Muscle

Extending the focus on the exterior of the asylum patient's body that was discussed in Chapter "Skin", this chapter considers how asylum doctors conceptualised and investigated the muscular system both before and after death. As researchers in psychiatric institutions began to incorporate physiological methods and instruments into their work, general paralysis was seized upon as an ideal disease for investigation. General paralytic patients suffered from a number of physical complaints—from atrophying muscles to disordered locomotion—that, at a time of increasing interest in the connection between brain and body (such as cerebral localisation), suggested that the disease did serious harm to the brain. The link between body and brain was investigated in several ways, such as searching for structural damage to the brain substance during postmortems. It was also investigated in ways that necessitated the active or passive involvement of the patient during life. Testing the patient's articulation, strength, or walking ability became a crucial part of physical examination, with many patients also leaving their own inscriptions in historical records alongside those of doctors and medical technologies. In examining physical abilities, though, doctors also found themselves confronting the rather complex issue of willpower—the control of patients over their own bodies, for example, or the frequent and seemingly purposeless thefts often committed by general paralytics. The degeneration of the bodily fabric—particularly of the muscles, which were symbolic of strong and vigorous masculinity—was a worrying illustration of the state of the brain, then, as well as a phenomenon that could have serious socio-economic consequences for patients and their families.

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Body and Brain in the Late Nineteenth Century

In August 1870, 38-year-old David T. was admitted to the West Riding Asylum having suffered a number of seizures in the workhouse. Upon admission he was observed to be nervous, unsure of where he was, and to have an unsteady, tottering gait. Throughout his stay in the Asylum his case notes regularly commented on his bodily weakness until, in January 1872, he had a seizure whilst eating some bread at breakfast and choked to death. A coroner's inquest held at the Butcher's Arms pub in nearby Eastmoor (pubs were a common venue for inquests at this time) returned a verdict of death due to an "epileptic seizure in the course of general paralysis with weak heart."[1] This constellation of factors wasn't uncommon when explaining the deaths of general paralytic patients. Whether examining the wasting of the bodily fabric, the movement of muscles during fits, or the appearance of the heart muscle after death, the state of patient's muscles was of particular interest to doctors at the West Riding in the final decades of the nineteenth century.

This interest was not confined to asylum researchers. The mid- to late-nineteenth century saw a good deal of scientific research into the nature of human muscles and reflexes. In the 1840s neurophysiologist Thomas Laycock had used the model of reflex action in attempting to explain mental diseases, and his ideas would later be developed by physiologist Marshall Hall. In Britain during the Victorian period, physiological researchers could find themselves constrained in their experiments by religio-philosophical concerns and the anti-vivisection movement, at the same time that they expressed optimism about new modes and methods of scientific inquiry.[2] Although we should be wary of organising Victorian science along simply physiological/psychological lines, by the second half of the nineteenth century many British workers in psychiatry were signed up to a somatic model of mental disease that was indebted to physiological methods and approaches.[3] In the nineteenth century, Hermann von Helmholtz's law of the conservation of energy (showing that all energy can be used for work but at some point its force will be exhausted) and Rudolf Clausius's second law of thermodynamics (as more energy is transferred, more of it is wasted) had introduced models that could be applied to both natural and man-made objects. Energy was increasingly synonymous with health, as discourses about labour and the powers of production were both 'medicalised' and extrapolated to the social arena. Clausius's concept of entropy, for instance, suggested the possibility of social decline in a modern

world that seemed to be squandering energy in all directions: progress came with concomitant risks.[4] Gerald Geison observes that nineteenth-century British physiology had a distinctly Darwinian tone embedded within it, together with a language of political economy that expressed concern for establishing normal and abnormal measures of the body.[5] Certainly at the West Riding, doctors were keen to obtain meticulous measurements of the body. The casebook record of Michael C., a 28-year-old hawker suffering from epileptic fits, meticulously listed the length and circumference of his upper and lower limbs in order to quantify the difference in size between his right and left arm. This yielded a total of 24 separate measurements, many of them demonstrating a marked disparity between his left and right sides.[6]

A general concern for bodily 'balance' was common at this time. Imagined as an entity that could easily cross the line into malfunction, the body was a finely balanced system of intakes and outgoings. This conception of the human body was by no means novel to the nineteenth century: in the sixteenth and seventeenth centuries, clockwork and automata provided an easily understandable model of how various bodily systems worked, and René Descartes had famously compared the body to a machine. German physicians such as Emil du Bois-Reymond and von Helmholtz, in the mid-nineteenth century, emphasised the usefulness of 'mathematical' methods in physiology that introduced new ways of thinking about the body—a physical object that could be understood in terms of physical and chemical laws—that would prove influential.[7] In the increasingly industrialised Victorian era, concerns for order and organisation took on a more philosophical tone as the rationalistic outlook of science and industry became central to discussions about the nature of human life itself.[8] In an era of railways, telegraphs, and mechanised production, the obvious way to discuss matters of flesh and blood was to utilise the language of industry. Metaphors appealing to modernity likened the physiology of the nervous system to the telegraph or to electricity. These concepts of industry and efficiency were also applied to muscle physiology in the second half of the century. Utilising instruments like Jules-Etienne Marey's myograph or Angelo Mosso's ergograph (both tracing and measuring muscle contraction), it was possible to produce graphical representations of the body's 'work.' Alongside other developments in the field —the identification of muscular dystrophy by French neurologist Guillaume-Benjamin-Amand Duchenne in 1868; the almost simultaneous discovery of the patellar (knee) reflex by Carl Friedrich Otto Westphal and

Wilhelm Erb in 1875; the 1876 foundation of the British Physiological Society—discussions about energy fed into a medical discourse where the body took centre stage.

This was a body that was intimately connected with the mind, and ideas about overwork or excessive expenditure of energy were being applied to mental as well as physical matters. As cerebral localisation experiments highlighted connections between the brain and the rest of the body, the brain's involvement in physical work and fatigue became a particular point of interest—and one that asylums like the West Riding were well placed to investigate. As Susan Leigh Star argues, theories about the brain that might be seen as variants of localisation theory had cropped up throughout the nineteenth century (in phrenology, for example), alternating with "diffusion theories" that viewed the brain from a more holistic angle (such as the work of Marie-Jean-Pierre Flourens).[9] It was in the 1860s and 1870s, however, that localisation theory re-asserted itself (while not completely replacing diffusionist ideas). The name that is perhaps most closely associated with this work in Britain is that of neurologist David Ferrier. After studying mental philosophy under *Mind* founder Alexander Bain, Ferrier had assisted Thomas Laycock before taking on appointments at King's College Hospital and the National Hospital for the Paralysed and Epileptic ('Queen Square'), meeting eminent neurologist John Hughlings Jackson in the latter. Ferrier was also a friend of then-West Riding Superintendent James Crichton-Browne, and visited him in Wakefield where they enthused about Gustav Fritsch and Eduard Hitzig's work in Germany that had used dogs to investigate the effect of cortical ablation (removal of portions of the brain) on movement. Agreeing that the research should be followed up, Crichton-Browne offered Ferrier the West Riding Asylum facilities, keen to prove that serious physiological and neurological research was possible in a psychiatric hospital. Ferrier began his work there in 1873, isolating 15 motor areas in the brains of monkeys (thus surpassing Fritsch and Hitzig's estimate of five). In 1876 Ferrier was made a Fellow of the Royal Society and his seminal text *The Functions of the Brain* was published in the same year.

