

‘The Days of Brilliancy are Past’: Skill, Styles and the Changing Rules of Surgical Performance, ca. 1820–1920

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Abstract: This paper examines how, over the course of the nineteenth and early twentieth centuries, the appreciation of skill in surgery shifted in characteristic ways. Skill is a problematic category in surgery. Its evaluation is embedded into wider cultural expectations and evaluations, which changed over time. The paper examines the discussions about surgical skill in a variety of contexts: the highly competitive environment of celebrity practitioners in the amphitheatres of early nineteenth-century Britain; the science-oriented, technocratic German-language university hospitals later in the century; and the elitist surgeons of late nineteenth and early twentieth-century United States with their concerns about distancing themselves from commercialism and cheap showmanship. For analysing the interaction of surgical practices with their various contexts the paper makes use of the concept of ‘performance’ and examines how the rules of surgical performance varied according to the prevailing technical, social, and moral conditions. Over the course of the century, surgical performance looked more and more recognisably modern, increasingly following the ideals of replicability, universality and standardisation. The changing ideals of surgical skill are a crucial element of the complex history of the emergence of modern surgery, but also an illuminating example of the history of skill in modern medicine.

Keywords: History of Surgery, Skill, Performance, Body History

‘The brain of an Apollo, the heart of a lion, the eye of an eagle, and the hand of a woman’¹ – often used and attributed to a variety of original sources, this dictum brings together some of the heterogeneous qualities attributed to the ideal surgeon at various times in history.

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¹ T.J.M., ‘Introduction’, in James Marion Sims (ed.), *The Story of My Life* (New York: Appleton, 1888), 9–29; see 24.

At the same time it represents a typical way of using cultural references to characterise surgical capabilities. It seems to be self-evident that among the capabilities of a surgeon technical skill is essential. But surgical skill is a problematic category that took on different meanings in the course of the history of modern surgery and it was associated with different values, specific to historical contexts. In this paper I look at how over the course of the nineteenth and early twentieth centuries the appreciation of skill in surgery shifted in characteristic ways. For that purpose I first define and characterise surgical skill as a historical phenomenon and introduce the concepts of style, repertoires and performance in order to describe and analyse its history. The idea of performance, in particular, makes it possible to connect the discussions of surgical skill and with the technical conditions, the professional contexts and the moral regimes at particular times and in particular places, as well as describing the overall trend towards a recognisably modern way of performing surgery.

Surgical Skill: Styles and Performance

As opposed to knowledge, which is often understood as purely mental, skill has a strong bodily component. In surgery it is considered a characteristic combination of corporeal and mental qualities (the ‘brain’ and the ‘hand’ of the dictum above).² Surgical skill can be seen as embodied material practice that becomes manifest in series of gestures surgeons perform in a particular way.³ Accordingly, surgery has been associated with manual skill for a long time. Even today, its practitioners are seen as ‘more doers than thinkers’, more like athletes, craftsmen or artists than savants.⁴

The way to acquire surgical skill is by imitating others and experiencing the practices physically rather than just appropriating them mentally. Surgical techniques become ingrained in the body – in its movements and even in its sinews and muscles.⁵ Aspects of surgical skill, such as the sense of touch, can be difficult to put into words. Therefore surgical skill is often characterised as having a significant component of ‘tacit’ knowledge⁶ – the ‘ability to perform skills without being able to articulate how to do them’, such as the skill involved in riding a bicycle,⁷ or, in fact, in making a medical diagnosis, which is ‘as much an art of doing as it is an art of knowing’.⁸ Being ‘tacit’, however, is not necessarily an inherent quality of a particular kind of knowledge or skill. As we will see, tacit elements of surgical skill can be made explicit. The tacit character is, at least in part,

² Christopher Lawrence, ‘Medical minds, surgical bodies: corporeality and the doctors’, in Christopher Lawrence and Steven Shapin (eds), *Science Incarnate: Historical Embodiments of Natural Knowledge* (Chicago: University of Chicago Press, 1998), 156–201.

³ Rachel Prentice, *Bodies in Formation: An Ethnography of Anatomy and Surgery Education* (Durham, NC and London: Duke University Press, 2013), 13: 132. Roger Kneebone and Abigail Woods, ‘Recapturing the History of Surgical Practice Through Simulation-based Re-enactment’, *Medical History*, 58 (2014), 106–21: see 109.

⁴ Lawrence, *op. cit.* (note 2), ‘characteristic combination’, see 156; ‘doers’, see 156. For metaphors in surgery derived from sports, such as ‘operating team’, ‘daily form’, ‘marathon’ operation, etc., see Stefan Hirschauer, ‘The Manufacture of Bodies in Surgery’, *Social Studies of Science*, 21 (1991), 279–319: 281.

⁵ Prentice, *op. cit.* (note 3), 164: 195–6; Hirschauer, *ibid.*

⁶ Michael Polanyi, *Personal Knowledge: Toward a Post-Critical Philosophy* (London: Routledge and Kegan Paul, 1958); Harry M. Collins, *Changing Order: Replication and Induction in Scientific Practice*, 2nd edn (Chicago: University of Chicago Press, 1992).

⁷ Thomas Schlich, *Surgery, Science and Industry: A Revolution in Fracture Care, 1950s–90s* (Basingstoke, UK: Palgrave, 2002), 67.

⁸ Polanyi, *op. cit.* (note 6), 54–5.

an attribution that varies depending on the historical context,⁹ for example when it serves particular professional purposes.¹⁰

Bodily techniques vary widely across cultures and histories. Classic examples of such variations are swimming strokes and walking styles.¹¹ Such variations exist in surgery too. There were differences in national styles of operating,¹² and at closer inspection one finds that contemporary observers described ‘many major and minor differences’ not only between nations but also between different cities and ‘between practitioners working in different hospitals within cities’.¹³ These varieties have been called ‘styles’, borrowing a term from the arts. Surgeons themselves employed such aesthetic categories, for example recommending ‘a grip on the scalpel as conducive to “elegance” as well as dexterity’. They conceded ‘that each anatomist and surgeon exercised “a taste of his own in these matters”’ and advocated the ‘cultivation of style’ in surgery.¹⁴

Surgical styles were passed on through imitation between practitioners because in many respects surgical training follows an apprenticeship model, as is typical for crafts.¹⁵ Since transmission through imitation requires submission to authority,¹⁶ particular master surgeons have spawned identifiable ‘schools’ of surgery. Like painters and craftsmen, surgical practitioners trace their special way of doing things back to particular masters and construct whole pedigrees of surgical schools.¹⁷ Surgeons in training who switched from one master surgeon to another noted the specificities of the schools, such as Hans Schlange in Germany, who in 1884 remarked that nothing piqued his interest more than seeing how the same surgical operation was carried out by the different schools.¹⁸ Personal and local variations in operative practice have continued to be discussed by surgeons up to the present time. A standard German textbook of 1914 claimed that operative technique always contains a good part of personal art and experience. Even though surgical institutions were in their essential elements identical everywhere, one wouldn’t find two places where techniques were applied in the same way, the three eminent authors of the textbook noted.¹⁹ Indeed, local and personal variations in surgical practice seem to defy all standardisation efforts: when the Swiss surgeons’ association AO/ASIF launched its ambitious and comprehensive project of standardising the operative treatment of broken

⁹ Alberto Cambrosio and Peter Keating, *Exquisite Specificity: The Monoclonal Antibody Revolution* (Oxford: Oxford University Press, 1995), 45–79.

¹⁰ Catherine Pope, ‘Resisting Evidence: The Study of Evidence-Based Medicine as a Contemporary Social Movement’, *Health*, 7 (2003), 267–82; see 274–5; Thomas Schlich, ‘The Art and Science of Surgery: Innovation and Concepts of Medical Practice in Operative Fracture Care, 1960s–70s’, *Science, Technology and Human Values*, 32 (2007), 65–87.

¹¹ As pointed out by Marcel Mauss long ago, quoted by Prentice, *op. cit.* (note 3), 10.

¹² Ghislaine Lawrence, ‘The ambiguous artifact: surgical instruments and the surgical past’, in Christopher Lawrence (ed.), *Medical Theory, Surgical Practice: Studies in the History of Surgery* (London and New York: Routledge, 1992), 295–314; see 307; Peter Stanley, *For Fear of Pain: British Surgery, 1790–1850* (Amsterdam and New York: Editions Rodopi, 2003), 62–3.

¹³ Stanley, *ibid.*, 62. Even beyond surgery, groups of practitioners differ in the ways they perform certain practices, so that one can ask if ‘surgeons cut like barbers – or . . . like butchers, or cooks, or carpenters’, Lawrence, *ibid.*, 307.

¹⁴ Stanley, *ibid.*, 224–6, quotes: 225.

¹⁵ James R. Zetka, *Surgeons and the Scope* (Ithaca, NY and London: Cornell University Press, 2003), 70.

¹⁶ Polanyi, *op. cit.* (note 6), 53.

¹⁷ See eg. H. Killian and G. Krämer, *Meister der Chirurgie und die Chirurgeschulen im deutschen Raum* (Stuttgart: Thieme, 1951).

¹⁸ See Arend Buchholz, *Ernst von Bergmann* (Leipzig: F.C.W. Vogel, 1911), 430–1.

¹⁹ August Bier, Heinrich Braun and Hermann Kümmell, *Chirurgische Operationslehre*, vol. 1 (Leipzig: Barth, 1914), 1. On surgeons’ discussions of different styles of operating, see also Lawrence, *op. cit.* (note 12), 307.

bones with metal plates and screws in the 1960s and 70s, local variations of their technique kept springing up left and right.²⁰

The different styles of surgery embody what it means to be a good surgeon in various ways. Being a good surgeon goes beyond mere technique and knowledge. It requires a particular combination of social and moral capabilities to qualify the surgeon to undertake his ‘high-stakes activity’, as Rachel Prentice notes about present-day surgery.²¹ In the dictum quoted above, ‘the heart of a lion’ alludes to a particular affective disposition for performing successful surgery. Surgical work thus includes affective and ethical components along with the technical dimensions.²² Thus, technical capabilities were often seen as being in need of moderation through ethical standards of conduct.²³ The ethical dimension is also present in surgical training, often in an implicit, tacit way. ‘Unspoken normative codes’ are typical for craft training, which has ‘as much to do with how to behave as it has to do with mastering specific tasks’.²⁴

Particular ways of performing practices come with specific ‘technologies of the self’, as conceptualised by Michel Foucault and used by Delia Gavrus in her contribution to this special issue about the first generation of neurosurgeons in the US.²⁵ In the history of science, these technologies of the self were constituted by various practices such as ‘training the senses in scientific observation, keeping lab notebooks, drawing specimens, habitually monitoring one’s own beliefs and hypotheses, quieting the will, and channelling the attention’.²⁶ Similar observations apply to surgery. Moreover, technologies of the self are associated with particular material, political and ethical contexts: seeing surgery as a practice of manipulating body structures ties in with Foucault’s claim that particular technologies of the self interact with particular ‘technologies of production, which permit us to produce, transform, or manipulate things’, since – and here he refers back to Karl Marx – ‘every technique of production requires modification of individual conduct – not only skills but also attitudes’.²⁷ Surgical operations are thus conducted in a particular style, in connection with specific technologies of the self as well as a specific moral and affective regimen.

