliver witnesses another ‘young Girl threading an invisible Needle with invisible Silk’, while in the land of the Houyhnhnms the dexterity with which the horses manipulate objects using ‘the hollow Part between the Pastern and the Hoof’ is proved by ‘a white Mare of our Family [who] thread[ed] a Needle (which I leant her on Purpose) with the Joynt’ (82, 413). These references are connected (materially, as it were) by the thread theme, but the delicacy of the manual operations with which they are involved is what makes them attractive and apparently significant. In Part IV Gulliver even beats and spins ‘a Sort of Ticking’ (a smooth, hard linen thread),

and covers his Indian canoe ‘with the Skins of *Yahoos* well stitched together, with hempen Threads of my own making’ (416, 424). As such, sewing is also related to another obscure material theme in Gulliver, to textiles, fabrics and (very commonly) to handkerchiefs, that most handy item of haberdashery.³⁴ Threads, like all the curious material things of Gulliver’s world, are, by Swift’s direction, instinct with manufacturers’ art and makers’ knowledge, as well as with the skill of those who use them at home or in public. These diverse materials and functions are usually described, moreover, with an anthropologist’s comparing eye.

The most schematic example of the rope motif in Part I of Gulliver involves cables and naval architecture. Gulliver tells us that the Emperor of Lilliput ‘often buildeth his largest Men of War, whereof some are Nine Foot long, in the Woods where the Timber grows’, using prodigious wheeled engines to draw them (and the occasional recumbent giant) to Mildendo, his capital.³⁵ This feat of Lilliputian engineering is travestied and out-done by Gulliver’s effortless drawing away of the Blefuscan naval fleet on hooked cables in Part I, Chapter Five.³⁶ Elsewhere in Gulliver ropes and threads are used artfully to bind and stitch: here their function involves compulsion once again, this time through traction. But it is important to notice that Gulliver’s great deed is not artful in a complex, mechanical, Daedalean way. Gulliver’s theft of the Blefuscan fleet is practical and resolute, but it is not ingenious. This shortcoming (if that is what it is) becomes evident when one looks at an earlier, classical narrative of boat-pulling with which Swift may have expected us to compare it. In the Life of Marcellus Plutarch tells the story of the famous boast that the truly ingenious

Archimedes makes to his friend King Hiero: that he is able to move the world, given the right place to stand. Hiero begs for a demonstration, and Archimedes fixes on a slightly smaller scale of experiment. He causes one of the king's three-masted merchantmen to be emptied and dragged onto land by the labour of many men. The Lilliputians' boat-moving procedures are similar, but what follows anticipates more specifically Gulliver's capture of the Blefuscan fleet: 'after putting on board many passengers and the customary freight', Plutarch continues, Archimedes

seated himself at a distance from her, and without any great effort, but quietly setting in motion with his hand a system of compound pulleys, drew her towards him smoothly and evenly, as though she were gliding through water.³⁷

In a similarly smooth gesture Gulliver 'with great Ease drew fifty of the Enemy's largest Men of War after me' (75). King Heiro and the emperor of Lilliput have the same response to these naval wonders: Archimedes and Gulliver are promptly recruited to their respective war efforts. Bruno Latour has made much of Archimedes's demonstration, calling it 'the oldest public scientific experiment'. Latour has focused on the way that Archimedes effectively overturns political relations by using technology to make one man (his kinsman the king) physically and militarily stronger than the many.³⁸ Hobbes's Leviathan is at the back of Latour's mind here – the gigantic artificial man who draws feeble humanity out of the state of nature – and it is likely that he is at the back of Swift's as well.³⁹ The obvious difference, though, is that Gulliver's cables are not rigged into compound pulleys or any other mechanical contrivance. Swift is no technophile, but the Archimedean comparison does

seem to suggest that there is something wanting, a lack of craft and skill, in Gulliver's coup.

This idea that Gulliver's 'extraordinary Stratagem' is merely prodigious is suggested again by comparison with another classical precedent. In his Roman History Dio Cassius narrates the emperor Severus's siege of Byzantium in 194-5 AD, during which the Byzantines used memorable techniques to capture their enemies' triremes. They deployed divers

to cut their anchors under water and drive in the ships' sides nails that were attached by ropes to the friendly shore; then they would draw the ships towards them, so that these appeared to be sailing up all by themselves, of their own accord, with neither oarsman nor wind to urge them forward.⁴⁰

The story was retold for the early-modern age by Melchisédech Thévenot in his much-translated and re-printed Art de Nager (1696).⁴¹ When Gulliver calls 'the boldest Part of my Enterprize', the cutting of the cables, he is laying claim to a comparable act of resourcefulness, and describing a similarly uncanny effect, that of 'the whole Fleet moving in Order', though unmanned. There is no firm textual evidence that Swift had these episodes from Plutarch and Cassius Dio in mind when we wrote part one of Gulliver's Travels, although both these authors appear in his library and are cited elsewhere in his works.⁴² But it is evident that he was writing satirically in a genre to which both belong, that of the ancient technical wonder-narrative.⁴³ The irony, once again, is that Gulliver is no Daedalus, no Archimedes, no Priscus (the Byzantine engineer mentioned by

Cassius Dio). A skilful professional, a surgeon and a mariner he may be, but his ‘extraordinary Strategem’ is a hollow parody of the military mechanics described by ancient historians and half-rivalled by the ingenious Lilliputians. The court of Lilliput is peopled by petty Machiavellian schemers and technocrats. Their dexterity in the sphere of politics corresponds with the general mechanical sophistication of their culture. Gulliver’s dubious triumph as a military technician, on the other hand, maps on to his clumsy efforts as a courtier. The Lilliputians are crafty, frivolous and domineering, but Gulliver’s lucky clumsiness is no more admirable.

III.

Doing Words with Things

Although the Lilliputians are skilful mechanics and technicians, the minimalizing distortion of scale in Part I of the Travels makes it hard for Gulliver to assess their contrivances, as we saw with the young seamstress and her invisible thread. We learn in Lilliput that Gulliver has ‘a Head mechanically turned,’ but he applies it to nothing more complicated than making a table, chairs and some stepping-stools (67, 92). In Parts II and III, by contrast, Gulliver gets his hands on and inhabits the work of several skilled craftsmen – notwithstanding his general sense that Brobdingnagian culture is ‘confined’ and ‘defective’, and that the Balnibarbians are irredeemably ‘clumsy, awkward and

unhandy'. In Brobdingnag a 'most ingenious Artist' makes Gulliver what he calls his 'large' bed chamber, while another 'Nice Workman, who was famous for little Curiosities', fashions those perennial necessities, chairs and a table, and a third contrives a minute lock for his door: 'I have known a larger at the Gate of a Gentleman's House in *England*', Gulliver reports (148). Swift's imagination dwells on shelter, transport and basic furniture, anticipating the very simple handicrafts that he encounters in the land of the Houyhnhnms. It does so again when Gulliver describes the smaller chamber for travelling made by 'the same Artist', with tables and chairs 'neatly screwed to the Floor' – a detail to which he returns at the end of Part II.⁴⁴ The socio-political implications are clear: the Brobdingnagians live securely in their civilization because it is honestly and plainly contrived. The simplicity of its institutions, like the coarseness of its textiles, is only relative, and Gulliver becomes accustomed to it very quickly.