This was a climate, then, where the relationship between brain and body was being ever more meticulously refined. For neurologists and physicians working in asylums, physical signs and symptoms were invaluable information. In their effort to elucidate the brain–body relationship, late nineteenth-century physiologists and photographers—such as Albert Londe at the Salpêtrière—turned to bodily gestures as indicators of the

brain's workings, aiming to transform these mental processes into scientific objects.[10] Housing large numbers of chronic cases, and with many patients suffering from unusual physical afflictions—seizures, paralysis, muscle weakness—institutions like the Salpêtrière were ideal sites for studying these phenomena. And with its clear commitment to physiological and neurological research, the West Riding Asylum was no exception.

General Paralysis and Muscle Wastage

In examining the brain–body relationship at the West Riding, general paralysis was an obvious model to look towards: its sufferers exhibited perhaps the most startling physical anomalies of all psychiatric patients. As its name indicated, the motor symptoms of general (or 'progressive') paralysis altered as the disease advanced. In the early stages, motor signs were subtle (lip or tongue tremors), progressing to difficulties with finer movements (buttoning the coat, writing) and an unusual gait, often somewhat 'elastic' and resembling drunkenness. In stark contrast to their bodily condition, general paralysis sufferers often held exaggerated views of their own state of health and physical abilities. Of William J., a 48-year-old widower, it was noted at admission: "He states that he has had no fits, and that he is at present in as good health as ever he was, which is manifestly untrue." William's unsteadiness on his feet, regular fits, and jerking tongue made clear that he was in fact very ill indeed.[11] As the previous chapter "Skin" discussed, general paralysis was thought to initially betray itself via the patient's skin and facial features. Several admission notes at the West Riding commented on the unusual appearance of the face of general paralytic patients. Benjamin H.'s "facial expression [was] blank owing [to] the atonic state of the muscles,"[12] whilst tremors of the lips and tongue like William J.'s were cited by almost all writers on the subject as a sure indication of the disease. These phenomena were evident immediately upon meeting the patient or came to the fore during the initial conversation with the doctor. At admission, a patient's articulation was often tested by asking them to repeat certain words: Matilda H., one of the smaller number of women (compared with men) diagnosed with general paralysis, could not "say the Alphabet, or certain words such as 'Perambulator'" and Henry S. was unable to pronounce "spectacle case."[13] Many patients were aware of their failing abilities; recording a meeting with 47-year-old general paralytic patient Selina L., the doctor noted that she was "somewhat painfully conscious of her difficulty in expressing herself."[14] As the disease

progressed almost every muscle of the body became involved in this non-performance, visually testifying to the patient's loss of physical autonomy and strength. Finally, many patients were confined to bed, due either to a complete inability to walk, or as a precautionary measure to reduce the risk of injury as they walked unsteadily around the asylum wards. Indeed, in contrast to their physical condition many general paralytic patients were prone to "a certain ambulatory mania," walking enthusiastically without any particular goal in mind.[15] Bed rest, however, often exacerbated the muscle wastage from which many general paralytic patients were already suffering.

In an 1891 article, Brislington House Asylum proprietor Bonville Bradley Fox described one of his general paralytic patients as "a magnificently made man, well able to use his excellent muscles, and knocking the attendants over like so many ninepins."[16] His interest in this patient stemmed from the fact that such physical strength was considered rare in general paralysis. Indeed, declining physical strength and motor coordination was often the stated reason for men's committal to an asylum as they found themselves unable to continue with their everyday life and work. For one West Riding patient, Henry S., the loss of power in his lower limbs rendered him incapable of continuing his occupation as a grocer, but his delusions of wealth also proved problematic for his business: he had unnecessarily ordered in 50 boxes of coal and 100 lbs of boiled beef.[17] The mental as well as physical symptoms of general paralysis were frequently implicated in the dismissal from or giving up of work: William A. was discharged by his employer due to his excited state as well as his inability to continue physical work.[18] The transformation of these patients' bodies, marked by weakened and atrophied muscles, stood in stark contrast to the 'hard' man who was active, healthy, and vigorous. Muscles were usually the embodiment of activity and energy. Alienist Charles Mercier, in *The Nervous System and the Mind* (1888), encouraged the reader to test the correlation between muscle hardness and action by extending their knee in order to feel the thigh muscle harden: "The *hardening* of the extensors when a limb [was] flexed" he said, "indicate[d] the *activity* of the process."[19] If the body was a machine that converted energy into labour power, then the body of the general paralytic patient was a broken down and rusty one. For men afflicted with general paralysis muscle wastage rapidly removed any "embodied capital" they once had, and with it the ability to participate in productive economic activity.[20] The importance of male breadwinners to families, however, meant that they often worked for

as long as possible—despite illness—and tended only to reach asylums in the late stages of disease when they were completely incapable of taking part in everyday life. For patients suffering from acute conditions this often meant a longer stay and tougher recovery than they would have experienced had they been admitted at an earlier stage. The entrance to the asylum by general paralytic patients more often than not signified the end of their participation in the world beyond its gates and, for their family, the loss of a key contributor to household income as well as a close member of the family. General paralysis was a disease, then, with significant socio-economic and emotional consequences.