At the same time, a surgical operation possesses the character of a ‘performance’. The word ‘performance’ has a variety of meanings. All of them can be useful for looking at surgery. Performance is, in a first sense, the ‘execution of an action’. It is, secondly, also ‘something accomplished’. In a third sense, it is a ‘public presentation or exhibition’.²⁸ Its multilayered semantics makes the term ‘performance’ particularly useful as an analytic tool for looking at the changes in surgical style. It brings together attention to ‘the bodies

²⁰ Schlich, *op. cit.* (note 7), 43–5.

²¹ Prentice, *op. cit.* (note 3), 196. See also Kneebone and Woods, *op. cit.* (note 3), 109.

²² Prentice, *op. cit.* (note 3), 6: 10–1, also 105.

²³ Even today, technical skill in surgery still does not always have positive connotations. See Prentice, *op. cit.* (note 3), 110.

²⁴ *Ibid.*, 106.

²⁵ Michel Foucault, ‘Technologies of the self’, in Luther H. Martin, Huck Gutman and Patrick H. Hutton (eds), *Technologies of the Self: A Seminar with Michel Foucault* (Amherst: University of Massachusetts, 1988), 16–49: see 18. For applying this to surgery, see Delia Gavrus, ‘Men of Strong Opinions: Identity, Self-Representation and the Performance of Neurosurgery’ (unpublished PhD thesis: University of Toronto, 2011), 9–10; and Gavrus, ‘Skill, Judgment and Performance for the First Generation of Neurosurgeons’, in this special journal issue.

²⁶ Lorraine Daston and Peter Galison, *Objectivity* (New York: Zone Books, 2007), 199.

²⁷ Foucault, *op. cit.* (note 25), see 18. See also Gavrus, *Men of Strong Opinions*, *op. cit.* (note 25), 9.

²⁸ Merriam-Webster Dictionary, <http://www.merriam-webster.com/dictionary/performance>, accessed April 8, 2013.

of practitioners, on their embodied practices, and their presentation of practices to different audiences'.²⁹ As Michael Worboys has noted, attention to performance additionally helps show 'how theories, practices, and meanings were co-produced', and 'how the actors combined elements, both old and new, from sciences, technologies, medicine, and wider socio-cultural resources'.³⁰

Christopher Lawrence and Delia Gavrus have borrowed the notion of 'repertoires' (which had been introduced by Stephen Shapin) as another useful tool for the analysis of the history of surgery. Repertoires are 'relatively stable packages of attributions and evaluations', which can be used as socio-cultural resources for legitimating particular kinds of surgical performance.³¹ Such repertoires enable but also restrict the legitimate ways of performing surgical operations while also shaping the corresponding identity of surgical practitioners.³² At different moments over the past several centuries, surgeons and physicians, Lawrence found, 'drew upon sets of characteristic corporeal and mental qualities in order to define their professional identity and to garner authority'.³³ Repertoires are thus specific to historical and local contexts: 'Identity is constructed out of materials at hand. . . . Cultures vary in their repertoires for recognizing roles, in their distributions of value to different sorts of activity, . . . and in the legitimacy they accord to conception of motive.'³⁴ As we will see, surgeons could be associated with poets as well as with engineers, with male butchers as well as with female embroiderers, according to the repertoires that were mobilised in the respective context. Poet, engineer, butcher and embroiderer were roles that 'preexisted in the background of which individual presentations might be understood and evaluated', providing specific 'vocabularies of motive and purpose . . . for warranting behavior and rendering comprehensible as behavior of a certain kind'.³⁵

Grace and Speed

In the first half of the nineteenth century, before the introduction of anaesthetics, the rules of surgical performance were quite different from the time period when surgeons were using anaesthesia. The image of the ideal surgeon was built around a 'mystique of speed', as Peter Stanley has called it. This image was conveyed through numerous anecdotes about how famous practitioners counted in seconds how long it took them to conclude an operation, typically an amputation. The arm 'may be on the floor in twelve or fifteen seconds', it was reported about the most celebrated surgeon of his period,

²⁹ This is what Iwan Rhys Morus, 'Placing Performance', *Isis*, 101 (2010), 775–8: 775, notes for the history of science; also Gavrus, *Men of Strong Opinions*, *op. cit.* (note 25), 15. Gavrus has shown in her case study on neurosurgery how the concept allows historians to look at different social enterprises that work together to produce the identity of surgeons. Gavrus, *Men of Strong Opinions*, *op. cit.* (note 25); Delia Gavrus, 'Men of Dreams and Men of Action: Neurologists, Neurosurgeons, and the Performance of Professional Identity, 1920–50', *Bulletin of the History of Medicine*, 85 (2011), 57–92.

³⁰ Michael Worboys, 'Practice and the Science of Medicine in the Nineteenth Century', *Isis*, 102 (2011), 109–15: see 112.

³¹ Steven Shapin, "'A Scholar and a Gentleman": The Problematic Identity of the Scientific Practitioners in Early Modern England', *History of Science*, 29 (1991), 279–327: 280. For surgery, see Lawrence, *op. cit.* (note 2), 159; Gavrus, *Men of Strong Opinions*, *op. cit.* (note 25), 5.

³² Gavrus, *Men of Strong Opinions*, *op. cit.* (note 25), 11–12.

³³ Lawrence, *op. cit.* (note 2), 159; Gavrus, *Men of Strong Opinions*, *op. cit.* (note 25), 6.

³⁴ Gavrus, *Men of Strong Opinions*, *op. cit.* (note 25), 11–12.

³⁵ Steven Shapin, *A Social History of Truth: Science and Civility in Seventeenth-Century England* (Chicago: University of Chicago Press, 1994), 129–30; Gavrus, *Men of Strong Opinions*, *op. cit.* (note 25), 11–12.

Robert Liston, and his shoulder amputations.³⁶ Cutting had to be performed decisively: ‘If a man sets about it hesitatingly he makes some blunder or other’, London surgeon John Abernethy admonished, and Frederic Skey declared that ‘timidity’ marked ‘the ignorant man at every step’.³⁷ Speed and physical agility were highly valued. William Fergusson, for example, kept the fingers of his left hand ‘supple by playing the violin and making his own instruments and was among the most nimble of a generation of rapid operators’.³⁸

British surgeons of that period aspired to be gentlemen and scholars, but they also retained an important connection to their strong masculine identity, which relied on ‘physical endurance, courage, solidity and honesty’. This combination gave them an important advantage in their cultural environment.³⁹ So, along with speed, boldness and courage were admired in surgeons of the time. The ‘mystique of speed’ thus formed part of what one could call a broader ‘mystique of the heroic surgeon’ – the surgeon who was willing ‘to attempt the novel and the dangerous’. Robert Liston, for example, was not only fast; he was also heroic. He was regarded as one of the boldest and most dexterous operators in Britain, his confidence in his own ability leading him to try out unprecedented surgical feats. His heroism went along with a particular way of presenting himself. Being of large stature and strength, Liston ‘... presented a brash exterior and his reputation for self-possession became legendary. One admirer... described the “perfect *non chalance*” with which he commenced the most formidable operation’. He prepared the instruments and table ‘with as much *sang froid* as a waiter at the London Tavern... preparing for a dinner party’.⁴⁰ Liston’s nonchalance is reminiscent of *sprezzatura* – the ability to make difficult tasks look easy, as defined in the Italian courts of the sixteenth century and since then used for characterising certain stylistic elements in works of art. In Victorian times such seemingly effortless grace was highly valued also with regard to more mundane chores, for example – an interesting parallel to surgery in terms of cutting – the art of carving meat at the dinner table. This skill was seen as ‘... one of the accomplishments of a gentleman’, for which instructive books were available, such as John Trusler’s *Art of Carving*, first published in 1788 and re-edited several times.⁴¹ In Liston’s case, nonchalance went along with his famous bluntness and with what was described as his ‘harsh and discordant’ voice.⁴² It is no wonder that Liston anecdotes abound in the popular historiography of surgery. Performances such as Liston’s were part of a culture of surgeon celebrities, who, especially in the British capital, competed for fame and glory as well as for high-status patients.⁴³

In that context, elegance was another quality that was admired in surgical work. Surgeons praised colleagues by comparing them to artists, poets and writers. An admirer

³⁶ Stanley, *op. cit.* (note 12), 226–7.

³⁷ *Ibid.*, 218.

³⁸ *Ibid.*, 227.

³⁹ Sally Frampton, “‘The Most Startling Innovation’: Ovarian Surgery in Britain, c. 1740–1939’ (unpublished PhD thesis: University College London, 2013), 259; Lawrence, *op. cit.* (note 12), 194.

⁴⁰ Stanley, *op. cit.* (note 12), 41–3; ‘The novel and the dangerous’, see 64; ‘Brash exterior’, ‘*non chalance*’, ‘dinner party’, 205.

⁴¹ See John Trusler, *The Honours of the Table Or, Rules for the Behaviour During Meals with the Whole Art of Carving* (London: Sleater, 1791), 17. On *sprezzatura*: Baldesar Castiglione, *The Book of the Courtier*, Charles S. Singleton (trans.), Daniel Javitch (ed.), (New York: W.W. Norton, 2002). I am grateful to one of the anonymous reviewers for pointing out these parallels to me.

⁴² Stanley, *op. cit.* (note 12), boldest and most dexterous operators: 19, confidence: 64, ‘harsh and discordant’: 205. See also: Reginald Magee, ‘Surgery in the Pre-Anaesthetic Era: The Life and Work of Robert Liston’, *Health and History*, 2 (2000), 121–33; large stature: 124.

⁴³ Stanley, *op. cit.* (note 12), 41–3.

described Charles Aston Key's style as the 'poetry of surgery'. One surgeon compared the use of the scalpel to 'penmanship' when he described the right kind of pressure for cutting: 'firm, but light and graceful'. One of the key elements that surgeons took from art was the ideal of intentional control. Thus John Abernethy in 1828 'took pride in the precision of his incisions and dissection' and told his students that they 'ought as much to expect a draftsman to draw a line in a direction he did not intend . . . as to expect that a surgeon would cut fibres if he did not intend it'. 'The head must always direct he hand,' Sir Astley Cooper wrote when describing 'self-possession' as the most important quality of a surgeon.⁴⁴ Here the arts provided a repertoire for fashioning surgical ideals and identities.⁴⁵

Surgery at this time was often a public event, and showmanship was part of the business. In fact, surgery has a long history as a spectacle. The surgical theatre goes back to the anatomical theatre, which served the purpose of making the performance of dissection visible to an audience, very much like in a real theatre.⁴⁶ Its spatial arrangement emphasised the theatrical character of the operation. The establishment of the great amphitheatres in the nineteenth century marked 'the summit of the surgeon's dazzling actor-role', in which the spotlight of the public gaze was focused upon him.⁴⁷ Along these lines, the operating theatres of the London hospitals were ' . . . the key arena for displays of surgical prowess', and not only for colleagues: 'Many hospitals admitted members of the public to watch operations, and there were always large crowds of medical students and other doctors present.' This shaped surgery's public image. In historian Stephanie Snow's words:

[B]y the late 1840s, 'modern' surgeons had constructed their professional identity upon attributes such as coolness and decisiveness. It was an image with elements of showmanship; the surgeon was the oasis of authority amidst the bodily confusion of severed flesh and bones, and the disarray of minds. . . . [N]o London surgeon was unaware of the way in which their public performance in the operating theatre could make or mar private practice.⁴⁸

But even at this point, elegance and speed were only one part of the picture. The 'admiration for speed' was counterbalanced by an emphasis on 'the need to work slowly when necessary and the fact that in many procedures rapidity was simply incompatible with effective surgery. . . . Charles Bell recommended that a lithotomy incision be made "slowly and deliberately".' And 'John Bell depicted a more realistic image of a surgeon "cutting rapidly and dexterously" when all was safe and "slowly and cautiously" when there was danger'. Even Liston insisted that there was a difference 'between boldness and rashness'.⁴⁹

Parallel to the culture of brilliance and speed, a more sceptical counter-movement can be seen at this point. Here the comparison with art came in handy, too. Like artists, surgeons had to avoid brilliance for its own sake. True elegance was 'grace without

⁴⁴ [Astley Cooper], 'Surgical Lecture', *The Lancet*, 1 (1823), 3–10: 4.