But the sound carpentry and practical toy making of Brobdingnag takes on satirical meaning mainly as a contrast (in turn) with the extraordinary clumsiness of the people of Laputa and Lagado in Part III. In the land of the giants, mathematics is studied closely (as it is, actually, in all four of the lands Gulliver visits), and 'wholly applied to what may be useful in Life; to the Improvement of Agriculture and all mechanical Arts', as is reasonable and natural (195). A contrastingly artificial division of the higher mathematics from all manual operations is at the centre of the fable of Part III of Gulliver's Travels. The satire here is focused on false analogies and failed communication between mathematics and other disciplines. There is no objection against mathematics well applied, in the Brobdingnagian manner, to practical purposes. Swift was not

alone among his contemporaries in making this sort of distinction. Bernard de Fontenelle (a target for Swift, as he had been for Temple, in the ‘Battle of the Books’) may have defended the abstract trajectories of pure mathematics in 1699, but John Arbuthnot, soon to be Swift’s most valued friend, replied in 1701 with a pamphlet showing how ‘Mathematicks of all parts of humane knowledge, for the improvement of the Mind, for their subserviency to other Arts, and their usefulness to the Common-wealth, deserve most to be encouraged’.⁴⁵

Similarly, the purity of the maths and music pursued by the Laputans is problematic in itself, but it is the botched appropriation of their thinking by certain Balnibarbians visiting from below that causes real abuses. Gulliver learns

That about Forty Years ago, certain Persons went up to *Laputa*, either upon Business or Diversion; and after five Months Continuance, came back with a very little Smattering in Mathematicks, but full of Volatile Spirits acquired in that Airy Region. That these Persons upon their Return, began to dislike the Management of every Thing below; and fell into Schemes of putting all Arts, Sciences, Languages, and Mechanicks upon a new Foot.⁴⁶

This is how Gulliver explains the foundation of the ‘Academy of PROJECTORS’ that he describes in the fifth and sixth chapters of Part III. The chronology of Gulliver’s Travels is not entirely reliable, but it is worth noting that its narrator arrives in Balnibarbi in 1707, so ‘about Forty Years ago’ points to the late 1660s. Swift scholars on the hunt for real-world historical anticipations of the projects that Gulliver observes at the Academy of Lagado have found the closest

correspondences in three near-contemporary sets of contexts: in papers published during the first decades of the eighteenth century in the Philosophical Transactions of the Royal Society; in the activities of projectors and engineers based near Exchange Alley during the same period; and in debates about the legacy of Isaac Newton.⁴⁷ But Arbuthnot for one felt that the science satirized in Gulliver's Travels was old-fashioned – more so, at least, than these contexts would suggest.⁴⁸ Gulliver's rough chronology takes us back to a slightly earlier period in the history of British science, to the 1660s, when its practical applications to trades and mechanics took up as much of the newly-established Royal Society's time as did abstract or experimental natural philosophy. Just as the island of Laputa is separated from Balnibarbi, the academy at Lagado is a divided institution, organized into distinct schools, wings and annexes. Gulliver moves from the Lagadan material sciences department to a second area of the college where 'the Projectors in speculative Learning resided'. One would expect a corresponding transition from scenes of material production to discussions of theories or ideas. Instead, Gulliver encounters a series of projectors whose principal concerns are mechanical. Above all, the 'Projectors in speculative Learning' are engaged in the development of impractical 'Instruments and Tools'. They have developed a machine that generates written text automatically, a communication system that substitutes words for 'Bundle[s] of *Things*', and a method of mathematics involving the eating of written problems.

The common characteristic of these 'Instruments and Tools' is that they are not designed for mediating human work on material objects. Understandably,

the first professor that Gulliver encounters is defensive about their utility, as Sprat had been defensive about the usefulness of the Royal Society.⁴⁹ He expects that his visitor will ‘wonder’ at seeing him ‘employed in a Project for improving speculative Knowledge by practical and mechanical Operations. But the world would soon be sensible of its Usefulness’, he is sure (266) – unrealized claims to ‘usefulness’ were the most common objects of anti-Royal Society satire during the 1660s.⁵⁰ The first instrument that Gulliver sees is the ‘Frame’ or language machine for the random generation of discourses. Of all the satires in Part III this one has proved the hardest to pin down to a particular object.⁵¹ But to dwell on specific historical corollaries is to risk missing the point here. One must take several steps back from the details of Swift’s satire in order to interpret it.

Swift’s irony is aimed at a common claim made by natural philosophers during the decade after the foundation of the Royal Society in 1660. The development of new scientific instruments, they argued, has greatly extended the scope of human observation and inquiry already, and will continue to furnish increasingly accurate data for reliable inductive hypotheses.⁵² The purpose of these devices is to help with the generation and accumulation of data. The important thing to note here is that the category of ‘scientific instruments’ was a very broad one in the early modern period. It is by the mechanical assistance of a ‘*variety of Inventions, [that] new matter for Sciences may be collected*’, wrote Robert Hooke in his best Baconian manner:

as it is by the benefit of Senses that we receive all our Skill in the works of Nature, so they also may be wonderfully benefited by it, and

may be guided to an easier and more exact performance of their Offices.⁵³

When Hooke writes of extensions to the senses he is thinking not only about machines that enhance perceptual apprehensions directly (like microscopes and telescopes), but about all sorts of instruments that measure, model, simulate, and otherwise act upon observed objects. William Wotton, writing in the same vein forty years later, made an even more general equation between instrumental medium and technique. Material science cannot progress, he says in Reflections on Ancient and Modern Learning, ‘without Numbers of Tools, or Arts, which may be of the same Use as Tools, to make the Way plain to several Things, which otherwise, without their Help, would be inaccessible’.⁵⁴ Accordingly, Wotton’s chapter on modern instruments is divided into a section on tools for general use, such as printing presses and compasses, and another on tools of particular use to natural philosophers, such as telescopes, thermometers and air pumps. This gathering together of practical and scientific instruments goes some way towards explaining why Swift’s satire on the idea of ‘improving speculative Knowledge by practical and mechanical Operations’ begins with the language machine, which looks more like the a child’s abacus or a printer’s forme than like the microscope one might have expected. Swift is satirizing the general claim that machines can have any significant impact in the abstract realms of language, philosophy or reason.