Alongside these externally visible changes, in the asylum it was noticed that the bodies of general paralytic patients seemed to undergo even deeper degenerative processes. As the body was externally diminishing, deterioration took place inside the body. Postmortem reports at the West Riding Asylum conveyed an image of the body's interior as a gelatinous mass: skulls and joints thickened, nerve tissue increased, and brains softened. As patients laid in bed or took little exercise, unused muscles began to degenerate. Not only did muscles atrophy, they were described as becoming "fatty" due to the transformation of muscle into fat. One casebook record at the West Riding noted that "the replacement of muscle by fat [was] very noticeable."[21] Upon sectioning the muscles of one patient's torso at postmortem, the muscle tissue was said to "exhibit fatty infiltration & disintegration appearance [*sic*] like a mixture of red & white currant jam."[22] Specific organs too, demonstrated these processes of fatty accumulation. Hearts were "macerable and pale, externally overloaded with fat," and livers "flabby."[23] Fat had long been seen—not only inside but outside the medical arena—as an indicator of individual self-control and, as emphasised by Christopher Forth and Ana Carden-Coyne in *Cultures of the Abdomen* (2005), it had special significance for the male body. As well as the potentially feminising effects of excess body fat in an aesthetic sense, "fat male bodies … continually raised doubts about the 'masculine' capacity to conquer appetites, brave hardships, and remain 'active' in physical, sexual, and moral terms."[24] Like body fat that altered the external shape of the body, the presence of fat deep inside it signalled the presence of "parasite[s], rather than [workers], in the corporeal economy," and indeed postmortem accounts might speak of fat as an "outside substance" that looked to have been poured into the body like tallow.[25]

Similar processes to those taking place in the muscles also began to be identified at the cell level, albeit relatively slowly, as—from the middle of the century—researchers turned their attention from tissues to cells as the primary site of disease pathology.[26] At the West Riding both were the subject of investigation, and both showed degenerative changes in general paralysis. West Riding Pathologist Edwin Goodall, along with W.L. Ruxton of Wadsley Asylum (located in Sheffield and another part of the West Riding county asylum system) examined the nerves of 10 patients at Wakefield, nine "undoubtedly" suffering from general paralysis and one whose exact diagnosis remained unclear.[27] Nerve portions of two and a half inches in length were taken from the arms of patients at postmortem, hardened, and stained. In Chapter "Skin" we saw the importance of photography to both the administrative and clinical practices of the asylum, and this was a technology applied to microscopic work too. By the 1880s photomicrography had become easier and more widespread as apparatus improved. The introduction of orthochromatic plates, for example, reduced the problems previously experienced in photographing stained specimens by balancing colour tones. Two mounted photomicrographs in the West Riding pathology lab's photograph album are those reproduced in Goodall and Ruxton's published article; physiology and microscopy often went hand in hand at the West Riding, evidenced by the large number of photomicrographs in the pathology lab's album that depicted the degeneration of nerves and muscle tissue.[28] Goodall and Ruxton's findings emphasised the unusual masses of material found in affected muscle tissue: increased amounts of connective tissue, clots, increased fat, and blood vessels with thickened walls. William Julius Mickle detailed similar changes to nerve cells in general paralysis, which became "ill-defined" and "podgy" and took up stains with difficulty.[29] As we'll see in more detail in Chapter "Brain", taming the softened and damaged tissues of the general paralytic body for further investigation proved continually challenging to asylum researchers.

The largest muscle in the human body, the heart, did not escape these degenerative processes. Particular emphasis was placed on functional change—including "the belief that emotions, by disrupting the circulation and the blood flow, could cause changes in the heart's action" even if the heart itself was unaltered.[30] The heart muscle was said to be commonly altered in general paralysis. In 64% of a patient sample of Mickle's, the heart was found to be "unduly flabby, friable, or fatty."[31] The hearts of general paralytic patients tended to exhibit thickened, atheromatous, or calcareous

changes to the valves—changes that were described by Woods Hutchinson in his 1901 *Studies in Human and Comparative Pathology* as "the commonest simple structural cause of disease in the adult and senile body."[32] There was an expectation, though, that such structural abnormalities would occur more often in insane patients, many of whom seemed prematurely aged both physically and mentally. West Riding Medical Officer and Pathologist Francis O. Simpson addressed this issue in an 1898 article, 'Congenital Abnormalities of the Heart in the Insane,' tabulating the results of 4252 postmortems that had been performed over a period of 31 years. Simpson said he had found congenital abnormalities of the heart in 148, or 3.5%, of this sample.[33] The hearts of two of his patient sample, Elizabeth S. and Frances T., were photographed and added to the pathological lab album on account of them having four (rather than three) cusps to the semi-lunar valve of the pulmonary artery (Fig. 1); in another

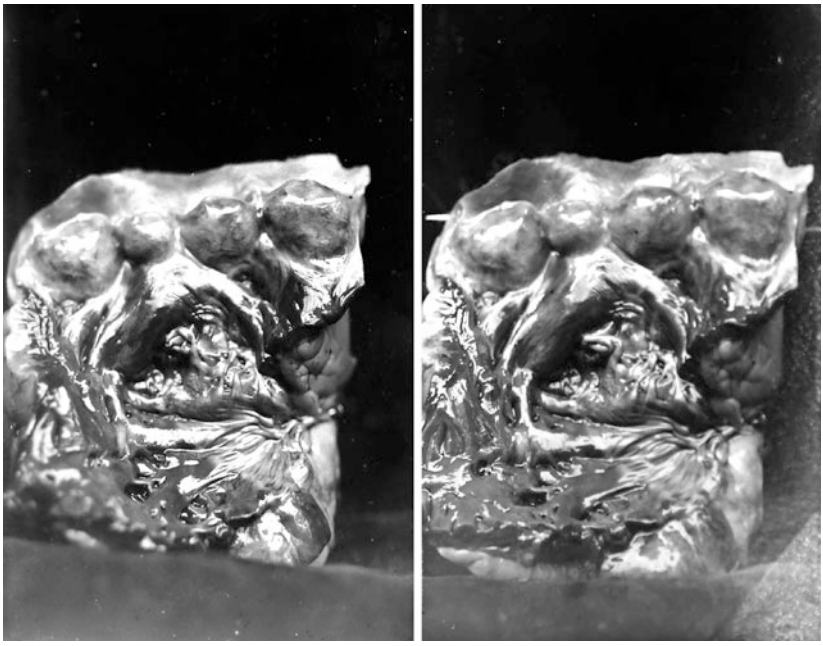

Fig. 1 Heart specimens showing anomalies of the valves, mid 1890s. Reproduced with permission of West Yorkshire Archive Service: Wakefield and the South West Yorkshire Partnership NHS Trust. WYAS C85/1111

case the heart of 15-year-old John C. was preserved, along with his stomach, for the Asylum museum.[34]

As well as the degenerated or anomalous appearance of the organ that could be seen at postmortem, several asylum doctors made heart disease the subject of physiological investigation. Official statistics seemed to show a rise in the incidence of heart disease among the general population at this time, and popular knowledge of it was spreading with the condition becoming something of a 'fashionable complaint' in the second half of the nineteenth century. Popular periodicals like *The London Journal* ran accessible, easy to understand, accounts of the condition; 'A Conversation on Heart Diseases between a Physician and his Patient,' for example, highlighted the bad habits that could exacerbate heart conditions, namely over-eating.[35] Physician John Milner Fothergill suggested that disorders of the heart were also increasing in the general male population due to the struggle for success that characterised the late nineteenth century—not unlike the competitive and tense 'Type A personality' of the 1950s who was thought to be at increased risk of heart attack.[36] Heart disease was linked by Fothergill and others to minor emotional or mental changes such as irritability or personality change, and the behaviour of asylum patients appeared to offer an exaggerated version of these states. It was not unreasonable to suppose, then, that heart disease, circulatory problems, and degeneration of the organ would be prevalent among asylum patients. Indeed, Cecil Beadles of Colney Hatch Asylum was emphatic that what was "popularly known as a fatty heart [was] common in lunatics."[37]