⁴⁵ Stanley, *op. cit.* (note 12), poetry: 225–6; penmanship: 226; precision: 225.

⁴⁶ Thomas A. Markus, *Buildings and Power: Freedom and Control in the Origin of Modern Building Types* (London and New York: Routledge, 1993), 229–40.

⁴⁷ Owen H. Wangenstein and Sarah D. Wangenstein, *The Rise of Surgery: From Empiric Craft to Scientific Discipline* (Folkestone: Dawson, 1978), 464.

⁴⁸ Stephanie Snow, *Operations without Pain: The Practice and Science of Anaesthesia in Victorian Britain* (Basingstoke: Palgrave Macmillan, 2006), 129.

⁴⁹ Stanley, *op. cit.* (note 12), Charles Bell: 227; John Bell: 227; Liston: 64.

‘affectation’, as commentators of the time wrote about surgery.⁵⁰ This is another example of the appreciation of *sprezzatura* as the opposite of affectation. These aesthetic categories were bound up with a particular moral regime: boldness and elegance, it was thought, must not be ends in themselves. They needed to be controlled by a moral framework to make sure that the surgeon’s performance stayed within the limits of his patients’ best interest. Increasingly, operative overenthusiasm, heroism and audacity were criticised from within the surgical profession, also outside of Britain, where colleagues were warning against the ‘huzza of the ignorant and vulgar multitude for the surgeon’, the ‘popular idolatry of the *mere operators*’, whose ‘frenzy for the use of the scalpel and saw, mallet and chisel, and even the red hot iron . . . become a passion, which often degrades surgery into human butchery’.⁵¹ The American surgeon Henry J. Bigelow condemned the idea of *heroic surgery* in 1850: ‘[F]or acquiring the notoriety which is the nucleus for surgical practice, a surgeon had better sometimes be known as the hero of extraordinary operations which have proved unsuccessful, even fatal, than as a follower of the usual routine of ordinary treatment’.⁵²

The warnings against technical bravado for its own sake were part of a wider move in Britain against what was seen as ‘medical corruption’ in all its forms.⁵³ According to John Bell, the ‘good surgeon’ ‘entertained neither vain nor selfish ambitions, shunning “masterly turn of his knife” to seek applause’.⁵⁴ These were rules of propriety and morality that were important to maintain the public’s trust within a culture of virtuosity and competition and probably also to depict doctors as gentlemen and to buy into the associated social standing.⁵⁵

Also, from the 1820s onwards, a new surgical strategy called ‘conservative surgery’ slowed down surgeons through increasingly complex interventions. In order to preserve patients’ body structures as best as possible, many amputations, for example, were replaced by excisions and resections of diseased or injured bone and tissue.⁵⁶ This strategy increased the length of operations, and ‘while the cutting part in the amputation of an arm might be over in ninety seconds the excision of an elbow joint could take fifteen minutes’.⁵⁷ The introduction of anaesthesia in the 1840s reinforced that trend; operating on insensible and motionless bodies made it possible to unfold surgeons’ technical abilities to a larger degree than ever, transforming surgical work to include more complex and more protracted procedures.⁵⁸

Pedantry as a Virtue: Antisepsis

In the second half of the nineteenth century the rules of surgical performance started moving towards even slower operations.⁵⁹ An important factor in this reconfiguration was

⁵⁰ *Ibid.*, 225–6. Astley Cooper (1768–1841) worked with ‘elegance . . . without affectation’, exhibiting the ‘graceful efforts’ of an artist. According to Sir Charles Bell, Roux operated ‘with grace without affectation’.

⁵¹ Gert H. Brieger, ‘From conservative to radical surgery in late nineteenth-century America’, in Lawrence (ed.), *Medical Theory*, *op. cit.* (note 12), 216–31: 218–20; quotes from the *New York Medical Gazette* of 1853 on 220.

⁵² *Ibid.*, 224.

⁵³ Frampton, *op. cit.* (note 39), 179.

⁵⁴ Stanley, *op. cit.* (note 12), 226.

⁵⁵ Lawrence, *op. cit.* (note 2), 187–98.

⁵⁶ Snow, *op. cit.* (note 48), 29.

⁵⁷ Stanley, *op. cit.* (note 12), 228.

⁵⁸ Snow, *op. cit.* (note 48), 125: 150–1: 186.

⁵⁹ Brieger, *op. cit.* (note 51), 225.

technical: the newly introduced measures of cleanliness for controlling wound disease required a slower style of operating. Among these measures, the approach that eventually became most influential was Joseph Lister's antiseptics. Lister himself embodied the opposite of the widely admired brilliant style of surgery: 'Slow in his actions and dripping with sweat, Lister was conventional in his use of the scalpel . . . and reluctant to attempt abdominal surgery except in emergencies'⁶⁰ – no *sprezzatura* here. The surgeon John Berg from Sweden was surprised to see his by then already famous colleague being a shy and awkward man with a stutter when he visited him in 1879/80.⁶¹ Lister's shy and sensitive personality went along with an operative technique that 'would always be slow, steady and cautious'.⁶² He was 'in many ways the typical earnest Victorian',⁶³ showing the emphasis on seriousness and self-discipline of the bourgeois culture of his time combined with straightforwardness and humbleness, but also scepticism – features that many observers have attributed to Lister's religious background as a Quaker.⁶⁴

Lister's ideal of surgical professionalism encompassed 'his demeanour and character', as well as 'his operative performance at every level: no detail was too insignificant for his attention'. For him, 'surgeons who did not give constant and vigilant attention to particulars in their practice, or who did not seek to improve performance, were failing in their duty to patients and letting down their profession'.⁶⁵ Lister's style had thus a strongly developed moral dimension. He kept reiterating the importance of careful attention to every detail and of 'earnest practical study', thus enunciating a particular ethics of both technical carefulness and scientific understanding in surgery.⁶⁶ In this context, good surgical skill was not about elegance and virtuosity but about following explicit rules: Lister's publications often contain thorough step-by-step instructions in which he 'tried to communicate . . . how to *perform* his methods, especially his hand skills, the manipulation of materials and instruments . . .'.⁶⁷ These instructions are attempts at passing on the often tacit skills of surgery by spelling them out as explicit and detailed rules to be followed, such as when Lister instructed his reading to prepare 'a solution of one part of crystallized carbolic acid in four parts of boiled linseed oil', then dip in the oily mixture 'a piece of rag from four to six inches square' and lay it 'upon the skin where the incision is to be made'. The detailed instructions continue:

⁶⁰ Anne Crowther and Marguerite W. Dupree, *Medical Lives in the Age of Surgical Revolution* (New York: Cambridge University Press, 2007), 120.

⁶¹ John Berg, 'Några synpunkter på antiseptikens genombrottstid av en som upplevat den Föredrag i Svenska Läkaresällskapet den 17 mars 1931 av professor John Berg', *Hygiea*, 93 (1931), 449–73, reprinted in *Svensk Medicinhistorisk Tidskrift*, 16 (2012), 38–53; see 44–5. The paper is based on a presentation Berg gave in 1931 for the Swedish medical society. I thank Nils Hansson for this information.

⁶² Malcolm Nicolson, 'Lister, Joseph', in W.F. Bynum and H. Bynum (eds), *Dictionary of Medical Biography* (Westport, CT and London: Greenwood, 2007), 799–803; see 799.

⁶³ Barrington Moore, Jr., 'Historical Notes on the Doctors' Work Ethic', *Journal of Social History*, 17 (1984), 547–71; see 555.

⁶⁴ C. Dukes, *Lord Lister (1827–1912)* (London: L. Parsons, Boston: Small, Maynard and company, 1924); F.F. Cartwright, 'Lister the Man', *British Journal of Surgery*, 54 (1967), 405–10; 'Funeral of Lord Lister', *British Medical Journal*, 1, 2669 (1912), 440–6.

⁶⁵ Michael Worboys, 'Joseph Lister and the Performance of Antiseptic Surgery', *Notes and Records of the Royal Society*, 67 (2013), 199–209; see 201.

⁶⁶ Joseph Lister, 'Further Evidence Regarding the Effects of the Antiseptic System of Treatment upon the Salubrity of a Surgical Hospital', *The Lancet*, 96, 2452 (1870), 287–9; see 288.

⁶⁷ Michael Worboys, *op. cit.* (note 65), 200–1 (emphasis in the original).

The lower edge of the rag being then raised, while the upper edge is kept from slipping by an assistant, a common scalpel or bistoury dipped in the oil is plunged into the cavity of the abscess, and an opening about three quarters of an inch in length is made, and the instant the knife is withdrawn the rag is dropped upon the skin as an antiseptic curtain, beneath which the pus flows out into a vessel placed to receive it.⁶⁸

It is important to note that, at this time, this high level of attention to detail was not common practice in surgery. Lister's method was seen as 'extremely complicated, expensive, irksome, and laborious' by many of his colleagues. An 1875 editorial in *The Lancet* held that the minute details of the antiseptic system with its 'extra expenditure of money, time, and labour' were only practised by enthusiasts with time on their hands.⁶⁹ The perception of his methods as being fussy and overly elaborate was part of the reason for the patchy reception of Lister's early work.⁷⁰ However, Lister's approach shaped surgery. A growing number of followers shared his concern for details. Thus, his most important student, William Watson Cheyne, provided detailed instructions of performance in his book *Antiseptic Surgery* of 1882 and remarked in 1891 that the 'minute details . . . all illustrate the principle'.⁷¹

Rather than his British colleagues, it was surgeons in the German-speaking countries who became particularly interested in Lister's technique. This is most probably due to a whole range of reasons. One of them was, as Michael Worboys claims, that in Germany, Listerians worked 'with the grain of advanced medical science rather than against it'.⁷² In other words, German doctors seem to have found it easier to integrate new ideas that were based in laboratory science than their British colleagues. In a medical culture where experimental science carried high prestige, it was a natural step to adopt the notion that the patient body was in significant ways comparable to a bacterial culture in the laboratory.⁷³ There were probably also structural reasons that made it easier for a demanding and precarious technique to be adopted. In Germany, the trend of relocating surgery in hospital environments seems to have been stronger than elsewhere. Novel ways of doing surgery were mostly performed at the universities with their large hospitals and a strong and hierarchically organised surgical staff, conditions that facilitated the controlled spread of the technique.⁷⁴

The distinctiveness of Lister's approach was particularly striking in this environment. Thus, in 1879 Johann Nepomuk von Nussbaum in Munich stressed the painstaking attention to detail that surgeons had to pay in order to reap the rewards of the antiseptic method. The difficulty, the German surgeon explained, does not lie in the artistic execution of the technique, by which he meant the technical difficulty as such, but in the constant and uninterrupted attention it demanded. Antisepsis required discipline of the body plus discipline of the mind. The new rules of surgical performance thus entailed a strict affective asceticism, forcing surgeons to subject themselves to a regime of mental discipline and restraint. This kind of discipline was not seen as a natural part of the surgical persona at the

⁶⁸ Joseph Lister, 'On a New Method of Treating Compound Fracture, Abscess, &c.', *The Lancet*, 90 (1867), 95–6, as cited in Worboys, *op. cit.* (note 65).