IV

Necessity and Invention

Themes of material medium and technique are important once again to Part IV of Gulliver's Travels, the voyage to the land of the Houyhnhnms. In the final quarter of the Travels, however, Swift turns their significance on its head. In the first three Parts he has half-encouraged us to assume that some sort of progressive technological culture will be present in each of the nations that Gulliver visits. But the material culture of the Houyhnhnms, for all their moral sophistication, turns out to be pre-mechanical. They have sledges, rather than wheeled chariots, for vehicles; they use sharpened stones to cut their crops and build their homes; and they have no knowledge of metalwork:

Their Buildings, although very rude and simple, are not inconvenient, but well contrived to defend them from all Injuries of Cold and Heat. They have a Kind of Tree, which at Forty Years old loosens in the Root, and falls with the first Storm; it grown very straight, and being pointed like Stakes with a sharp Stone, (for the *Houyhnhnms* know not the Use of Iron) they stick them erect in the Ground about ten Inches asunder, and then weave Oat-straw, or sometimes Wattles betwixt them.⁵⁵

Unlike Gulliver, the Houyhnhnms cannot twist fibres to make threads. But they can weave and wattle. There is a modern tradition in the anthropology of the arts, going back to the nineteenth-century German architectural historian Gottfried Semper, that identifies these processes as the most ancient and simple of human

techniques.⁵⁶ This insight is anticipated by the practice of Swift's philosophical horses.

The Houyhnhnms' lack of iron is especially significant.⁵⁷ Swift's contemporaries assumed that iron is indispensable to the advancement of knowledge, and that if a society were to lose the use of smelted metals it could be expected to regress into savagery. In the preface to his Mechanick Exercises Joseph Moxon declines to include 'that Rough and Barbarous sort of working which is used by the Natives of *America*' – pottery, wattling, weaving, and canoe-making, all Houyhnhnm proficiencies – in the category of the mechanical arts, because those people have no iron tools, and therefore no geometric instruments: 'they know neither of *Rule*, *Square*, or *Compass*; and what they do, is done by Tedious Working, and he that has the best Eye at Guessing'.⁵⁸ John Locke made similar reflections in the Essay concerning Human Understanding: that 'were the use of Iron lost among us, we should in a few Ages be unavoidably reduced to the Wants and Ignorance of the ancient savage *Americans*, whose natural Endowments and Provisions, come no way short of those of the most flourishing and polite Notions'.⁵⁹ The well-ordered traditional society of the philosopher-horses gives the lie to these assumptions of early-Enlightenment anthropology, in so far as a satirical fiction can give 'the thing that is not' to anything. By cutting away the very possibility of mechanical art in Part IV of Gulliver's Travels Swift also puts the technical cultures of the first three Parts into a more uncertain perspective. Material technique is no longer the reliable index of ways in which intelligent beings inhabit the world. Indeed, the most philosophic beings of all dispense with it almost entirely.

Quite apart from their lack of instruments with moving parts or calibrations, the Houyhnhnms (being hooved quadrupeds) lack thumbs that move strongly at the trapezio-metacarpal joint, correspondently strengthened index fingers, or wrists that rotate through 180 degrees.⁶⁰ It is in the human hand, as the anatomist Sir Charles Bell wrote in 1833, ‘that we have the consummation of all perfection as an instrument’. But it is a consummation for which the Houyhnhnms, who call themselves ‘*the Perfection of Nature*’, have no equivalent.⁶¹ The scope for technologizing their bodies in the Maussian sense is drastically limited, especially given their reluctance to let hominids ride on their backs. Correspondingly, the Houyhnhnms’ astonished efforts to think through the implications of Gulliver’s handiness, which they perceive immediately, are worked deeply into the satire of Part IV. Gulliver’s strange ‘Affectation of walking continually on my two hinder Feet’ is also relevant here.⁶² The Houyhnhnms are fascinated by his fingers and shoes: one ‘viewed my Hands and Feet, walking round me several times’; he looked ‘with great Earnestness upon my Face and Hands’; ‘He stroked my Right Hand, seeming to admire the Softness, and Colour; but he squeezed it so hard between his Hoof and Pastern, that I was forced to roar’; he later ‘discover[s] Signs of Wonder what I had done to my Fore-feet’ when Gulliver puts on gloves.⁶³ The master Houyhnhnm remarks more than once on the uselessness of Gulliver’s feet, nails and hair, and he links it (tellingly) to the human love of ‘Inventions’:

He said... That, we disarmed our selves of the few Abilities she
[Nature] had bestowed; had been very successful in multiplying our
original Wants, and seemed to spend our whole Lives in vain

Endeavours to supply them by our own Inventions... I walked
infirmly on my hinder Feet; had found out a Contrivance to make my
Claws of no Use or Defence, and to remove the Hair from my Chin,
which was intended as a Shelter from the Sun and the Weather.⁶⁴

A vein of humour running through Part IV depends on the reader's efforts to create a visual image of the Houyhnhnms performing everyday manual operations with 'the hollow Part between the Pastern and the Hoof of their Fore-feet': weaving 'Mats of straw, not unartfully made', offering Gulliver 'a Fettle full of Oats', threading a needle, cutting oak wattles with a 'sharp Flint fastened very artificially, after their Manner, to a wooden Handle' (413, 341, 343, 424). Later Gulliver affects not to 'trouble the Reader with a particular Description of my own Mechanics' as he prepares to leave the land of the Houyhnhnms. This *occupatio* or rhetorical passing-over recognizes that reader's likely curiosity about the methods used to build and stock his 'Indian Canoo' (424). It has the same function as Gulliver's deliberately sketchy descriptions of the Houyhnhnms at their hoof-work. As with Gulliver's pseudo-technical military triumph, Swift seems to encourage us to doubt that there is very much in it.

The master Houyhnhnm's contemptuous account of the sources of human invention does make an impression on Gulliver. But in the antepenultimate chapter of Part IV it is clear that Swift's everyman-hero remains *homo faber* to the core, albeit on a drastically reduced scale. Gulliver describes with care his Crusoe-like (though still more basic) improvisations in shelter-building, thread-making, joinery, tailoring and the tanning of Yahoo hides.