The heart has long been an organ that "[blurs] the boundaries between cultural supposition and apparent medical fact," linked to other physical and emotional disturbances and held up as a symbolic object signifying much more than the merely physical.[38] In the eighteenth century, disorders of the heart were associated with high living and over stimulation; by the late nineteenth century, this association was still evident despite the shift towards pathological anatomy and precision measurement with instruments such as the sphygmograph to chart the pulse and blood pressure. Although the brain was the primary object of investigation for asylum researchers, it did not eclipse other parts of the body, all of which were considered to have some relationship with that organ. At the West Riding, J. Wilkie Burman tabulated the results of 500 postmortems to investigate the incidence of heart disease among the insane, reasoning that if insanity was to be cured by "removing bodily disorder" then heart disease should be a major area of investigation.[39] With more attention being paid to the

links between mind and body, the physical connections between heart and brain made it commonsensical that the state of one would affect the other. Commenting on his findings, Burman suggested that hypertrophy of the heart in asylum patients was likely due to the strain put upon the organ, comparing West Riding Asylum patients with people in the general population whose condition was attributed to overwork or mental stress. This comparison to the general population was apt, as investigators like Fothergill struggled to prove that either heart disease or congenital abnormalities were more common in the insane than the sane population. Fothergill had come to the conclusion that heart disease was actually comparatively *rare* among the insane and Burman, too, had to admit that heart disease "as a certified cause of death, [was] scarcely more common in the West Riding Asylum than in the West Riding of Yorkshire generally."[40] In addition, it was difficult to establish a chain of cause and effect with regard to heart disease and insanity: it was possible that the circulatory problems came first, altering the circulation and nutrition of the brain, or that the heightened emotions of insane patients had impacted directly upon the organ. Though the results of investigations like Burman's or Fothergill's were inconclusive regarding the prevalence of heart disease among 'the insane' more broadly, the physical state of the heart as seen at postmortem suggested that it was directly and profoundly affected in general paralysis. The degeneration, fattiness, or deformity of the heart muscle in these patients neatly paralleled their external bodily appearance and that of other body parts, from the large (muscles of the limbs) to the microscopic (nerves).

Rather like the eighteenth-century gentleman suffering from heart problems as a consequence of an overly luxurious lifestyle, general paralytic patients were personally implicated in the aetiology of their disease. Although it would be some years before a conclusive link was established between general paralysis and syphilis, doctors in the late nineteenth century made a connection between the disease and what they considered to be abnormal or illicit sexual activity, or behaviours such as excessive drinking. Patients diagnosed with general paralysis were frequently noted to have a history of venereal disease, to have been involved in a large number of sexual liaisons, or to be given to drinking to excess. William C., a police constable, was diagnosed with general paralysis that was attributed to sexual excess and syphilis, having previously been treated with mercury, and was said to have attempted rape several times before being committed to the Asylum.[41] This lack of moral self-control was mirrored in patient's

physical movements. The often unruly and chaotic body of the general paralytic patient was described in terms that suggested a lack of central control, with cells imagined as wayward 'soldiers' and whole bodies as 'armies without commanders.' An 1888 article by Charles Mercier provides an excellent example of such language, where he justifies his use of military analogy: "the whole military machinery may be actually regarded in the light of a nervous mechanism. It is by the direct action of their nerve-centres that the officers conceive and issue their orders to their subordinates."[42] Similarly, John Hughlings Jackson described the "march of the convulsion," in which the progression of the convulsive movement of a fit could be seen to sweep across the body from its extremities like troops invading a country's borders.[43] Men's bodies were being taken over by something much stronger than themselves, and the use of militaristic analogies highlighted well the issue of strength in relation to bodily control, as well as the sense of a war between opposing forces. If muscle was 'good,' then muscular weakness or atrophy might be conceptualised as somehow amoral: just as "physical fatigue did not exist in isolation from the will [or] from morality," the wasted body reflected the past actions of its owner.[44] An article by West Riding Medical Officer F. St. John Bullen, for example, related the case of A.C. who had suffered a paralytic stroke. The stroke and its subsequent effects were correlated with a profound change in character: A.C. appeared "half dressed" in the street, began using foul language, and engaged in "reckless debauchery."[45] Bullen attributed the attack to sexual excess, alcohol, and syphilis, stating that "[t]he two latter especially of all, tend to produce a vitiation of nerve tissue and an intellectual and moral deprivation."[46] Like the inveterate masturbator, the exercise of a man's sexual energy could sap the very flesh from his bones. The nineteenth-century notion of a "spermatic economy," with men feared to be squandering both their own livelihood and the future of the human race via excessive masturbation, was heavily dependent on the notion of bodily balance.[47] Such ideas also extended into early twentieth-century physical culture. In his wonderfully titled *Superb Virility of Manhood* (1904), physical culturist Bernarr Macfadden warned readers that masturbation was one of the chief causes of diminished virile power, weakening both the willpower and the physical bodies of those who indulged in the habit.[48] Muscle might be used up by a man's 'immoral' over-exertions—Macfadden offered a range of muscular exercises to regain strength—so that the bodies of the general paralytic or self-abusing patient

stood as testament to the polluting, debasing, and degenerating effects of modern society.

For many asylum doctors, general paralysis was concerning not only in terms of the clinical challenges that it posed, but also due to the threat that the general paralytic patient was thought to pose to society more broadly. Nineteenth-century conceptions of diseases were explicitly related to the external environment, such as consumption as a result of poor sanitation. Connections like these served to tie the body to its immediate environment and lay the responsibility for disease at the feet of sufferers themselves.[49] Softened, atrophied bodies that failed to behave in the usual way implied a failure to maintain one's own body, in contrast to the ideal of the controlled and self-regulated man. Roger Smith suggests that control of the body and its actions became linked to the state in this period: as the franchise was extended, it was expected that men would internalise the state's traditional values of law and order, producing an outlook and attitude that complemented the requirements of industrialisation.[50] Unnatural local changes signalled a disharmonious body at odds with its environment and with the needs of industrial, capitalist society—this was clear in the inability of general paralytic patients to continue working in their normal occupations. The disordered male body was an anomaly, yet at the same time it was crucial to imagining order. It was an example that, in demonstrating the deviant body, painted a clearer picture than ever of the desired ideal.[51] In addition, as a disease concentrated in towns and cities, general paralysis illustrated the apparently emasculating effects of urban life, raising the disturbing possibility that the converse of industrial progress was de-evolution and degeneration.