⁶⁹ 'Editorial', *The Lancet*, 106 (16 October 1875), 565–6; see 565.

⁷⁰ Anne Crowther, 'Lister at Home and Abroad: A Continuing Legacy', *Notes and Records of the Royal Society*, 67 (2013), 281–94.

⁷¹ Worboys, *op. cit.* (note 65), 204.

⁷² Michael Worboys, *Spreading Germs. Disease Theories and Medical Practice in Britain, 1865–1900* (Cambridge and New York: Cambridge University Press, 2000), 98–9.

⁷³ See Thomas Schlich, 'Farmer to Industrialist: Lister's Antisepsis and the Making of Modern Surgery in Germany', *Notes and Records of the Royal Society*, 67 (2013), 245–60.

⁷⁴ *Ibid.*, 247.

time. It was, in fact, associated with a very negative quality, pedantry. Lister's system had to be defended by its proponents against being ridiculed as propagating pedantic accuracy. It didn't require much of a genius to wash one's hands or to place a piece of silk on a wound, sceptics scoffed.⁷⁵ Critics were able to draw on a long tradition connected to the vice of pedantry. In the late nineteenth-century German-speaking world (as today), a pedant was a formal character who clung to insignificant details – a stickler for detail, someone who regards trivialities as important, who is fussy and overly formal.⁷⁶ This was what antiseptic surgeons looked like to those of their colleagues who did not adopt their specific style.

'The Days of Brilliancy are Past': Discipline and Science

In the 1880s and 90s, many surgeons, starting in the German-speaking world, supplemented or replaced Lister's antiseptics by what they called 'asepsis'.⁷⁷ In asepsis, instead of killing the germs, they were to be avoided in the first place. This strategy took the requirements on discipline and self-restraint up a level. Achieving and maintaining a germ-free environment as required by aseptic surgery was particularly precarious, and the demands on bodily control and mental presence were especially high. While antiseptics, with its strategy of killing germs indiscriminately, had been relatively forgiving, in asepsis, with its much more targeted approach, 'the smallest mistake . . . would come back to haunt the surgeon', as Johann von Mikulicz phrased it.⁷⁸ Accidental contamination of the operation site could 'no longer be atoned for by antiseptic sprinkling as in the past',⁷⁹ another surgeon remarked. Therefore in the aseptic operating room no uncontrolled move could be tolerated. A single gap in the aseptic system would jeopardise the surgical result. This was the background for the introduction of a whole array of new elements in the surgical armamentarium devised to fix those gaps, such as surgical gloves and surgical masks. These new measures followed the surgeons' strategy to expand the controlled conditions of the bacteriological laboratory to the operating room in order to reach a comparable amount of aseptic control in both spaces.⁸⁰ The spread of asepsis therefore went along with further changes in the rules of surgical performance.

In his colourful memoirs, the German surgeon Carl Ludwig Schleich described how he lived through a regime change, when in 1883 his old head surgeon, Bernhard von Langenbeck, was succeeded by Ernst von Bergmann. For Schleich, his old chief, with

⁷⁵ Johann Nepomuk von Nussbaum, *Leitfaden zur antiseptischen Wundbehandlung insbesondere zur Lister'schen Methode für seine Schüler und für praktische Ärzte* (Stuttgart: Enke 1879), 8–9.

⁷⁶ On the long tradition of pedantry, see Shapin, *op. cit.* (note 36), 287–312. For nineteenth-century Germany, see *Deutsches Wörterbuch von Jacob und Wilhelm Grimm*, 16 Bde. in 32 Teilbänden, Leipzig 1854–1961, Quellenverzeichnis, Leipzig 1971, Online-Version vom 20.01.2013, pedant bis pfeffern (vol. 13, col. 1522–23), from 1886; *Oekonomische Encyklopaedie oder allgemeines System der Staats-, Stadt-, Haus- und Landwirthschaft in alphabetischer Ordnung von D. Johann Georg Krünitz*, vol. 108 (1808); *Meyers Großes Konversationslexikon. Ein Nachschlagewerk des allgemeinen Wissens*, sechste, gänzlich neubearbeitete und vermehrte Auflage, vol. 6, col. 531 (Leipzig and Vienna, 1905–9).

⁷⁷ Thomas Schlich, 'Asepsis and Bacteriology: A Realignment of Surgery and Laboratory Science', *Medical History*, 56 (2012), 308–43.

⁷⁸ J. Mikulicz, 'Ueber Versuche, die "aseptische" Wundbehandlung zu einer wirklich keimfreien Methode zu vervollkommen', *Deutsche medizinische Wochenschrift*, 33 (1897), 409–13: 411.

⁷⁹ A. Wölfler, 'Ueber Operations-Handschuhe', *Beiträge zur klinischen Chirurgie*, 19 (1897), 255–59; see 256.

⁸⁰ Thomas Schlich, 'Surgery, Science and Modernity: Operating Rooms and Laboratories as Spaces of Control', *History of Science*, 45 (2007), 231–56; *idem*, 'Negotiating Technologies in Surgery: The Controversy about Surgical Gloves in the 1890s', *Bulletin for the History of Medicine*, 87 (2013), 170–97.

his ‘unimaginable speed’ in operating, was the ‘most elegant surgeon of all times’. He illustrated this claim with a Liston-type anecdote about when, one day, an American colleague had come to Berlin to see Langenbeck perform his famous circular cut for amputation. For a moment the visitor turned his head to sneeze and blow his nose. When he turned back to the operating table, the leg was off. To his chagrin, the American had missed the critical moment. Schleich characterised Langenbeck as a ‘genius’, whose ‘sure and elegant hand of an aristocrat demonstrated almost exclusively operating methods that he had invented himself, in the same way a virtuoso demonstrates his skills that were only given to him and were unachievable by others . . .’.⁸¹ The term ‘genius’ tapped into a specific cultural repertoire that was available for characterising this particular – and now obsolete – aspect of surgical style at his time. The idea of genius in the modern sense had originated in the Romantic period earlier in the century. It was understood as a productive–eruptive force, characterised by its originality and spontaneity.⁸² Genius had something ineffable about it. It was associated with talent, natural gift and unconstrained creativity.⁸³ It was very much the antithesis of scientific replicability through mechanical instruction.⁸⁴ This is why Schleich used the notion for describing something that was no longer applicable.

With von Bergmann’s arrival, Schleich became ‘witness to the abrupt change of things’. The young surgeon felt as if ‘genius’ was replaced by ‘pedantry’ as the leading principle of his Berlin surgical hospital. ‘Before our eyes a baffling reorganization took place,’ he wrote in his picturesque narrative, ‘. . . not one stone was left upon another at the determined hands-on grip of the conqueror who had just arrived. A system that was elaborated down to the last details, was juxtaposed to the old, beloved habits with the rigor and pedantry of military instruction.’⁸⁵ ‘[I]f von Langenbeck was the spirit and the soul of surgery itself, his successor resembled a consummate organizer’ who took the existing ideas and consolidated them into a teachable system.⁸⁶ Like Lister, von Bergmann aimed at spelling out the elements of good surgery so that every surgeon could make use of them.

Hans Schlange observed the same change when he moved to Bergmann’s Berlin clinic from the University of Kiel under Friedrich von Esmarch. For von Esmarch, Schlange wrote, it was typical to display his elegance in a theatrical grand pose. This was exactly the opposite of von Bergmann, who was always sober and to-the-point, his operations fast and efficient. Similarly, von Esmarch had a passion for new surgical instruments. From every surgical congress, he would return with new gadgets, itching to try them out and employing a large number of them in his operations. This was diametrically opposed to

⁸¹ Carl Ludwig Schleich, *Besonnte Vergangenheit* (Berlin: Rowohlt, 1921), ‘speed’, ‘most elegant’: 154; anecdote: 156; ‘genius’: 170.

⁸² *Goethe-Wörterbuch*, (ed.) Berlin-Brandenburgische Akademie der Wissenschaften [bis Bd. 1, 6. Lfg.: Deutsche Akademie der Wissenschaften zu Berlin; bis Bd. 3, 4. Lfg.: Akademie der Wissenschaften der DDR], der Akademie der Wissenschaften in Göttingen und der Heidelberger Akademie der Wissenschaften (Stuttgart 1978–). vol. 3, col. 1453.

⁸³ Simon Schaffer, ‘Genius in romantic natural philosophy’, in Andrew Cunningham and Nicholas Jardine (eds), *Romanticism and the Sciences* (Cambridge: Cambridge University Press, 1990), 82–98: see 86–9. For a comprehensive account of the history of the changing notions of ‘genius’, see Darrin McMahon, *Divine Fury: A History of Genius* (New York: Basic Books, 2013).

⁸⁴ Schaffer, *op. cit.* (note 83), 89.

⁸⁵ Schleich, *op. cit.* (note 81), 169–70.

⁸⁶ *Ibid.*, 170.

the principles of von Bergmann, who restricted himself to the most necessary, functional and simple instruments and rarely purchased newly designed models.⁸⁷

Von Bergmann's university hospital in the Ziegelstrasse in Berlin was an elite institution, where he could try out the latest interventions in modern surgery. His practice was not dominated by the day-to-day care of Berlin's numerous accident victims, as in other surgical departments of the time, such as the one at the Charité hospital under his colleague Adolf Bardeleben just a couple of streets away.⁸⁸ Bergmann was able to perform a very sophisticated form of surgery. Many of his cases were elective operations, for example, the planned resection of cancer. He justified these elective operations through the results of the scientific experiments that he conducted in parallel, following an explicit program of scientific surgery. For Bergmann, the figure of the experimental scientist guided the idea of the ideal surgeon. He had come to Berlin in 1882 with the plan of turning surgery into a scientific discipline. In his inauguration speech he sketched out a utopian technocracy in which the application of the laws of nature to surgical practice would lead to unflinching success. Like the results of a scientific experiment, surgical procedures could be made universally replicable if they were conducted with discipline and precision.⁸⁹

Accordingly, upon his arrival in Berlin the surgeon immediately sought out the friendship and co-operation of another newcomer to Berlin, the bacteriologist Robert Koch. Koch was in many ways the very embodiment of the power of the new science. Moreover, both men were proponents of the technocratic and military elite that the Wilhelminian State had cultivated at the time.⁹⁰ Like Koch, von Bergmann was a high state official, a privy councillor decorated with high military honours.

Von Bergmann's generation evoked a new cultural repertoire for their new rules for performing surgery. Surgeons now used science and modern technology as their reference points for self-definition. In this vein, Richard von Volkmann claimed in 1881 that the modern surgeon was no longer at the mercy of the vagaries of nature. While the pre-antiseptic surgeon was like the farmer, depending on whatever harvest the elements would grant him, the modern surgeon was like an industrial manufacturer of whom the public expected high quality products.⁹¹ Surgeons like von Volkmann and von Bergmann situated themselves in the context of the modernity of science, industry and engineering. Along these lines, at the end of the century one of the most influential surgeons of his generation, the Breslau head surgeon Mikulicz, made a similar move and identified surgery as one of a number of modern technologies that were associated with a particular risk potential. He demanded a regime of risk management that was in keeping with the ones used in

⁸⁷ Arend Buchholz, *Ernst von Bergmann* (Leipzig: F.C.W. Vogel, 1911), 435.