I often got Honey out of hollow Trees, which I mingled with Water,
or eat it with my Bread. No Man could more verify the Truth of these
two Maxims, *That, Nature is very easily satisfied*; and, *That,*
Necessity is the Mother of Invention. I enjoyed perfect Health of Body,
and Tranquility of Mind. (416-7)

The word ‘*Necessity*’ has been put under pressure by Swift’s irony before. Previously it implied basic compulsion of circumstances, as it does here, when Gulliver described the chair and table that he made for himself in Lilliput as effects of his ‘Having a Head mechanically turned, and being likewise forced by Necessity’ (92). There is an echo in this of Robinson Crusoe describing the tedious processes by which ‘Time and Necessity made me a compleat natural Mechanick’.⁶⁵ In the Lenten (not to say Spartan) setting of the Land of the Houyhnhnms, Gulliver’s maxim concerning necessity recalls another famine-courting parent of invention: the ‘*universal Artist*’ of the Academy at Lagado, who sows fields with chaff and breeds naked sheep.⁶⁶ Swift’s imaginative association of ingenious mechanical ‘invention’ with barrenness and material necessity – or with bare sufficiency, as in Part IV – is distinctive, and it is hard to find contextual readings that explain it.

There is an instructive contrast to be made here with Rabelais’s Quart Livre, a touchstone for Gulliver’s Lucianic satire. Rabelais’s universal artist (‘premier maistre es ars de ce monde’) is ‘Missere Gaster’, or Signor Belly.⁶⁷ It is appetite, not hunger, that begets arts. Gaster, who embodies the inordinate energies of greed, is also the triumphant originator of technologies.⁶⁸ He could hardly be more different from Swift’s impoverished ‘*universal Artist*’ in Part III.

As the inventor of agriculture Gaster supplies the endless gluttony of his followers, the Gastrolaters, with abundant food. As the inventor of architecture and gunpowder he builds cities and destroys them:

he lately Invented Cannons, Field-pieces, Culverins, Bombards, Basilisks's, Murthering Instruments that dart Iron, Leaden, and Brazen Balls, some of them outweighing huge Anvils; this by the means of a most dreadful Powder, whose Hellish Compound and Effect has even amaz'd Nature, and made her own her self out-done by Art...⁶⁹

It is worth noting here that Gulliver's lecture to his distressed master Houyhnhnm on 'the Art of War' opens with an inventory so similar to Gaster's as to suggest a borrowing: 'I gave him a Description', says Gulliver, 'of Cannons, Culverins, Muskets, Carabines, Pistols, Bullets, Powder, Swords, Bayonets, Sieges, Retreats, Attacks, Undermines, Countermines, Bombardments' – and so the list goes on in a denotative outpouring as banal as it is sublime, a laundry-list of horrors (366). But it is the contrast between the fables of invention in Rabelais and in Swift that demands explanation more than any possible inter-textual connection. The irresolvable tension that Rabelais creates between Gaster's creativeness and destruction, between voracious material hunger and excremental waste, is missing from Gulliver. Swift's is a famished vision of human invention and manufacture. It is a vision that will find its fullest expression in The Modest Proposal, where a beggarly nation, unemployable 'in *Handicraft or Agriculture*', is shown progressive techniques in husbandry of a very domestic kind.⁷⁰ And in Gulliver too, the barrenness of technique has a political referent.

V.

Craftsmen

The impoverishment of the technical realm that Swift paints so austere in the land of the Houyhnhnms invites a revision of our reading of the book as a whole. Previously, the mechanical arts had always been associated with material prosperity and social progress, for better or worse. In the first three Parts of Gulliver's Travels we learn something essential about each of the nations Gulliver visits when he tells us how they craft, manipulate or mechanize the environments in which they live. What we find out about their processes of technical mediation, and about the materials and tools that they deploy, always has a particular correspondence with their political cultures. The ligatures and tightropes of the Lilliputians make an emblematic connection between indications of restraint and coercion on one hand, and displays of facile political agility on another. The solid, curious cabinetmaking of the Brobdingnagians stands for practical accomplishment and honest craft. It is coarse only in relation to the gigantic generosity (as Swift presents it) of their morality and polity. The one machine that actually works in Balnibarbi, land of abstracted mathematics and cack-handed projecting, is a flying island used by its pilots to dominate and extort (with corresponding political clumsiness) a subjugated populace. Each of these three technical cultures contrasts with the others, describing different ways of acting and being in the world. In each case these various modes of being are reflected in contrasting political organizations.

Swift seems to be setting out an argument about human arts and political techniques in these first three books, working through his sense of their varieties, dangers, limits and possibilities. For the Lilliputians, personal accomplishments are more important than any particular tool or machine through which technical agency is mediated. Their love of technique is inordinate, and betrays them into frivolous Machiavellian politicking and various absurd, deadly quarrels. Once presented with Gulliver, however, they are keen to technologize his body as an instrument of conquest. The Brobdingnagians, on the other hand, tread safely a middle path between sophistication and simplicity. They have had the advanced art of printing ‘as well as the *Chinese*, Time out of Mind’, for instance. But their mindfulness of practical ends means that technology is always kept within bounds, never allowed to dominate human life with its own impersonal logic. The King of Brobdingnag rejects Gulliver’s receipts for gunpowder and his descriptions of ‘terrible Engines’ of war out of hand (196, 191). The Balnibarbian, by contrast, is technological, rather than merely technical beings, and they allow abstracted technique to frame every intervention that they make on the world. In this respect the mathematicians on the flying island of Laputa have much in common with the under-landers they dominate and despise. Both are committed to technologies that they allow to proliferate but cannot understand, and that predetermine all their ‘speculations’. The island-observatory elevated by a delicately poised lodestone lifts them up into the ethereal realm of astronomy; the academy filled with machines automates their thought and speech. Martin Heidegger wrote of technology as an enframing (*Gestell*) of mankind, an uncontrollable tide that possesses us and bars us from

entering ‘into a more original revealing [of the world] and hence to experience the call of a more primal truth’.⁷¹ Technology orders and stockpiles the energies of nature (sunbeams from cucumbers) without purpose and without end. The Balnibarbians have started on this forced march to technological modernity, even if they are not very far along it when Gulliver encounters them.