Muscle and Mind

It was not only the atrophy and degeneration of muscle tissue that doctors identified as a key feature of general paralysis, but also the accompanying derangement of motion like that seen in A.C.'s case, above. Despite visceral changes to the bodily fabric, evolving awareness of "a psychophysical parallelism" made many doctors hesitant to locate the problem simply in the muscle substance.[52] Alongside postmortems and tissue samples, they looked to signs and symptoms that could be observed during life. William T. (whom we met in Chapter "Skin") was noted to have a gait that "exemplifies [the] maniacal condition of G.P., he struts, bounds, swaggers, does everything in an exaggerated manner."[53] Although general paralysis

clearly had profound effects on the patient's movements, there was some disagreement on the place of motor symptoms in the condition's progression, and the ease with which particular disorders could be mapped on to the stage of the disease. The Scottish physician David Skae had observed disorders of gait that preceded any mental manifestations of the disease, and Mickle had observed several patients "insane for some time … before any motor indications [could] be detected even by close examination."[54] The variable nature of general paralysis's physical and mental effects is borne out by many West Riding records: one man, though exhibiting only slight mental disturbance, showed "exceedingly well-marked" physical symptoms (difficulty in speaking, tongue tremor, shaking limbs, walking on his heels, and an inability to stand still with his eyes closed).[55] John L. was "not extravagant in his ideas [upon admission]. But his voice walk & manner [were] all indicative of General Paralysis."[56] As well as disorders of gait, general paralytic patients could experience seizures or muscle twitching, sometimes with alarming frequency. James E. exhibited spasmodic twitching of the right side, starting in the foot, "on average about 51 times in a minute."[57] Whole body epileptiform seizures were characterised by severe muscular movements, with or without loss of consciousness. Many writers were in agreement that such seizures were a worrying portent. They "usher[ed] in the gravest reductions, often leaving the subject a complete mental wreck," representing something of a final straw that heralded a steep decline in mental acuity.[58] In 24 of 60 West Riding cases surveyed by Rainhill Asylum's Charles Newcombe, death occurred within a month of a major seizure taking place.[59] William F.B., likely one of the patients in Newcombe's sample, died just over a month after "a series of 13 Epileptic fits, passing out of one into the other."[60]

In its motor manifestations, general paralysis was a convincing argument that brain lesions could act as naturally-occurring 'experiments,' highlighting links between the brain and bodily movements and offering evidence that mental disorder was organic disease of the brain tissue. Excited to contraction by the nervous system, the muscles of the body showed how the work of that system was carried out, as well as when it had malfunctioned. "The knowledge that we already possess of the nerve-centres," wrote London Hospital physician Francis Warner, "is from observation of the condition of the muscles … during life as they may be affected with paralysis or spasm with the brain lesion found after death."[61] The casebooks of the West Riding demonstrate the increasing confidence that its doctors had in external bodily movements as indications of what was

occurring beneath the surface of the skull—a physiological 'surfacing.' William H., whose left upper arm was flexed and left leg paralysed, was thought to be suffering from an "embolism of the right middle cerebral, affecting the Corpus Striatum."[62] Unilateral disorders of motility were common in general paralysis and pronouncements like that of William H.'s doctor echoed those of Hughlings Jackson, who asserted that symptoms such as limb paralysis were signs, like mental derangement, of "what [was] going on wrong, in the highest sensori-motor centres."[63] The link between mental and physical degeneration was sometimes also made by patients and their families. The explanation for William C.'s illness suggested that the beginnings of the problem lay in William's back pain. Thirty-eight years old, married, and employed as a boot finisher, William was conveyed to the Asylum from Holbeck Workhouse in Leeds. On admission he was described as thin and undersized, with exaggerated right knee jerks and marked elbow jerks.[64] A letter from his brother gave a detailed account of William's condition over the preceding three years, describing how his

> … neuralgia in the muscles of the back [caused him to] suffer something dreadful. He would lie a handkerchief round his head when the pain went in, he used to cry and say he made no wonder that people went out of there [*sic*] mind if they suffered as he did. … Last Saturday he woke up saying he had plenty of money, went to his work giving [his workmates] rows of houses each. They took him home and he went clean off.[65]

For this writer, his brother's back pain was recognised to be a phenomenon bound up with his mental disturbance. But for some medical commentators, muscular pains and disorders were not simply coincidental accompaniments to mental disease; rather, they were parts of the body that—in their apparent agency—revealed a great deal about diseases of the mind. "That the muscles possess a sensibility of their own," wrote Ferrier, "is proved beyond all doubt by their nervous supply and by physiological and clinical research."[66] Here, Ferrier was echoing the ideas of his former tutor Alexander Bain who, in his 1855 work *The Senses and the Intellect*, set in motion "a sustained consideration of muscles as active and independent participants in the constitution of mind."[67] Ferrier's own research described a hierarchically organised community of muscles that varied in strength, with "the powerful extensors of the back, and muscles of the thighs keep[ing] the body arched backwards and the legs rigid."[68] Experiments such as Eduard Friedrich Wilhelm Pflüger's decapitated frogs

(which continued to twitch after the head had been severed) suggested a degree of autonomy within the bodily fabric, as did tests in which muscles continued to contract when electrical stimulus had been removed. The electrical experiments of Guillaume-Benjamin-Amand Duchenne further implied that coordination required a harmonious relationship between different muscle groups—an "instinctive association."[69] In 1893–1894 neurophysiologist Charles Scott Sherrington identified a feedback mechanism in muscles that played a significant part in regulating posture and movement, demonstrating the importance of simple reflexes in "the purposeful life of the organism as a whole."[70]

In investigating reflex anomalies at a time when the relationship between body and mind was being explicitly and meticulously discussed, it was difficult not to view muscular anomalies through the lens of willpower and self-control. Muscles "identify us as genuine agents," and this is a perception that stretches back to the days of Galen when even sitting was defined as an act regulated by the will.[71] A strong-willed man kept his muscles in check as, "if liberated from control, [they would] perform their function spontaneously."[72] Disordered reflexes and seizures suggested a lack of central control, and it was not a huge step to aligning this lack of physical control with defective willpower and moral reasoning. "The most perfect inhibitory capacity," suggested American physician Charles Bancroft, "is met with in those individuals that present a strong and healthy will power."[73] The will, an elusive but enduring concept in nineteenth-century alienist science, was most forcefully expressed—or most notably absent—in the movements of the body. As the counterpart to primitive desire, the will represented higher evolutionary development, with an individual's powers of inhibition increasing with age. The role of the healthy brain was to maintain control over the body and its actions. The view that only the will stood between order and chaos was well suited to physiological descriptions of the nervous system that emphasised a hierarchy of muscles, nerves, and impulses, where the loss of control over bodily movements was conceptualised as a "de-education."[74] This could be glimpsed in the tottery but energetic gait of tabes dorsalis (a condition caused by the degeneration of the spinal cord in untreated syphilis). The loss of finer movements in general paralysis suggested that the most complex motor abilities were good indicators of the brain's condition. On many asylum wards one could see examples of patients engaged in purposeless, repetitive activity that pointed to a grave prognosis, such as walking in circles or rocking back and forth.