⁸⁸ Gerhard Baader, Thomas Beddies and Marion Hulverscheidt, 'Chirurgie und naturwissenschaftliche Medizin (1850–90)', in Johanna Bleker and Volker Hess (eds), *Die Charité. Geschichte(n) eines Krankenhauses* (Berlin: Akademie, 2010), 99–125. The comparison is from Johanna Bleker, 'Antisepsis in Deutschland. Zur Wissenschaftsgeschichte der Chirurgie 1872–92' (unpublished manuscript, 2013). I thank Johanna Bleker for sharing the manuscript. See also Arend Buchholz, *op. cit.* (note 88); Buchholz cites Hans Schlange, who claims that von Esmarch's Kiel school was much more advanced in the care for accident victims than Bergmann's school.

⁸⁹ Ernst von Bergmann, 'Die Gruppierung der Wundkrankheiten', *Berliner klinische Wochenschrift*, 19 (1882), 677–9: 701–3; see 678.

⁹⁰ It is not by chance that Schleich made a comparison between Bergmann and the Prussian general Helmuth von Moltke; Schleich, *op. cit.* (note 81), 170. About Koch's links to a politically conservative bureaucratic control concept and to the military, see Silvia Berger, *Bakterien in Krieg und Frieden. Eine Geschichte der medizinischen Bakteriologie in Deutschland 1890–1933* (Göttingen: Wallstein, 2009), 48–53.

⁹¹ Richard Volkmann, 'Die moderne Chirurgie, Sammlung klinischer Vorträge, no. 221', in Richard Volkmann (ed.), *Chirurgie II*, (Leipzig: Breitkopf & Härtel, 1881: 1877–92).

transport and industry and stated that ‘in the same way as in other areas of technology – in the operation of railways, in mining and in the metal industry – it can be demanded of us that we improve as much as possible the arrangements for the safety of the people who are entrusted to us’.⁹² The shift in surgical style went along with the active and intentional comparison surgeons made between themselves and other occupations they wanted to be grouped with.

The surgical style connected to this new self-image was more diligent than ever. In his standard textbook of aseptic surgery of 1892, Bergmann’s assistant Curt Schimmelbusch described ‘calm and not overstrained operating’ as the condition for successfully maintaining the aseptic state of the operation site. In order to prevent infection, no blood or wound secretions, no detached or insufficiently supplied tissue parts should stay in the wound cavity, since the healing process could only start from growing and regenerating body tissues. Blood and detached parts of tissues impeded direct contact of the healing tissues with each other and provided the nutritional material for pathogenic germs. Therefore, exact haemostasis, drainage of wound secretion, and the creation of smooth wound margins were necessary. Bergmann himself had propagated this style since 1882 and developed it into a specific culture of asepsis.⁹³

In the same time period, Theodor Kocher in Bern, Switzerland put even more stress on accuracy in operating.⁹⁴ His surgical style corresponded to his personal discipline and emotional restraint, as well as the earnestness, diligence and patience shaped by his religious background in the Moravian Church.⁹⁵ He had started propagating slow operating in the 1870s, which put him in opposition to the majority of surgeons of the time. Kocher also had adopted Lister’s antisepsis early on, but he stressed that even with the new technique it was still important to provide optimal mechanical conditions for wound healing. Any mechanical tension or pressure on tissue that could obstruct proper circulation had to be avoided. Tissues had to be protected from being pushed, pressed or torn. The incision of the skin had to follow its natural tension lines, which the surgeon had determined in a series of experiments. Since his experimental work had shown him that the collection of blood outside the blood vessels was an important source of wound infection, one of Kocher’s main concerns was diligent haemostasis, and he conducted animal experiments to perfect the existing techniques of stopping arteries from bleeding.⁹⁶

In 1887 Kocher’s Swiss-American colleague Nicholas Senn saw him taking over an hour in performing a goitre removal – Kocher’s signature operation – remarking that ‘all the forceps which the institution possessed, some 60 or 70, were brought into use’.⁹⁷ Among his colleagues, Kocher was regarded as the very paragon of meticulousness. Mikulicz argued in a discussion in 1897 that even Kocher, ‘of whose meticulous diligence in all things technical we are all convinced’, reported occasional putrefaction after his

⁹² Mikulicz, *op. cit.* (note 78), see 411. For the context see also Schlich, *op. cit.* (note 74).

⁹³ Curt Schimmelbusch, *Anleitung zur Aseptischen Wundbehandlung* (Berlin: Hirschwald, 1892), 160: 162. For Bergmann’s culture of asepsis, see Schlich, *op. cit.* (note 77).

⁹⁴ Ulrich Tröhler, *Der Nobelpreisträger Theodor Kocher 1841–1917. Auf dem Weg zur physiologischen Chirurgie* (Basle: Birkhäuser, 1984), 189.

⁹⁵ Ulrich Tröhler, ‘Theodor Kocher: Chirurgie und Ethik’, *Gesnerus*, 49 (1992), 119–35: see 129–30.

⁹⁶ Tröhler, *op. cit.* (note 94) 28–34.

⁹⁷ N. Senn, ‘Lucerne, Berne and Geneva’, *Journal of American Medical Association*, IX, 12 (1887), 379–82: 380. Also: Berkeley G.A. Moynihan, ‘The Ritual of a Surgical Operation’, *British Journal of Surgery*, 8, 29 (1920), 27–35: 32–3.

operations.⁹⁸ The young French surgeon René Leriche, who visited Kocher in 1906, was equally impressed by his Swiss colleagues' exactness and care. He saw Kocher changing his cotton gloves no fewer than six times during a colon operation. Leriche had never seen such discipline, he conceded.⁹⁹ Kocher's operations thus came with a particular kind of performance, even though his style had in itself an anti-performance character; the American neurosurgeon Harvey Cushing, who had visited Kocher in 1901, remarked on this (anti-)performative dimension, claiming that Kocher's operative work was 'beyond compare' – but 'for the patient and not the bystander'. Kocher's unspectacular style resulted in better surgery, Cushing claimed, so that 'one has, in fact, a feeling of surgical security in Bern'.¹⁰⁰

Kocher's slowness and diligence had made new operations possible: only with his specific operative style was Kocher able to successfully perform the extremely demanding procedure of goitre removal – an intervention that before Kocher entailed forbiddingly high complication and death rates. But it also worked the other way round: tackling difficult procedures, especially in the abdomen, forced surgeons to work more diligently. The expansion of surgery had created 'a surgery of details', as it was noted, characterised by '... small and rapid incision, minimum manipulation, thorough enucleation, careful irrigation, religious cleanliness and perfect drainage ...'.¹⁰¹

Kocher was very influential beyond the German-speaking world, particularly in Britain and the US.¹⁰² It is a sign of his international recognition that in 1909 he was the first surgeon to be awarded the Nobel Prize. In 1920, British surgeon Berkeley G.A. Moynihan referred back to Kocher's surgical style as being exemplary. Surgical success, he held, depended on 'scrupulous, exacting, and unceasing supervision and close scrutiny of every smallest incident of procedure'.¹⁰³ 'Infinite gentleness, scrupulous care, light handling, and purposeful, effective, quiet movements which are no more than a caress, are all necessary ...', and here he combined these rules with the corresponding cultural identification figures:

... if an operation is to be the work of an artist, and not merely of a hewer of flesh. For every operation, even those procedures which are now quite commonplace, should be executed not in the spirit of an artisan who has a job to get through, but in the spirit of an artist who has something to interpret or create.¹⁰⁴

Moynihan here mobilised the figure of the artist to refer to technical sophistication and seriousness and not for its connotations of brilliancy or genius of an earlier period. This shows the multiplicity of possible meanings in cultural repertoires and their flexibility in use, depending on the context.

Diligence trumped elegance in this new culture of surgery. The American Carl Beck claimed in 1895 that:

⁹⁸ Mikulicz, *op. cit.* (note 78), see 410.

⁹⁹ René Leriche, *Souvenirs de ma vie morte* (Paris: Éditions du Seuil, 1956), 170.

¹⁰⁰ Harvey Cushing, 'Haller and his Native Town. Letter from a Post-Graduate Student', *American Medicine*, II, (1901), 542–4: 580–2; see p. 590.

¹⁰¹ David Barrow, 'How the Refinement of Abdominal Surgery Have Influenced General Surgery', *Transactions of the American Association of Obstetricians and Gynecologists*, 2, (1889), 92–9; 'surgery of details': 95; 'small and rapid incisions': 92.

¹⁰² Tröhler, *Der Nobelpreisträger*, *op. cit.* (note 94), 178.

¹⁰³ Berkeley G.A. Moynihan, 'The Ritual of a Surgical Operation', *British Journal of Surgery*, 8, 29 (1920), 27–35: 32–3: 34.

¹⁰⁴ *Ibid.*, 35.

[T]he operations of less skillful surgeons, performed with a comparatively small degree of dexterity, are more successful in their final results, provided that they are thoroughly aseptic, than the operations of surgeons less scrupulous in their preparations, even though the technical work be performed with the greatest possible elegance.

This kind of diligence was understood as a ‘particular feature of character’, compared to which ‘operative skill, desirable as it is, . . . does not possess half the degree of importance . . .’.¹⁰⁵ According to medical historian Gert Brieger, interest shifted from ‘the drama and theatricality of the operation itself’ towards ‘the drama of the results’.¹⁰⁶

Now the brilliant surgery of the past was used as a negative backdrop. ‘The days of the so-called “brilliant surgeon” are over’,¹⁰⁷ the leading English surgeon Frederick Treves announced in his popular textbook in 1892. For him, brilliancy was tantamount to ‘the reckless manipulations of an irresponsible hand, or the fortunate thrusts of the overbold’, which would often lead to ‘lamentable results’. However, surgeons like Treves were not opposed to skill as such, as medical historian Claire Brock rightly points out. Treves appreciated the individual surgeon’s ‘skill and precision’, but it was a special kind of skill, it was no longer ‘the brilliance of early nineteenth-century speed and *sang froid*’ but ‘the splendour of intricacy, precision and the possibility of replication’ that counted as desirable qualities in a surgeon’s style.¹⁰⁸

Physiological Surgery

No one embodied the values of the slow and non-spectacular style of surgery more perfectly than William Halsted at Johns Hopkins. Halsted had, in fact, started out as a particularly bold and brilliant surgeon. During his time as a young practitioner in New York City he pursued an extraordinarily energetic and lively career, operating at multiple hospitals, excelling in teaching and research. In the course of his early career Halsted experimented with cocaine for local anaesthesia and he became addicted to the substance. Subsequent attempts to treat this addiction with morphine made him dependent on both drugs for the rest of his life. He went to a sanatorium for treating his addiction and then moved to Baltimore, where in 1890 he became the first head of the Department of Surgery at the new Johns Hopkins Hospital and was appointed Professor of Surgery in 1892 when the Johns Hopkins School of Medicine was established.¹⁰⁹

Before the hospital opened, Halsted performed surgery on animals for experimental purposes. During this period he developed a completely new operative style, performing on his dogs, as an eyewitness reported, the most careful surgery imaginable. His specific culture of surgery differed strongly from the ‘fine tradition of the old operative surgery’ in Baltimore and elsewhere in his American environment.¹¹⁰ For Halsted this was a complete turnaround: the ‘brilliancy, boldness and manual dexterity’ he had displayed in New York City were substituted by ‘conscientiousness, thoroughness and safety’.¹¹¹ Many observers attribute this dramatic change of style to the experience of his drug addiction,¹¹² one of

¹⁰⁵ Carl Beck, *A Manual of the Modern Theory and Techniques of Surgical Asepsis* (Philadelphia: W.B. Saunders, 1895), 243.