So what of the Houyhnhnms? Part IV of Gulliver’s Travels has acquired a reputation for intractability and conceptual turbulence, and the power of the writing here often tempts readers to pass over what is at the centre of Gulliver’s account of the Houyhnhnms: a quite specific set of satires on the liberal middle-class professions. Swift’s satirical contention is that these professions, the sources of such intolerable pride for their practitioners, are really indistinguishable from the most humble trades and sordid occupations. In Chapters V and VI the work of lawyers, doctors and politicians is depicted as a set of mere ‘Trades’ and ‘Mysteries’. They are systems of mechanical tricks and knacks that involve no requirement of literacy or science in their adpets, only an apprenticeship in low cunning. Politicians are Swift’s principal target here, as ever.⁷² It is an attack for which we have been prepared. In Chapter VI of Part I the Lilliputian sages prove that ‘Providence never intended to make the Management of publick Affairs a Mystery’ (86). In Part II the King of Brobdingnag ‘professed both to abominate and despise all *Mystery, Refinement, and Intrigue*, either in a Prince or Minister’ (194). In Part III Gulliver tells a professor at the Lagadan ‘School for Political Projectors’ about the kingdom of Tribnia, where plots and conspiracies are the ‘Workmanship’ not of cunning malcontents, but of statesmen ‘who desire to raise their own Characters of

profound Politicians’ (282). Finally, in Part IV Gulliver shows his master Houyhnhnm how senior politicians in Europe are a class of tradesman identifiable with their most menial servants:

The Palace of a *Chief Minister*, is a Seminary to breed up others in his own Trade: The Pages, Lacquies, and Porter, by imitating their Master... sometimes by the Force of Dexterity and Impudence, arrive through several Gradations to be Successors to their Lord.⁷³

The professions (or ‘Trades’) appear together again in the climactic penultimate paragraph of Part IV’s last chapter, when Gulliver claims that he is ‘not in the least provoked at the Sight of a Lawyer, a Pick-pocket, a Colonel, a Fool, a Lord, a Gamester, a Politician, a Whore-munger, a Physician... or the like’ – until he sees them ‘smitten with *Pride*’.⁷⁴ This is something less than an attack on reason and mankind, but Swift’s earliest readers understood its political significance immediately, and caught hold of the mechanical trades comparison as well. Just over a month after the appearance of Gulliver’s Travels on 28 October 1726 the first number of The Craftsman (published 5 December, written by the editor Nicholas Amhurst) was published. It became the most widely read and influential opposition journal of the day. Introducing his periodical, ‘Caleb’ declares that satire on the professions will be its main focus: ‘It is for this Reason that I have entituled my Paper *The CRAFTSMAN*; under which general Character I design to lay open the Frauds, Abuses, and secret Iniquities of all Professions; not excepting those of my own; which is at present notoriously adulterated with pernicious mixtures of *Craft*, and several scandalous Prostitutions’.⁷⁵ Amhurst and his backers, Viscount Bolingbroke and William Pulteney, chose the figure of the cunning manual technician – the Craftsman of

the their title – to stand as cypher for contemporary corruptions in all the liberal professions, but especially in that of politicians. In doing so they were self-conscious about recycling the culminating conceit of Gulliver's Travels.⁷⁶

Swift's satire on the professions in Part IV of Gulliver's Travels is set alongside his description of a civilization that does without trades and mechanical technology altogether. The Houyhnhnms lack opposable thumbs, so even manual operations (if that phrase has any meaning in a world of hooves) are reduced to absolute simplicity. Their ability to make wattles and clay pots is surprising enough. Gulliver reports the benefits to body and mind of the material deprivations occasioned by the Houyhnhnm's technical poverty. But, obviously, this is something less than an indication that Swift intends any sort of general satire against the use of mechanical handiworks for bettering the circumstances in which humans live. Swift inherited the common opinion of early-modern governing-class people – itself firmly underpinned by Graeco-Roman ethical teaching – that the profession of mechanical art is intrinsically despicable, because technicians cannot have the leisure to cultivate the liberal attainments of learning, virtue and *honnêteté*.⁷⁷ That familiar prejudice appears throughout his published writings.⁷⁸ But it was too conventional to supply the extraordinary satire with which Gulliver's Travels culminates. Would the Houyhnhnms still be Houyhnhnms if their Yahoo helots were employed to make them wheeled vehicles and upholstered furniture, or if the Yahoos did as much (or more) for themselves? Perhaps not, but Swift does little to encourage his readers to think through this possibility. In the land of the Houyhnhnms we do not expect Gulliver to attempt techno-military knowledge transfer of the sort rejected so

indignantly by the king of Brobdingnag. Gulliver's voyage to the philosopher-horses completes Swift's treatment of the technological theme by bringing it home to the subject that always vexed him more than any other: the reasons, methods and motives of politicians. But the political edge of the satire cuts because it has behind it such a weight of embodied and socialized sensation.

¹ See Charles Gildon, The Life and Strange Surprizing Adventures of Mr. D---- de F--, of London, Hosier (1719), 15; Ian Watt, The Rise of the Novel (Berkeley: California University Press, 1957), 87; but cf. Margaret Cohen, The Novel and the Sea (Princeton University Press, 2010), 62.

² Daniel Defoe, The Life and Strange Surprizing Adventures of Robinson Crusoe, ed. J. Donald Crowley (Oxford University Press, 1972), 68; see also 72.

³ Joseph Moxon, Mechanick Exercises: or, the doctrine of handy-works. Applied to the art of printing. The second volumne [sic] (1683), 6; Moxon's account of the advanced art of printing is grounded explicitly in his elaboration of simple technologies (furnace-building, metalwork, joinery, turning) in the first volume of the Exercises (1677).

⁴ Robert Boyle, Some Considerations touching the Usefulness of Experimental Naturall Philosophy... the Later Section of the Second Part (1671), in The Works of Robert Boyle, eds. Michael Hunter and Edward B. Davis, 14 vols. (London: Pickering and Chatto, 1999), 6:408.

⁵ Michael Polanyi, Passive Knowledge: Towards a Post-Critical Philosophy (Chicago University Press, 1958), 69-247.

⁶ Jonathan Friedman, 'Marxism, Stucturalism, and Vulgar Materialism', Man, ns. 9 (1974): 447; for an alternative conception see François Sigaut, 'Technology', in Tim Ingold, ed., Companion Encyclopedia of Anthropology, 2nd ed. (London: Routledge, 2002) 420-459, at 446: '...the production (including the reproduction) of skills is inseperable from the production of material goods, and, consequently, the way societies organize themselves to produce – the Marxists' 'mode of production' – depends as much on the skills as on the goods to be produced'.