Reduced willpower and thoughtless motor activity could also account for some of the more unusual symptoms of general paralysis, such as theft. In some cases theft was related to the delusions of grandeur held by the patient, as in the case of a 39-year-old man admitted to the West Riding in 1872: he had stolen a number of wine glasses from a hotel in order to host a "grand dinner party" for his friends.[75] Several patients entered the asylum via the courts in consequence of their stealing; Robert H., also admitted in 1872, had been found guilty of larceny after taking two wheelbarrows and a quantity of coal. His wife emphasised that he had no need to steal the coal as the family was comfortably off at the time, also noting that the crime had been committed openly, in daylight, with no attempt at concealment.[76] This clumsiness and lack of concern for being caught characterised most cases of theft by general paralytics, for many of whom a criminal act was out of character and caused serious problems both for themselves and their families. Forty-year-old Thomas G. had returned home to his wife on several occasions with articles stolen from the market: "on Monday two boxes of herrings one of which he sold, on Wednesday, a barrel of crab fish, and on Thursday, five fishes."[77] Mickle suggested that as well as being a result of delusions of grandeur and general confusion, some instances of theft were "nothing more … than an absent-minded, and practically automatic, involuntary act."[78] William H. had been in the Wakefield House of Correction for stealing and was then sent to the workhouse before being admitted to the Asylum on account of his unusual conduct. As well as restlessness and frequent undressing, he had been found wandering in the local market "with pockets full of useless articles – pieces of glass etc."[79] Once in the asylum, this automatic picking up of items was manifested in the collection of rubbish rather than the theft of goods. On the wards, many general paralytic patients could be observed collecting dead flies, dust, and other rubbish, hoarding it in their pockets. For Mickle, behind this collecting of items lay the same automatic impulse or failure of willpower that 'motivated' theft, with both actions purposeless and mechanical.

Physiological explanations for such automatic or mechanical actions, by bridging the gap between the biological (reflex action) and the mental (the will), allowed alienist science to move closer towards the realms of natural science. Willpower was a force that could be weakened by physical changes including "impaired nutrition, defective functional activity, or more gross structural lesions."[80] The study of the will and its operation (or nonoperation) allowed for the immaterial and invisible to be joined with the

material, visible, and measurable. John Hughlings Jackson's theory of dissolution—an opposite process to evolution—well illustrated this joining, connecting muscle with the will in a manner that questioned the view of the former as a 'low' element disconnected from the 'higher' mind. Dissolution of the nervous system, a concept that Jackson explicitly linked to the work of Herbert Spencer, was evident when those movements or faculties which were last to be acquired—those most dependent on the will—were the first to be affected, such as the movements of the fingers. To Jackson, muscular atrophy was a visual representation of the degree of dissolution of the nervous centres. Even a patient's facial expression might indicate "coarse degenerative changes" in the brain, with general paralysis being "the most striking [example] of … dissolution of expression."[81] Like dissolution, William Bevan Lewis's "muscular element of thought" was also conceptualised as a function guided by evolutionary principles, being the first to decline in insanity; when it declined "the apparent *energy and freedom of the will [was] restricted*," as seen in the melancholic's resting muscles and sluggish eyes, for example.[82] Generally, though, loss of will-power was thought to increase automatic movements. In a case related by Bevan Lewis in *The Lancet*, he described the course of seizures in one of his general paralytic patients in a way that clearly emphasised the disease as a form of 'de-evolution': "The movements around the mouth were peculiar, and strongly reminded one of the movements of the lips in animals about to snap when the canines are exposed by the retracted lips."[83]

That seizures were viewed as significant insights into the workings of the mind can be seen throughout the West Riding's casebooks. Michael C.'s epileptic fits were described in great detail and vividly conveyed his loss of consciousness as well as his own awareness of his condition:

> … a terrified look suddenly appeared. Patient's legs became stiff, & slowly contracted, & he exclaimed rapidly 'Oh, I'm in a fit by God'. … He appeared not to lose consciousness for a few seconds, then Tonic contractions of the muscles of the Legs, & of R[ight] arm supervened, the L[eft] arm not appearing to be affected. The face twitched violently. … After P[atient] had taken a breath or two, the Eyes turned strongly to the R[ight], & sudden jerks of the Body appeared. The R[ight] arm was rapidly extended. Finally the Eyes were directed strongly upwards. P[atient] lay for a considerable time unconscious after the fit.[84]

Michael C. was clearly painfully aware of his oncoming seizures, and some other patients were able to describe their experiences of fits to the doctor. Michael D. recounted how "Sometimes before [the] advent of [a] fit, a red & white star is seen. … This comes slowly towards him, and seems as if going into his head."[85] Another patient, in conversation with the doctor, expressed concern for the language used to describe his experiences; he objected to them being called "dizzy fits" and preferred his own term of "amaze-abouts."[86] The physical movements of patients during fits or muscular spasm were occasionally captured in photographic form. William S.—admitted to the West Riding Asylum at age 18 and diagnosed as an "epileptic idiot"—was one such patient who attracted the interest of the staff. His movements, described as "very fantastic on account of the contractions (permanent) of the muscles of his arms and legs" prevented him from walking, though he was able to "shift about the ward by moving his feet when sitting in a chair." His notes suggest that he was rather a favourite of the staff, described as "cheerful and bright," intelligent, and fond of looking at pictures and playing games.[87] Three photographs in the pathology lab's album depict the extreme contortions of William's fingers and wrists. Other images depict the uncomfortable warping of his body as he is pictured on a bed and sitting in a chair, in all instances with arms and legs flexed sharply at their joints.

Photography was just one way of seeing that compensated for what could not be seen during life: the state of the brain. Like photography, the observation of a patient's movements could be an efficient diagnostic tool when the patient's verbal testimony was unreliable or impossible. This was particularly important in general paralysis: the patient's power of articulation was often limited, as was their ability to follow lines of questioning. In the case of Abraham B., the doctor noted that his speech was "thick and rather indistinct," and that he showed "great obtuseness in understanding what [was] said to him."[88] Compensating for these difficulties, his body was coaxed into 'speaking' for him: "Patellar tendon reflex absent in each limb; plantar reflex almost absent, no cremasteric reflex. Tactile sensibility of lower limb diminished in acuteness."[89] Tests like these were a crucial part of examination alongside other forms of evidence, with new medical and scientific practices bound up with and complementing developing psychiatric theory. As the final sections of this chapter show, various forms of physical examination aimed to shed light on what was occurring inside patients' bodies. By studying accounts of such examinations in the historical records, we are able to uncover the wide range of manual, technical

—sometimes verging on artistic—practices that took place within the asylum, but also the place of patients in relation to the practices of physical examination and record-keeping.