¹⁰⁶ Brieger, *op. cit.* (note 51), see 217.

¹⁰⁷ Frederick Treves, *A Manual of Operative Surgery*, vol. 1 (London: Cassell, 1892), 29.

¹⁰⁸ Claire Brock, ‘Risk, Responsibility and Surgery in the 1890s and Early 1900s’, *Medical History*, 57 (2013), 317–37; see 323, in particular, *ibid.*, footnote 26.

¹⁰⁹ Michael Bliss, *Harvey Cushing: A Life in Surgery* (New York: Oxford University Press, 2005), 100–2.

¹¹⁰ W.G. MacCallum, *William Stewart Halsted, Surgeon* (Baltimore: Johns Hopkins Press, 1930), 67.

¹¹¹ William H. Welch, ‘Introduction’, in MacCallum (ed.), *op. cit.* (note 110), v–xiii; see viii.

¹¹² For an account of Halsted’s addictions, see Gerald Imber, *Genius on the Edge. The Bizarre Double Life Dr William Stewart Halsted* (New York: Kaplan, 2010), see eg. 47–59, 90.

them declaring that it was to Halsted's 'credit that he was able to overcome this habit, and it is probably very fortunate for American Surgery that he acquired it'.¹¹³ For the rest of his life, Halsted was the incarnation of pedantry (the vice that, as we have seen, had become a modern virtue). Socially aloof and eccentric, he cared about the tiniest detail also in his personal life. His suits were all tailored in London. His shoes he had made in Paris, and he selected the particular place in a skin from which he would have the leather cut. He not only insisted on wearing shirts that were made in Paris, he also for years sent his shirts to Paris to be laundered.¹¹⁴

In his surgery, Halsted found it essential to operate 'with the utmost respect for the integrity and nutrition' of his patient's tissue.¹¹⁵ Cutting was slow and controlled, sewing light and without force: only a little strength should be employed for the knots in sutures since 'the obstruction to the circulation produced by sutures and ligatures is often the immediate cause of suppuration in infected wounds...', as he explained.¹¹⁶ To avoid the strangulation of tissue in sutures he purposely used very weak silk, which would tear if too much force was applied to it. Like Kocher, whom he visited repeatedly in Bern, Halsted developed an 'obsession with hemostasis' which 'led to seemingly endless clamping or ligating of every possible bleeding point'.¹¹⁷ One of his residents described how he employed 'hundreds of clamps, delicate pincers that he specially designed with fine points, so that very little tissue would be crushed'.¹¹⁸ Consequently Halsted's operations were 'notoriously long'. His operating style 'was so slow that colleagues joked about patients healing before he had finished operating on them'.¹¹⁹ Halsted's surgical style was focused on various modes of control – through anaesthesia, haemostasis and gentle tissue handling. For him, control was the recipe for success. It allowed him to perform even extremely extensive interventions such as the radical operation for breast cancer, his 'trademark operation'.¹²⁰ The aim of this operation was removing all of the cancerous tissue from the patient's body. It was radical in so far that it was understood to go down to the root of the problem and resolve it once and for all. As a result of technical control combined with the perfectionist attitude about the complete removal of any cancer tissue, the radical mastectomy was radical to the point of recklessness.¹²¹

The performance shown by surgeons like Halsted and Kocher was a different kind of spectacle than the old surgery. It was slow but fascinated with its exactness, precision and discipline. Leriche, who after Kocher also visited Halsted, experienced Halsted's surgical performance as an epiphany. In the first three days of his visit at Johns Hopkins, the French surgeon reported he had become a different man.¹²² Leriche had grown up with the brio and speed of French-style surgery – the 'brilliant amphitheatre exercise' and the 'fast and neat operation', he explained. In this tradition, speed was supposed to leave little time for infection and shock to occur. Halsted, by contrast, started from the premise that an

¹¹³ Allan O. Whipple, 'Halsted's New York Period', *Surgery*, 32 (1952), 542–50: 549.

¹¹⁴ MacCallum, *op. cit.* (note 110), 104–6.

¹¹⁵ Bliss *op. cit.* (note 109), 101.

¹¹⁶ W. S. Halsted, 'The Treatment of Wounds', *The Johns Hopkins Hospital Reports*, 2, 5 (1891), 304–13: see 305.

¹¹⁷ Bliss, *op. cit.* (note 109), 101.

¹¹⁸ Hugh Young, *A Surgeon's Autobiography* (New York: Harcourt, Brace and Company, 1940), 62.

¹¹⁹ Bliss, *op. cit.* (note 109), 101.

¹²⁰ Joseph Colt Bloodgood, 'Halsted Thirty-Six Years Ago', *American Journal of Surgery*, 14 (1931), 89–148: 103–4; 'trademark': Bliss, *op. cit.* (note 109), 101.

¹²¹ See Barron Lerner, *The Breast Cancer Wars. Fear Hope, and the Pursuit of a Cure in Twentieth Century America* (Oxford, New York: Oxford University Press, 2001), 15–40.

¹²² Leriche, *op. cit.* (note 99), 185.

operation – no matter how long – is aseptic from one end to the other if the right measures are taken to make asepsis perfect. Leriche saw Halsted operating on a breast cancer for ‘two and one-half hours, maybe even three’.¹²³ He admired the American’s precision of movements, the lightness of his hand and exactness in haemostasis and operative reconstruction.¹²⁴ Leriche adopted Halsted’s style and brought it to France, introducing slow, as he put it, meticulous, attentive operations, without bravado.¹²⁵

Thus the change in the style of surgery occurred in Europe and in North America, but it is not quite clear where it originated. Similar conditions of technology, professional development and cultural orientation towards science and technology might have made the same style attractive to surgeons on both continents. In any case, the major proponents of the new way of surgical performance recognised each other when they met. When in 1899 Halsted went on another trip to Europe and visited Kocher’s department to observe the technical methods used in Bern, he recognised a kindred spirit, and the two pedants, both ‘equally fastidious in their operative craftsmanship’, as Cushing characterised them, became life-long friends.¹²⁶

Halsted is a prime example of a master surgeon forming his own school of followers. At Johns Hopkins, he mostly trained students without any prior surgical experience, so that he could shape their style from the very start. Going through the full-scale residency system that Halsted had created after the German model, his trainees stayed long enough with him to pick up even complicated practices.¹²⁷ Most of them later occupied prominent places in American surgery and passed on the Halsted style to the following generations,¹²⁸ so that this school became extremely influential in the US and beyond.¹²⁹ In addition, Halsted also made converts outside of his circle of students.¹³⁰

Another element of the diligent style shaped by surgeons like Kocher and Halsted was their reference to experimental physiology as the epistemological basis of surgical knowledge. It was often called ‘physiological surgery’ for both its protection of the body’s physiology and also for its association with experimental physiology. Halsted was, in fact, part of the institutional project at Johns Hopkins of deliberately following the German model and emphasising experimental research as the foundation of modern medicine.¹³¹ Visitors remarked on the institution’s scientific spirit,¹³² and Leriche claimed that Halsted’s surgical school was more scientific than any other surgical program in the world. It was here that one finds Claude Bernard’s surgical heirs, he announced.¹³³

¹²³ Justine Randers-Pehrson, *The Surgeon’s Glove* (Springfield, IL: Charles C. Thomas, 1960), 59.

¹²⁴ Leriche, *op. cit.* (note 99), 111.

¹²⁵ *Ibid.*, 66.

¹²⁶ Ira M. Rutkow, ‘William Halsted and Theodor Kocher: “An Exquisite Friendship”’, *Annals of Surgery*, 188 (1978), 630–7; see 630. See also Bliss, *op. cit.* (note 109), 139.

¹²⁷ Samuel James Crowe, *Halsted of Johns Hopkins: The Man and His Men* (Springfield, IL: Thomas, 1957), 54, 60, 123, 236. The average term of service of his intern was eight years – six years as assistant and two years of service as actual house surgeon. William Halsted, ‘The Training of the Surgeon’, The Annual Address in Medicine, delivered at Yale University, New Haven, Conn., 1904, first published in *Johns Hopkins Bulletin*, xv (1904), 267–75; reprint in William S. Halsted, *Surgical Papers* (Baltimore: Johns Hopkins Press, 1924), 512–31; see 522–3.

¹²⁸ MacCallum, *op. cit.* (note 110), 186. See also B. Noland Carter, ‘The Fruition of Halsted’s Concept of Surgical Training’, *Surgery*, 32 (1952), 518–27: 521.

¹²⁹ Leriche, *op. cit.* (note 99), 185–6. MacCallum, *op. cit.* (note 110), 84. On the Halsted school of surgery, see Crowe, *op. cit.* (note 125), especially 37–59.

¹³⁰ Whipple, *op. cit.* (note 113), 550.

¹³¹ MacCallum, *op. cit.* (note 110), 59–61.

¹³² Edward Farrell, ‘A Trip to Baltimore’, *Maritime Medical News*, 5 (1893), 68–70.

¹³³ Leriche, *op. cit.* (note 99), 186.

Along these lines, many surgeons from the 1880s onwards worked in close collaboration with physiologists or had their own physiology laboratories.¹³⁴ Experimental physiology provided surgery with a model for replicability: surgeons explicitly compared the certainty of success of new treatments with the replicability of a physiological experiment. Kocher stated in his 1909 Nobel Prize lecture that a ‘physiological remedy’ for deficient thyroid function could lead to ‘a real cure . . . with the reliability of a physiological experiment’ and claimed that he had applied this principle when he first transplanted the thyroid in 1883.¹³⁵ One of Halsted’s students compared his teacher’s hernia operation to a physiological experiment, claiming that Halsted had worked out a procedure that was simplified enough so that it could be performed by different surgeons with the same reliable success.¹³⁶

Replicability was also at the heart of other surgical standardisation efforts in the US context. Around the turn of the century, the *American College of Surgeons* discussed the standardisation of the conditions for performing surgery in American hospitals. They demanded, among other things, that ‘certain definite methods’ of asepsis were to be ‘applied constantly’ in all hospitals. The standardised procedural system should be guided by the principles of simplicity, uniformity and reasonableness. The ability of ‘the chief’ to ‘uniformly do the same thing in the same manner under the same conditions’ was seen as an essential leadership quality because it would enable younger surgeons to thoroughly acquire the system.¹³⁷

Despite Halsted’s and Kocher’s wide-reaching influence, not every leading surgeon conceptualised modern surgery as being slow and meticulous. Modern surgery was not necessarily time-consuming and conscientious. Up-to-date surgery could also be seen as being speedy and efficient. In his president’s address at the *American Association of Obstetricians and Gynecologists* in 1907, Robert T. Morris criticised the trend towards slow surgery and demanded a return to previous ideals of expeditious work.¹³⁸ Fast surgery, Morris claimed, was the true physiological surgery. It would result in less exposure to germs, less use of anaesthetics and, above all, less disturbance of the organism and its ability to fight shock and infections. For Morris, surgery had to be both quick and gentle – and the two qualities went together.¹³⁹ He advocated cultivating ‘a rapidity of action which will make every move count, and which will allow the average abdominal operation, for instance, to be completed in about fifteen minutes. Get in and get out!’¹⁴⁰ Morris blamed techniques such as antisepsis, asepsis and also anaesthesia for the lamentable state of affairs in surgery. They ‘blew down’ the ‘fine idea of rapid operating’ in the previous century, just when it ‘had started to grow into an imposing feature of the landscape’.¹⁴¹ These methods had enabled a ‘tendency to devote more time to detail in operative technic

¹³⁴ Thomas Schlich, *The Origins of Organ Transplantation: Surgery and Laboratory Science, 1880–1930* (Rochester, NY: University of Rochester Press, 2010), 146–62.