⁷ Ilse Vickers, Defoe and the New Sciences (Cambridge Univesity Press, 1996), 55-98; Anne Van Sant, 'Crusoe's Hands', Eighteenth-Century Life, 32 (2008), 120-137; Joanna

Picciotto, Labors of Innocence in Early Modern England (Cambridge, Mass.: Harvard University Press, 2010), 541-560; Cohen, *Novel and the Sea*, 59-97.

⁸ On Swift and Defoe see Daniel Defoe: The Critical Heritage, ed. Pat Rogers (London: Routledge, 1972), 38-40; Patrick Reilly, Jonathan Swift: The Brave Desponder (Manchester University Press, 1982), 10-17; Michael McKeon, The Secret History of Domesticity: Public, Private and the Division of Knowledge (Baltimore: Johns Hopkins University Press, 2005), 623-7

⁹ Boyle, Some Considerations, 399 and 469-70, on tradesmen assessing natural phenomena 'by Mechanical waies'.

¹⁰ Sigaut, 'Technology', 422.

¹¹ For Swift and anthropology see Larry Wolff, 'Discovering Cultural Perspective', in The Anthropology of the Enlightenment, ed. Larry Wolff and Marco Cipolloni (Stanford University Press, 2007), 3-33, at 4-9; for contemporary proto-anthropological thinking see Daniel Carey, Locke, Shaftesbury, and Hutcheson: Contesting Diversity in the Enlightenment (Cambridge University Press, 2005), 69-97; Lewis, Rhodri, 'William Petty's Anthropology: Religion, Colonialism, and the Problem of Human Diversity', *HLQ*, 74 (2011): 261-288.

¹² Marcel Mauss, 'Techniques and Technology' (1941-8) in Techniques, Technology and Civilization ed. Nathan Schlanger (New York: Durkheim Press, 2006), 147-53, at 149.

¹³ Bruno Latour, We Have Never Been Modern, tr. Catherine Porter (Cambridge: Harvard University Press, 1993), 7, 141.

¹⁴ But for Swift's on-going interest in the political economy of manufacture see Sean D. Moore, Swift, the Book, and the Irish Financial Revolution: Satire and Sovereignty (Baltimore: Johns Hopkins University Press, 2010), 26-58; for his experience of the printer's trade see Ian Gadd, 'Leaving the Printer to his Liberty: Swift and the London

Book Trade, 1701-1714', in Jonathan Swift and the Eighteenth-Century Book, ed. Paddy Bullard and James McLaverty (Cambridge University Press, 2013), 51-64.

¹⁵ See Franco Volpi, 'The Rehabilitation of Practical Philosophy and Neo-Aristotelianism', in Action and Contemplation Studies in the Moral and Political Thought of Aristotle, ed. Robert C. Bartlett and Susan D. Collins, (Albany: SUNY Press, 1999), 3-26, at 13-15.

¹⁶ See for further examples of the former, see Womersley's important fn. 48-9, Cambridge Edition of the Works of Jonathan Swift, gen. ed. Ian Gadd and others, 17 vols. (Cambridge University Press, 2008-), vol. 16: 271-2; for examples of the latter see CWJS, 1:66, 173.

¹⁷ Nigel Thrift, 'Afterwords', in Non-Representational Theory: Space, Politics, Affect (Abingdon: Routledge, 2008), 109-149, at 112.

¹⁸ See Neil Chudgar, 'Swift's Gentleness', ELH, 8 (2011): 141; Kristin Girtten, 'Mingling with Matter: Tactile Microscopy and the Philosophic Mind in Brobdingnag and Beyond', The Eighteenth Century, 54 (2013): 501; Chudgar and Girtten respond to a perceived passing over of Gulliver's sense-world in Carol Houlihan Flynn, The Body in Swift and Defoe (Cambridge University Press, 1990).

¹⁹ Alan Radley, 'Displays and Fragments: Embodiment and the Configuration of Social Worlds', Theory and Psychology, 6 (1996): 569.

²⁰ See Ian Higgins, Swift's Politics: A Study in Disaffection (Cambridge University Press, 1994), 2-4, 172ff.

²¹ CWJS, vol. 16, Gulliver's Travels, ed. David Womersley (2012), 51-3. References to this volume of the Cambridge edition are also given in parentheses in the body of the text.

²² Arjun Appadurai, 'Introduction: Commodities and the Politics of Value', The Social Life of Things: Commodities in Cultural Perspective, ed. Arjun Appadurai (Cambridge University Press, 1988), 3-63, at 54.

²³ On technique and improvisation see Bruno Latour, 'On Technical Mediation: Philosophy, Sociology, Genealogy', Common Knowledge, 3 (1994): 33; see also Richard Sennett, The Craftsman (London: Penguin, 2008), 194-213.

²⁴ OED, 1a, 'Chiefly *spec. in Surg.*, a thread or cord used to tie up a bleeding artery, to strangulate a tumour, etc.'

²⁵ For a similar usage see John Arbuthnot, The History of John Bull, ed. Alan W. Bower and Robert A. Erickson, 86, where Jack hangs himself by 'a most strict Ligature'; Arbuthnot dwells on the 'smooth, strong, tough Rope, made of many a ply of wholesome *Scandinavian* Hemp, compactly twisted together, with a Noose that slip'd as glib as a Bird-cather's Gin' (85).

²⁶ Marcel Mauss, 'Techniques of the Body' (1935), in Techniques, Technology and Civilization, 77-140, at 82; for an historical perspective see Pamela H. Smith, The Body of the Artisan: Art and Experience in the Scientific Revolution (Chicago University Press, 2004), especially 95-128; in the Advancement, p.107, Francis Bacon cited Aristotle's maxim that 'the hand is the Instruments of Instruments'.

²⁷ Mauss, 'Techniques', 110.

²⁸ For the thread motif in Swift's early satire see CWJS, 1:92, and 49 n.22 (on 366) for proverbial connections between tailoring and religious fanatics; cf. 8, 51, 62, 209 for discursive threads; see also the '*String* in the Harmony of Human Understanding' at 108; and n.27 on p. 434.

²⁹ Shakespeare, Taming of the Shrew, I.ii.111; see Wayne A. Rebhorn, 'Petruchio's "Rope Tricks": The Taming of the Shrew and the Renaissance Discourse of Rhetoric', Modern Philology, 92 (1995): 300-2.

³⁰ CWJS, 16:58-9; cf. Swift's friend Matthew Prior, Carmen Seculare, in The Literary Works of Matthew Prior, ed. H. Bunker Wright and Monroe K. Spears, 2 vols. (Oxford: Clarendon Press, 1971), 1:161-81, at 175: 'Round ORMOND's Knee Thou ty'st the Mystic String, | That makes the Knight Companion to the King'.