Physical Examination and Inscription

That David Ferrier had undertaken his localisation research within the walls of the West Riding Asylum testifies to the institution's importance to physiological and neurological research in the later years of the nineteenth century. Early physiological research had tended to use the limbs of insects as raw material, and later in the century vivisection allowed links to be more clearly made between the muscles and the brain (though not without serious criticism from antivivisection campaigners, who targeted Ferrier's work in particular). Yet for many practitioners the mortuary remained the best source of specimens for study, and more so as alienism moved in a self-consciously scientific direction in the 1870s and 1880s, drawing upon the methods of the natural sciences. At the West Riding significant space was allocated to the laboratory study of mental disease. Under the Superintendency of Crichton-Browne, a new mortuary room and pathological laboratory were constructed in 1872–1873 and a pathologist appointed in 1872.[90] This was a forward-thinking step; pathologists tended to have a low status in medicine in the nineteenth century, but at the West Riding it was clear that they held an important place in the institution. In 1890 Bevan Lewis noted that although all medical officers should be capable of performing postmortem examinations, the study of the nervous system was so complex that it was preferable that "one official should more specially devote his time to this object."[91] By 1895, the Asylum could boast:

> … a complete outfit of … Laboratories and other rooms as are essential to the scientific investigation and treatment of disease … [comprising] Pathological, Histological, and Bacteriological Laboratories, rooms for Physio-psychical research and Physiological Chemistry, Opthalmoscopic Room, rooms for Electrical treatment, Photographic studio, Library, and Lecture room.[92]

A large asylum full of chronic cases was, as Crichton-Browne put it, "stored with only too vast an accumulation of pathological material … [and

afforded] unusual facilities for observation and research," both during life and after death.[93]

Much of the work carried out in the West Riding laboratory depended upon the dead body. Efforts to secure the bodies of psychiatric patients for postmortem investigation and scientific research are discussed in some detail in Eric Engstrom's study of German psychiatry in the imperial period. He tells us that patients who were judged to be "valuable neuropathogical specimens" were offered free beds in order to obtain access to their bodies after death.[94] This reflected the belief of many practising alienists at this time that much knowledge might be contained within the fabric of the body that would, in turn, lead to the eradication of many mental diseases. In Britain, too, the importance accorded to the bodies of asylum patients can be glimpsed in appeals during the 1870s for postmortems to be made a universal and automatic practice within medical institutions, and in the encouraging tone of the Commissioners in Lunacy regarding the number of postmortems undertaken. The Commissioner's 1885 report on the West Riding Asylum noted that "The number of postmortem examinations, 193, [was] very satisfactory."[95] Some commentators, however, worried that postmortems were a waste of time and were liable to "excite suspicion of neglect during life, and of ignorance of the cause of death."[96] Despite the support of Crichton-Browne and others, efforts to institute universal postmortems were rejected in 1877, though this did not mean that all asylums followed the same protocol. Jonathan Andrews summarises the situation thus: "At some asylums post-mortems had become *de rigueur*, formal consent not even being sought. At a minority, prior consent was procured from patients while living. Whereas a few sought written consent using purpose-specific pro-forma, others relied merely on verbal consent."[97] At the West Riding the intent to perform a postmortem was discretely noted on the certificate of admission sent to relatives: "In case of death the usual postmortem examination will be made in order to certify correctly the cause of death. Relatives in any case objecting to this course are requested to communicate immediately upon receipt of this notice, personally, with the Medical Superintendent."[98] It is impossible to know how many families responded to this, but towards the end of the century it is clear that a significant number of relatives were voicing their objection to postmortem, either wholly or in terms of the body parts examined. Casebooks kept during the patient's lifetime were occasionally annotated "Post mortem objected to," or alternatively "No objection to P.M."[99] Postmortem records show that some families had very specific ideas about where the boundaries lay:

often the head was not permitted to be examined, though there were some rare exceptions in which the head only was specified. Usually the chest and abdomen were the parts of the body viewed by families as an acceptable area of investigation, indicated by notes such as "Thorax only permitted to be examined."[100]

This increasing awareness of, and objection to, postmortem practices was just one factor in the asylum researcher's drive to study mental and physical disease as it appeared during life, *before* postmortem. Watching and recording movement during life was an invaluable opportunity, unavailable after death, to see the body-brain connection in action. Although small pieces of muscle might be analysed during life using a tool such as Duchenne's trocar (a pointed instrument that punctured the skin), this said more about the substance of a muscle than of the forces guiding its use. William Gowers' 1886 *Manual of Diseases of the Nervous System* was one of the first neurological textbooks to discuss means of uncovering conditions that would otherwise only be revealed at postmortem.[101] Tests like Babinski's sign (stroking the sole of the foot, the big toe extends while the others curl downwards) were important props to the professional self-image of modern neurologists and physiologists, but also promised to bring doctors to a closer understanding of chronic cases of mental disease. Some patients found themselves the centre of particular attention, visited by doctors and researchers from other institutions; Samuel N., a 47-year-old man admitted to the West Riding in 1890, was visited by Queen Square neurosurgeon Victor Horsley on account of his disturbances of sight and motor and reflex anomalies.[102]

With its plethora of somatic manifestations, general paralysis was fertile ground for the employment of physiological tests. Before carrying out reflex or other tests, though, disorders of gait or movement could be easily observed in everyday actions such as getting into bed or dressing. A doctor noted of Jeremiah B. that his "movements [were] very tremulous when any exertion [was] made. This was well seen when he tried to remove his shirt."[103] Such actions formed an informal but illuminating element of physical examination, with doctors noting whether patients were able to "perform a simple act, such as buttoning, readily."[104] The action of walking, as well as suggesting a diagnosis of general paralysis in cases of haltering or unsteady gait, could also be innovatively inscribed using large sheets of paper upon which patients walked with inked feet to leave imprints of their footsteps. Jean-Martin Charcot had a "gait laboratory" at the Salpêtrière in which patients would walk across paper in this manner to