¹³⁵ Emil Theodor Kocher, ‘Concerning pathological manifestations in low-grade thyroid diseases’, Nobel lecture, 1909, in *Nobel Lectures in Physiology or Medicine, 1901–1921* (Amsterdam: Nobel Foundation, 1967), 330–83; see 335. For examples from the second half of the twentieth century see Schlich, *op. cit.* (note 7), 86–109.

¹³⁶ MacCallum, *op. cit.* (note 110), 90.

¹³⁷ Albert J. Ochsner, ‘Aseptic Surgical Technique: Minimum Requirements for Aseptic Surgical Operating in a Hospital in which the Personnel of the Operation Room is Permanent’, *Annals of Surgery*, 40 (1904), 453–63; ‘applied constantly’: see 453; principles: 454; leadership: 545. See also Peter Kernahan, ‘Franklin Martin and the Standardization of American Surgery, 1890–1940’ (unpublished PhD thesis: University of Minnesota, 2010).

¹³⁸ Robert T. Morris, ‘Back to an old idea, for it introduces a new principle in surgery’, in *Dawn of the Fourth Era in Surgery and Other Short Articles Previously Published* (Philadelphia and London: Saunders, 1910), 40–57 (article first published in 1907).

¹³⁹ *Ibid.*, 43.

¹⁴⁰ Quote: *Ibid.*, 51–52.

¹⁴¹ *Ibid.*, 45.

[sic]', which, according to Morris, 'sometimes degenerated into "puttering"'.¹⁴² He was particularly critical of surgical gloves, which were not only useless but also impeded the full employment of surgical skill: 'The coming generations of surgeons', he warned, 'brought up on rubber gloves, will not do the wizard-like work that was done by some of the older operators . . .'.¹⁴³ Morris's objections document that at this point slow operating had in fact become mainstream. His criticism did not turn the trend. Most leading surgeons rejected his ideas and continued to operate slowly.¹⁴⁴

The Rules of Performance Change: 'A Tedious and Dull Show'

Morris argued in particular against the suspicion that skilful surgery was intended to be a spectacle. He complained that the brilliant surgeon was charged of being 'a player to the gallery' instead of receiving due credit for his strategy of achieving good operative results by virtuosity in sophisticated surgical techniques.¹⁴⁵ With this statement he reacted in particular to the restrictive attitude taken by the early American neurosurgeons in emulation of Halsted's style. Neurosurgeons at the time were building their disciplinary identity by emphasising strict self-discipline, emotional asceticism, and restraint in performing their surgery.¹⁴⁶ This attitude was part of the concerns of many leading American surgeons in the first decades of the twentieth century who distanced themselves from colleagues who were seen as performing unnecessary procedures for commercial reasons. In this context, technical brilliance had become morally questionable. Judgment and a sense of the limits of surgery were prioritised instead.¹⁴⁷

The doyen of American neurosurgery of that period was Harvey Cushing, himself a student of Halsted's. Cushing's operations were described as being as painstaking and fastidious as his teacher's.¹⁴⁸ Like Halsted's, his surgery required an exact feel for the application of force on the living tissue; Cushing prepared himself for his extirpations of the trigeminal nerve ganglion removal by operating on fresh cadavers, and he described how he sensitised himself to the right level of delicacy:

Only after a great number of operations at the autopsy table can one satisfactorily train his reflexes to appreciate the degree of force which it is necessary to apply at the edge of the ganglionic dural sheath in order that it may be split and the ganglion exposed by lifting away its superior covering. . . . To satisfactorily free the entire ganglion is a delicate procedure and familiarity with the crackling sensations imparted to the hand while liberating it from its dural envelope cannot be overvalued. . . .¹⁴⁹

The success of surgical work, Cushing thought, depended 'upon detail, patience, and the expenditure of time'.¹⁵⁰ In this process, the surgeon had to learn self-control and suppress

¹⁴² Robert T. Morris, 'The advantage of expeditious surgical work', in *Dawn of the Fourth Era in Surgery and Other Short Articles Previously Published* (Philadelphia and London: Saunders, 1910) (article first published in 1905), 59–69: see 59.

¹⁴³ Robert T. Morris, 'The hand of iron in the glove of rubber', in *Dawn of the Fourth Era in Surgery and Other Short Articles Previously Published* (Philadelphia and London: Saunders, 1910) (article first published in 1907), 11–9. On similar discussions in the German-language context, see Schlich, *Gloves*, *op. cit.* (note 80).

¹⁴⁴ Robert T. Morris, 'My changes of view in appendicitis work', in *Dawn of the Fourth Era in Surgery and Other Short Articles Previously Published* (Philadelphia and London: Saunders, 1910) (article first published in 1905), 71–90: see 83–4.

¹⁴⁵ Morris, *op. cit.* (note 138), 49.

¹⁴⁶ Gavrus, *Men of Strong Opinions*, *op. cit.* (note 25); see also *idem*, 'Skill', *op. cit.* (note 25).

¹⁴⁷ Kernahan, *op. cit.* (note 137), 76; Gavrus, 'Skill', *op. cit.* (note 25). One important context were the scandals about fee splitting among surgeons and the referring physicians, see *ibid.*, and Kernahan, *op. cit.* (note 137).

¹⁴⁸ Gavrus, 'Men of Strong Opinions', *op. cit.* (note 25), 81–83: 316–17.

¹⁴⁹ As cited by Bliss, *op. cit.* (note 109), 128–9.

¹⁵⁰ Harvey Cushing, 'Recent Observations on Tumours of the Brain and Their Surgical Treatment', *The Lancet*, 175, 4506 (8 January 1910), 90–4: see 94.

his emotions and impulses.¹⁵¹ He deplored the ‘impatience to attain results’ that was so ‘characteristic of the species surgeon’ but often led ‘to the taking of unjustifiable risks’, and he admitted that he had to ‘curb himself in the desire to do just a little more’ all the time.¹⁵² The point consisted in knowing when to stop.

Cushing projected an image of a highly cultured, self-possessed and discrete surgeon. Perceived as a ‘surgeon–artist–writer’,¹⁵³ he cultivated a strong interest in arts, fine literature and medical history, collected antique books, worked on his drawing skills and wrote occasional non-surgical texts. When the British surgeon Harold Stiles (unsuccessfully) nominated Cushing for the Nobel Prize in 1922, he characterised him as ‘the world’s greatest cerebral surgeon . . . a man of great culture and a brilliant writer’.¹⁵⁴ As a retirement project he composed a biography of William Osler. Osler was a suitable subject. He was the epitome of the highly cultured, elite doctor with scholarly interests, of famous equanimity.¹⁵⁵ He thus embodied many of the ideals that the first neurosurgical associations used for picking their members, according to a catalogue of features that reflected respectability and moral aptitude. The neurosurgeons around Cushing availed themselves of a cultural repertoire that engendered trust in their moral reliability and respectability in order to fend off any charges of commercialism and corruption. Part of the repertoire used in this context mobilised a tradition of feminine values in surgery, in which womanly tenderness, the milder virtue and gentleness were evoked as elements in the otherwise very masculine surgical character ideal,¹⁵⁶ with the result that neurosurgery was ‘inflected with a feminine resonance, being often called “delicate performance” and likened to embroidery’, as Gavrus has found.¹⁵⁷

An important element of this package of values was modesty in performance. When Cushing in 1911 recapitulated the change of the rules of good surgery, he interestingly phrased it in terms of performance for an audience of colleagues. He noted that the new surgical principles with their detailed haemostasis and delicate tissue handling were ‘prohibitive of haste and the old-time thrills for the bystander . . .’.¹⁵⁸ He claimed that ‘. . . the stirring, slap-dash, and spectacular’ was ‘rapidly giving way to the quiet, patient, and undramatic performance’.¹⁵⁹ The best brain surgeon, he explained:

. . . had to aspire to put on a ‘tedious and dull show’ in the operating room, a slow and careful performance whose aim was to lead to the best result for the patient rather than a quick and dazzling show that nourished the surgeon’s vanity. Thus for Cushing, the surgeon’s work had a crucial moral dimension that rested on the character of the surgeon, who had to refrain from spectacular performances both in the operating room and on the public stage as well.¹⁶⁰

¹⁵¹ Gavrus, ‘Men of Strong Opinions’, *op. cit.* (note 25), 80.

¹⁵² Harvey Cushing, ‘The Control of Bleeding in Operations for Brain Tumors’, *Annals of Surgery*, 54, 1 (July 1911), 1–19: 5.

¹⁵³ Bliss, *op. cit.* (note 109), 450.

¹⁵⁴ Nobel Archives, Stockholm, Sweden: Stiles 1922. Thanks to Nils Hansson for this information.

¹⁵⁵ *Ibid.*, 363–7. On Cushing’s interest in history and old books, see 147, 470–2. Osler’s motto, used in his coat of arms among other places, was ‘aequanimitas’. On Osler, see Michael Bliss, *William Osler: A Life in Medicine* (Toronto: University of Toronto Press, 2000).

¹⁵⁶ Lawrence, *op. cit.* (note 2), 193–4.

¹⁵⁷ Gavrus, *Men of Strong Opinions*, *op. cit.* (note 25), 20.

¹⁵⁸ Cushing, *op. cit.* (note 149), 1–2.

¹⁵⁹ *Ibid.*

¹⁶⁰ Gavrus, ‘Men of Strong Opinions’, *op. cit.* (note 25), 71.