³¹ For anthropological perspectives on thread technology and writing see Tim Ingold, Lines: A Brief History (London: Routledge, 2007), 120-151.

³² The Spectator, ed. Donald F. Bond, 5 vols. (Oxford: Clarendon Press, 1965), 3:522.

³³ Cf. Chloe Wigston Smith, Women, Work, and Clothes in the Eighteenth-Century Novel (Cambridge University Press, 2013), 34-6, 65-73, where Swift's 'suspicion towards clothes' is emphasised.

³⁴ For handkerchiefs see CWJS, 16:55, 59-60, 127, 129, 131, 161, 174, 207, 224, 353.

³⁵ CWJS, 16:39-40; cf. 424, where Gulliver's 'Canoo' is 'drawn on a Carriage very gently by *Yahoos*'.

³⁶ It is recalled again at the end of the first Part, where Gulliver escapes the little people by the mere good fortune – mechanical expertise has nothing to do with it – of finding a boat, a set of paddles for which 'cost me ten Days making', CWJS, 16:75, 108-110; cf. the dragging of Gulliver's hat (61).

³⁷ Plutarch's Lives, tr. Bernadotte Perrin, 11 vols. (Cambridge, Mass.: Harvard University Press, 1961) V:473 ('Marcellus', xiv.8).

³⁸ Bruno Latour, 'The Force and the Reason of Experiment', in Experimental Inquiries: Historical, Philosophical and Social Studies of Experimentation in Science, ed. H.E. Le Grand (Dordrecht: Kluwer, 1990), 49-80, at 50; cf. Never Been Modern, 109-111.

³⁹ For a direct reference to Abraham Bose's 'Picture of *Hobbes's Leviathan*' see 'Mechanical Operation', CWJS, 1:179; For Swift with Hobbes and Latour see Jonathan Lamb, The Things Things Say (Princeton University Press, 2011), 144; referring to Latour, We Have Never Been Modern, 15-35.

⁴⁰ Dio Cassius, Roman History, tr. Earnest Cary, 9 vols. (Cambridge, Mass.: Harvard University Press, 1914-27), 9:189 [LXXV.12.3].

⁴¹ Melchisédech Thévenot, The Art of Swimming (1699), A10^v-11^r.

⁴² Dirk F. Passmann and Heinz J. Vienken, The Library and Reading of Jonathan Swift, Part 1: Swift's Library, 4 vols. (2003), 1:530-1 [annotated by Swift]; 2:1467-9; see for

eg. Swift vs. Mainwaring: The Examiner and the Medley, ed. Frank. H. Ellis (Oxford: Clarendon Press, 1985), 192; and CWJS, 1:65 and n.36.

⁴³ See Kevin Greene, 'Attitudes to Invention and Innovation in Greek and Roman Writers', Oxford Handbook of Engineering and Technology in the Classical World, ed. John Peter Oleson (Oxford University Press, 2009), 800-830, at 801-2; cf. Gulliver's obscene attempts to create technological wonder at CWJS 16:191, 366.

⁴⁴ CWJS, 16:160; cf. 208; for transport cf. 170, the 'ingenious Workman' who makes Gulliver a miniature sail boat; cf. also the reading machine made by the 'Queen's Joyner', 197.

⁴⁵ Bernard de Fontenelle, 'The Usefulness of Mathematical Learning', in Miscellanea Curiosa, ed. Edmond Halley, 3 vols., 2nd ed. (1708), 1:[A4^v-a8^v]; John Arbuthnot, Essay on the Usefulness of Mathematical Learning (Oxford, 1701), 3, italics reversed; CWJS, 1:157, 496.

⁴⁶ CWJS, 16:255; for the false 'Analogy' between mathematics and politics see 235-6.

⁴⁷ Marjorie Nicolson, 'The Scientific Background of Swift's Voyage to Laputa', Annals of Science, 2 (1937): 299-334 and 405-430; Pat Rogers, 'Gulliver and the Engineers', MLR 70 (1975): 260-70; Gregory Lynall, Swift and Science: The Satire, Politics and Theology of Natural Knowledge, 1690-1730 (Houndmills: Palgrave, 2012), 89-109; for an illuminating 'field-specific' reading of Swift's project satire see David Alff, 'Swift's Solar Gourds and the Rhetoric of Projection', Eighteenth-Century Studies, 47 (2014): 245-260.

⁴⁸ Arbuthnot to Swift, 17 October 1725; and Gay and Pope to Swift (reporting Arbuthnot), 7 November 1726, Correspondence of Jonathan Swift, ed. David Woolley, 4 vols. to date (Frankfurt am Main: Peter Lang, 1999-), 2:615, 3:47.

⁴⁹ Sprat, History, 245.

⁵⁰ See for example Meric Casaubon, A Letter to Peter du Moulin... Concerning Natural experimental Philosophie (1669), 5-6; see comical repetition of the claims about 'useful

and luciferous processes' in Henry Stubbe, A Specimen of Some Animadversions upon a Book Entitled, Plus Ultra (1670), 50, 57, 64; and later Thomas Shadwell, The Virtuoso A Comedy, Acted at the Duke's Theatre (1676), 31, Snarl exclaiming 'Pox! let me see you invent any thing so useful as a Mousetrap'; cf. CWJS, 16:256.

⁵¹ Perhaps the closest match is with the 'living calculator's bench' [*Lebendige Rechenbanck*] developed by Gottfried Leibniz in the 1670s: see Martin Gierl, 'Science, Projects, Computers and the State: Swift's Lagadian and Leibniz's Prussian Academy', in The Age of Projects, ed. Maximillian E. Novak (University of Toronto Press, 2008), 297-317, at 306-10; Marjorie Nicholson proposes no parallel for the language machine in 'Scientific Background'.

⁵² See Michael Hunter, Science and Society in Restoration England (Cambridge University Press, 1981), 75-7; Paolo Rossi, The Birth of Modern Science, tr. Cynthia de Nardi Ipsen (Oxford: Blackwell, 2000), 15-17.

⁵³ Robert Hooke, Micrographia: or Some Physiological Descriptions of Minute Bodies made by Magnifying Glasses (1665), b2^v; see also Sprat, History, 74-5; Joseph Glanvill, Plus Ultra, or, The Progress and Advancement of Knowledge (1668), 52-3; and William Wotton, Reflections upon Ancient and Modern Learning... With a Dissertation upon the Epistles of Phalaris, by Dr. Bentley, 2nd edition with large additions (1697), 184-198, Chap. XV: 'Of several Instruments invented by the Moderns'.