Neurosurgeons thus distanced themselves from self-advertising showmanship and commercialism – reproaches that were very present in the discussions about the surgeon's role in American society at the time. The North American neurosurgical community is a good example of the carefully guarded boundaries of propriety, which determined how much showmanship and drama was allowed, and, associated with those, the moral boundaries of appropriate behaviour in relation to the profession's credibility.¹⁶¹

At a more general level, the anti-performance rhetoric (and practice) of early twentieth-century surgery points to the necessity of careful management of any performance. It is not 'always a compliment' to describe 'someone as putting on a good act', as Iwan Rhys Morus has stated for the history of science. Performative qualities can always be used by enemies to attack one's integrity.¹⁶² As we have seen, in surgery (as in science), one strategy to deal with this issue was to claim to 'do away with performance altogether by undertaking its rhetorical erasure, as evinced by injunctions to modesty, humility, plain speaking, and disinterestedness'.¹⁶³

The American story of neurosurgery was part of a broader shift of the management of surgical performance in which the priority of the patients' interest over surgical skilfulness was discussed. Thus, in Britain in 1903, William Henry Bennett warned in a speech given to the Medical Society of London about an all-too-frequent readiness to 'undertake operations without fully considering the ultimate advantage of their patient', and his was not an isolated case. The impression was that 'brilliance of showmanship, coupled with the addiction of success' had led to more routine experimentation in surgery. As surgery had become safer, surgeons were willing to take higher risks. Bennett demanded a more serious 'ethical consideration of the benefits to be accrued to the patient who undergoes the procedure and not simply the skilfulness of the achievement'.¹⁶⁴

The proponents of the new style now claimed that their predecessors had put too much emphasis on showing off their capability. While in the previous era of the public operating theatre, technical and manual dexterity was a valorised skill, surgeons like Treves and Cushing now warned of it.¹⁶⁵ Treves in 1892 evoked the 'great temptation' of 'the operating theatre of a large hospital, and the presence of an audience of enthusiastic and marvel-loving students'. These offered 'the display of theatrical effect' and encouraged 'a disregard for other than immediate results'. But, as he emphasised, 'the time is . . . now long past when a surgeon would "whip off" a leg or remove a stone with something of the fever and the *éclat* of a conjurer who draws an unexpected rabbit from his sleeve.'¹⁶⁶

At this time, the traditional operating theatre as the place for surgical performance was rapidly becoming obsolete. Even while large ornate marble amphitheatres were being constructed towards the end of the nineteenth century, this type of operating venue was starting to be replaced by smaller rooms.¹⁶⁷ Surgeons demanded smaller units to be able to separate septic from clean cases and limited their audience for hygienic reasons. They were keen, as Martin Kirschner in Germany emphasised in 1931, to 'separate patients, odours and operative materials'. This tactic of spatial enclosure and partitioning increased control and helped to convert the messy clinical world into a laboratory-like ordered

¹⁶¹ *Ibid.*, 27–35.

¹⁶² Morus, *op. cit.* (note 29), see 776. Also Gavrus, *Men of Strong Opinions, op. cit.* (note 25), 37.

¹⁶³ Michael Wintroub, 'Taking a Bow in the Theater of Things', *Isis*, 101 (2010), 779–93; see 788.

¹⁶⁴ Quotes from Brock, *op. cit.* (note 108), 329.

¹⁶⁵ Kernahan, *op. cit.* (note 137), 76.

¹⁶⁶ Treves, *op. cit.* (note 107), 29.

¹⁶⁷ Markus, *op. cit.* (note 46), 229–40.

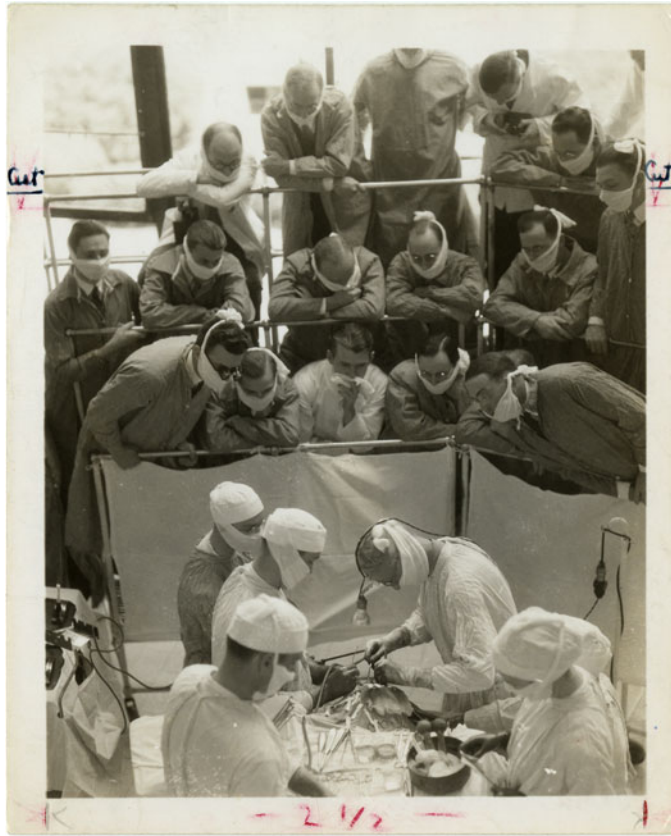


Figure 1: An example of the new form of the surgeon's actor-role: Cushing operating before the Harvey Cushing Society; photograph, taken at some point 1929–32. Source: Harvey Cushing Photograph Collection, Harvey Cushing/John Hay Whitney Medical Library, Historical Library, Boston.

reality. In the operating room surgeons were attempting 'to get along with as few persons as possible . . . because the fewer workers the more quiet it is and the less danger there is of a slip in technique', Kirschner explained.¹⁶⁸ In the twentieth century the 'theatricality of surgery' was changing, as Brieger has phrased it; the place of surgery was now more often prosaically referred to as 'operating room' instead of 'theatre', with the focus shifting 'from the operation itself to the results that were achieved'.¹⁶⁹

However, the surgeon's actor-role did not disappear. It merely took on a new form (see Figure 1). The operation was still a performance that continued to shape the surgeon's identity, as Gavrus rightly notes for American neurosurgery: the 'audience continued to be important during certain surgical performances', but it was 'a small, very select audience of hand-picked professional colleagues' who had the authority to judge it properly in this form of organised professional exchange. It became a crucial tool 'in the staging of a

¹⁶⁸ Martin Kirschner, *Operative Surgery: General and Special Considerations*, I.S. Ravdin (trans.) (Philadelphia and London: Lippincott, 1931), separate: 245; 'get along': 250. See also Schlich, *op. cit.* (note 80).

¹⁶⁹ Brieger, *op. cit.* (note 51), 229.

professional self', to showcase the surgeon's 'skill and method in front of his professional guests'.¹⁷⁰

One can say that surgery became a different kind of spectacle at that time. The standards of what constituted the right kind of performance had changed, but performance was still happening. Even an anti-performance surgical style is, in reality, still a performance. The changing rules of performance reflected the changing values and ideals of surgeons, but they also represented a more widespread change in the contexts of performance, changes in role models for surgeons and in their strategies of self-presentation, and changes in the public's expectations.¹⁷¹

Skill and Modern Surgery

We have looked at the discussions about surgical skill in a variety of contexts: the highly competitive environment of celebrity practitioners in the amphitheatres of early nineteenth-century Britain; the science-oriented, technocratic German-language university hospitals later in the century; and the elitist surgeons of the late nineteenth and early twentieth-century United States with their concerns about distancing themselves from commercialism and cheap showmanship.¹⁷² We have seen that context was not the whole story: within the changing contexts, individuals and their characteristics played a significant role. With their particular personal backgrounds – Lister and Kocher with their special religious affiliations or Halsted with his drug addiction – these surgeons helped shape their contexts. But it is also clear that, on the other hand, the impact of their work depended on how it was judged in their contemporary environment; thus, Liston was a hero in early nineteenth-century London but considered a slap-dash braggart by a later generation of surgeons. Similarly, Lister and Halsted would probably just have stood out as annoying pedants in an earlier time period, not as the innovative pioneers that they were regarded as in their time.

The discussions within the various contexts confirm that skill is a problematic category in surgery. Even in such a technically-dominated field, the history of skill was not simply determined by the character of the job, nor did it follow any simple trajectory of straightforward technical improvement. Instead, we can describe specific sets of rules of performance in surgery which are embedded into wider cultural expectations and evaluations. Such regimes of surgical performance change over time, so that the virtues of the past become the vices of the present. Different styles of surgical practice went along with different images of the surgeon: the Apollo, lion, eagle and woman of the introductory dictum. These discourses refashioned the surgical persona by using contemporary repertoires, mobilising the prestige of art and poetry or experimental science and engineering. Ideals of skill varied accordingly; valued skills could either be tacit, individual and creative, as expressed by the concept of genius, or they could be explicit, standardised, and enabling replication independently of the idiosyncrasies of individual practitioners. Early in the century, the best surgery was to be heroic, daring, fast and energetic (the 'heart of a lion'). Later on, fastidiousness, gentleness, conscientious and slowness were the (less lionessque) ideals.

¹⁷⁰ Gavrus, *Men of Strong Opinions*, *op. cit.* (note 25), 'audience': 66; 'staging': 79; 'skill': 77.

¹⁷¹ Cf. *ibid.*, 14.

¹⁷² The shift of the geographical focus represents the shift of the centres of innovation in surgery from Britain to Germany and finally to North America in the course of the century. These centres provided the models for up-to-date, avant-garde surgery, along with the corresponding values.

We can find a variety of factors that shaped the rules of surgical performance: technical, social, and moral. Particular technologies – anaesthesia, antiseptics, asepsis, haemostasis – came with particular requirements as to the speed with which they were performed, the degree of control required, the decisiveness, precision or thoroughness of cutting and sewing. Variations of the purposes and objectives of surgical work also influenced its style: reacting to emergency situations favoured heroism, whereas elective operations to remove cancer called for a more circumspect approach; amputation could be done quickly, reconstruction required more time, etc.

Simultaneously, the environment in which surgery was performed underwent fundamental changes. Early in the century, when operations were performed in public theatres, surgeons stood in open competition with each other. This setting went well with an emphasis on brilliancy and speed. Subsequently, surgery moved to smaller, isolated spaces, located within large hospitals with their extended technical infrastructure. Practitioners started working within the framework of an established surgical speciality, which, in turn, formed part of a medical profession with particular privileges but also with particular ethical commitments. Now, competition for patients was frowned upon, as was the open demonstration of one's technical capabilities. The surgical style in this setting was characterised by control, caution and diligence. These changes in the rules of performance reflected corresponding shifts in the moral regime of surgery; surgeons now had to show self-discipline and patience, rather than courage and cold-bloodedness. At the same time, intra-professional competition gave way to a showing of professional unity, collegiality and protection of the patient's interests. This happened towards the turn of the century when surgical interventions into the human body reached an unprecedented magnitude and scale. Surgeons had to show that they were trustworthy and in control of what they were doing. In this situation, they developed a specific culture of expertise, characterised by the dominance of technical values, such as the ideal of technical control, transparent rules of practice, and technical replicability, independent of the individual person of the surgeon. Technicality in this sense meant that, as Theodore Porter has phrased it, there was 'little opportunity for waywardness'. It enabled practitioners to take a 'pose of disengagement' and 'self-effacing objectivity'.¹⁷³ Surgeons could thus be trusted to be dispassionate, detached and objective technical experts, free of bias and vested interest, who could present surgery as the 'inevitable, scientific solution' to the problem of disease.¹⁷⁴ The general trend of the changes in the rules of surgical performance thus points towards a way of practising surgery that looks recognisably modern – the ideas of standardisation and replicability, the use of explicit rules, and the reliance on institutionalised rather than personal trust are all generally acknowledged hallmarks of modernity. As we have seen in some of the examples, they can be correlated with more general developments in a modernising world, for example, in industry, science, and the military. In this way, the history of surgical skill helps to situate the development of modern surgery within the emergence of modern societies more generally.

¹⁷³ Theodore M. Porter, 'How Science Became Technical', *Isis*, 100 (2009): 292–309: 294 ('little opportunity'), 305 ('stance,' 'pose').

¹⁷⁴ Christopher Lawrence, 'Democratic, divine and heroic: the history and historiography of surgery', in *idem* (ed.), *Medical Theory, Surgical Practice. Studies in the History of Surgery* (London and New York: Routledge, 1992), 1–47: see 32.