⁵⁴ Wotton, Reflections, 185.

⁵⁵ CWJS, 16:412-3; for a very similar passage see William Dampier, A New Voyage Around the World (1697), 84-6.

⁵⁶ Gottfried Semper, 'Style in the Technical and Techtonic Arts', in The Four Elements of Architecture and Other Writings, tr. H.F. Mallgrave and W. Herrman (Cambridge University Press, 1989), 218-9, discussed by Tim Ingold, Lines, 42.

⁵⁷ For the Ovidian context see Womersley's n.18, CWJS, 16:412.

⁵⁸ Joseph Moxon, Mechanick Exercises. Or, the doctrine of handy-works (London, 1677), A4^r.

⁵⁹ John Locke, An Essay Concerning Human Understanding, ed. Peter Nidditch (Oxford: Clarendon Press, 1975), 646 [IV.xii.2].

⁶⁰ For the significance of these features see Frank R. Wilson, The Hand: How its Use Shapes the Brain, Language and Human Culture (New York: Pantheon, 1998), 127-137; cf. CWJS, 16:358: 'I was not able to feed my self, without lifting one of my fore Feet to my Mouth: and therefore Nature had placed those Joints to answer that Necessity'.

⁶¹ Charles Bell, The Hand: its Mechanism and Vital Endowments as Evincing Design (London: Pickering, 1833), 157, quoted by Raymond Tallis, The Hand: A Philosophical Inquiry into Human Being (Edinburgh University Press, 2003), 222; CWJS, 16:350.

⁶² CWJS, 16:352; cf. 358, 'if either of my hinder Feet slipped, I must inevitably fall'.

⁶³ CWJS, 16:336, 337, 344-5; cf. 334, the Yahoo's raised paw (of greeting?), which Gulliver answers with a blow, and 336, the Houyhnhnm's gentle removal of Gulliver's own greeting hand from his neck; in 'Mingling with Matter', 502-8, Kristin Gerten discusses Swift's satire on the Baconian idea of the scientist's perfect union of 'hand and eye'.

⁶⁴ CWJS, 16:389; cf. 357.

⁶⁵ Defoe, Crusoe, 72.

⁶⁶ CWJS, 16:265; Womersley notes the Rabelaisian (see below) source for chaff sowing at n.29; see also 535, 539; see Ian Higgins, 'Swift and Sparta: The Nostalgia of Gulliver's Travels', Modern Language Review, 78 (1983): 513-31.

⁶⁷ Pantagruel's Voyage to the Oracle of the Bottle being the Fourth and Fifth Books of the Works of Francis Rabelais, tr. Pierre Motteux 2 vols. (1694), 1:222; cf. Persius, 'Prologue', lines 10-11, in Juvenal and Persius, ed. Susanna Morton Braund (Cambridge, Mass.: Harvard University Press, 2004), 44-5: 'magister artis ingenique largitor | venter' ['that master of expertise, that bestower of talent, the belly'].

⁶⁸ See Mikhail Bakhtin, Rabelais and his World, tr. Hélène Iswolsky (Bloomington, IN: Indiana University Press, 1984) 300-1; on the excremental themes of this passage see Pauline Goul, ““Et voilà l'ouvrage gasté”: the Poetics of Plenitude and Scarcity in Rabelais's Gaster”, Forum for Modern Language Studies, 50 (2014): 332-40.

⁶⁹ Pantagruel's Voyage, 219-21, 242-3.

⁷⁰ The Prose Writings of Jonathan Swift, ed. Herbert Davis and others, 16 vols. (Oxford: Blackwell, 1939-74), 12:109-18, at 110-11.

⁷¹ Martin Heidegger, ‘The Question Concerning Technology’ in The Question Concerning Technology and other Essays, tr. William Lovitt (New York: Garland, 1977), 3-35, at 20-3, 28.

⁷² For an earlier example with a technological metaphor see Swift in ‘Sentiments of a Church-of-England Man’, PW, 2:1-25, at 23, on failures to understand the nature of political consent, ‘especially by the Lawyers; who of all others seem least to understand the Nature of Government in general; like under-workmen, who are expert enough at making a single Wheel in a Clock, but are utterly ignorant how to adjust the several Parts, or regulate the Movement.’

⁷³ CWJS, 16:384; for a more positive model of the statesman as architect-mechanic of state, see ‘Some Free Thoughts upon the Present State of Affairs’ (1714), PW, 8:77-98, at 81: ‘I suppose, when a Building is to be erected, the Model may be the Contrivance only of one Head; and it is sufficient that the under-workmen be ordered to cut Stones into certain Shapes, and place them in certain Positions; But the several Master-Builders must have some general Knowledge of the Design, without which they can give no Orders at all. And indeed I do not know a greater Mark of an able Minister, than that of rightly adapting the several Faculties of Men...’

⁷⁴ CWJS, 16:443; this is anticipated by the most famous passage in Swift’s correspondence, from his letter to Alexander Pope, 29 September 1725, Correspondence,

ed. Woolley, 2:606: 'I hate the tribe of Lawyers, but I love Councillor such a one, Judge such a one for so with Physicians (I will not speak of my own Trade...'

⁷⁵ The Craftsman. By Caleb D'anvers, of Gray's-Inn, Esq., 14 vols. (1731), 1:5.

⁷⁶ For Swift's involvement with The Craftsman see Lord Bolingbroke, Contributions to The Craftsman, ed. Simon Varey (Oxford: Clarendon Press, 1982), introduction, xiii-xxxiv, at xx; Swift's own account is in 'Epistle to a Lady', The Poems of Jonathan Swift, 2nd ed., 3 vols. (Oxford: Clarendon Press, 1958), vol. 2, 635.

⁷⁷ See Pamela O. Long, Openness, Secrecy, Authorship: Technical Arts and the Culture of Knowledge from Antiquity to the Renaissance (Baltimore: Johns Hopkins University Press, 2001), 16-45; see Wotton, Reflections, 303: 'The old Philosophers seemed still to be afraid that the common People should despise their Arts if commonly understood; this made them keep for the most Part to those Studies which required few Hands and Mechanical Tools to compleat them...'; see also Sigaut, 'Technology', 423: 'Invention is double-edged, benign or malignant, as ambiguous as the civilizing hero of mythology [Odysseus and others], who is often depicted as ambitious, shifty, cunning'.

⁷⁸ For eg. CWJS 1:65-6, and especially CWJS 2:299-300 on Isaac Newton as 'an obscure Mechanick'; see Lynall, Swift and Science, 100-9.