produce a bodily 'text.'[105] These relatively informal methods of investigation were used alongside more precise instrumentation and procedures drawn from physiology. Bevan Lewis tested the muscular sense of patients using an instrument of Francis Galton's; this consisted of a box containing a number of trays and weights. Patients were asked to hold the different trays and rank them in order of weight. Using this device in combination with the aesthesiometer, Bevan Lewis found a "distinct impairment of muscular discrimination" in general paralysis, with patients struggling to distinguish between heavier and lighter objects.[106] The reaction times of patients were also tested at length by Bevan Lewis using an instrument that aimed to measure reactions to both visual and aural stimuli.[107] Often, however, making a series of careful measurements required a significant time commitment on the part of both doctor and patient; Bevan Lewis's results regarding reaction time represented the average of 20 separate trials for each patient.[108] That doctors at the West Riding were getting to grips with both the practice and accompanying technical language of such tests is evidenced by casebook records. One writer—possibly a student—placed some of his phrases within quotation marks: "'cutaneous stimulation' altogether absent" and "'coordinate movement' present & almost normal."[109] Employing such methods on an asylum ward—as opposed to in a physiological laboratory—could also prove challenging. Physical examination depended upon the cooperation of the patient, and it is evident from the West Riding records that this was not always forthcoming. Percival F. "[refused] to have his genitals exposed, for the purpose of testing the cremasteric reflexes."[110] Others viewed such tests through the lens of prison life, judging examinations to be assessments of their fitness to undertake physical work. James E., a fish dealer suffering from Charcot's knee (chronic degenerative disease of the joint), told a doctor that a few days previously another member of staff had tested his knees to ascertain whether he would be able to work the treadmill.[111]

Some forms of testing required less input from the patient, namely electrical and reflex testing. Several researchers investigated the electrical excitability of the muscles in general paralysis: whilst Richard von Krafft-Ebing claimed such excitability was retained in the disease, John Charles Bucknill and Daniel Hack Tuke argued it was lost.[112] Hughlings Jackson suggested the possibility of a "superpositive" response to electricity as a result of tissue destruction, in which reactions increased; in line with his notion of dissolution, however, the form of action that increased was "of a simpler, more fundamental, less elaborate [character] … The most

elaborate forms of conduct [were] lost."[113] At the West Riding Bevan Lewis's experiments found the lower body reflexes "extremely deficient, and in several cases almost totally abolished" and in two cases investigated by Wadsley Medical Officer John Lowe no contraction of a muscle in the lower leg could be obtained at all, even at the highest power.[114] Most interesting to these researchers was the effect of electrical current in simulating—on a reduced time scale—the progress of general paralysis itself. "In general paralysis the motor symptoms follow a course resembling that of the symptoms induced by electric excitation," observed the French neurologist Achille-Louis Foville. "At first there is a slight trembling in certain groups of muscles, then the trembling becomes more marked, and may be accompanied by violent functional excitation, while later convulsions … occur, to be followed often by paralysis."[115] Rather like a seizure, electrical current could reveal in microcosm larger-scale, longer-term, disease processes. However, electrical equipment involved significant commitment in terms of finances and space, as well as being dependent upon a reliable electricity supply. The installation of a hydro-electric bath at the West Riding in 1902 necessitated a three-day stay by an electrical engineer from London.[116] Bucknill and Tuke noted that electrical experimentation could be replicated more conveniently (if "less effectually") by tickling the soles of the patient's feet.[117]

Certainly, the reflex test was a quick and simple method of investigating the mind–body relationship. Viewed as objective signs of organic disease, the late nineteenth century witnessed "a veritable deluge of 'new reflexes'" inaugurated by Joseph Babinski's systematic study of the plantar reflex.[118] General paralytic patients exhibited distinct reflex anomalies: of 44 cases studied by Bevan Lewis, the knee jerk was found to be normal on both left and right sides in only six.[119] The general consensus was that general paralytic patients suffered increased knee jerks upon percussion. Again, though, general paralysis's changeable and progressive nature complicated what was at first sight a straightforward test. Mickle, writing on the knee jerk, noted that it "may be normal, or may be increased, diminished, or absent," as well as varying according to the stage of the disease.[120] More certain and more minutely quantifiable signs were needed, then.

In an 1881 article, Parisian neurologist E.C. Seguin offered three methods of testing the functions of movement: having the patient make passive or active movements, physical inspection, and use of the dynamometer.[121] As a measure of physical strength, the dynamometer was an instrument used by many physiologists and neurologists from the late

nineteenth century, particularly following its promotion by American neurologist William Hammond. The instrument consisted of a steel spring attached to a scale and was placed in the hand; pressing the spring caused a steel arm to indicate the force exerted on the scale. The dynamometer was one of several tests carried out on West Riding patients who presented notable motor anomalies; it could be employed immediately upon admission as part of the physical examination with the results recorded in the casebook alongside the patient's height, weight, and other physical details. As a measure of the force exerted by muscles, the dynamometer often simply confirmed what could be surmised with the human eye: Joseph K., who had noticeably smaller right than left limbs and a lack of plumpness to the right side of his face, exhibited a grasping power in the right hand that was half that of the left.[122] It might also back up other test results, such as Edinburgh surgeon Byrom Bramwell's use of it in a patient with an increased right knee jerk. In this case, the patient's right hand exhibited a lower grasping power, and at postmortem a tumour was found on the left hemisphere of the brain, taken as evidence of the connection between lesions of the brain substance and disorders of movement.[123]

With a little modification, however, the dynamometer could produce a direct visual representation of motor phenomena. Manufactured by French instrument maker Mathieu and advertised by Hammond, the dynamograph connected a dynamometer to mechanical recording apparatus. Though its use was somewhat limited by its higher cost, the dynamograph "indicate[d] the perfection of … the muscular sense" via the straightness of a line drawn by the patient.[124] Hammond went further than most in extolling the instrument's virtues when he employed it in a murder trial. As the accused was unable to keep the pencil still in order to draw a straight line, Hammond argued he had a generally reduced willpower, correlating this impaired physical ability with reduced moral control and homicidal tendencies.[125] Hammond's use of the dynamograph in this case highlights the assumed relationship between cerebral mischief and bodily incoordination that was gaining credence at this time, as well as the role of the will and of intellectual effort in physical exertion. Paul Broca, for example, had used the dynamometer to test the physical abilities of different social classes. He claimed to have found greater strength not among manual workers, but those whose work was of a more intellectual flavour, positing a link between mental activity and physical strength.[126] C.H. Féré, at the Salpêtrière, tested this mind/muscle strength correlation by having patients perform various mental tasks whilst squeezing the dynamometer.

He found that strength increased when simple tasks (such as counting to 45) were performed at the same time; conversely, intellectual fatigue had the effect of reducing muscular energy.[127] Muscular movements, then, seemed to represent activities going on, unseen, elsewhere in the body. For the general paralytic patient, bodily action (and inaction) suggested that significant degenerative change was occurring in the cerebral substance: in the gradual enfeeblement of the body, one could almost watch the progress of a mysterious lesion eating its way through the brain.

Like reflex and other tests, though, dynamometry was not an exact science, yielding inconsistent results even within the same individual; in four trials conducted by Bullen, he recorded results of 27/31, 24/30, 24/30, and ("with swing") 32/32 in the same patient.[128] Establishing a normative standard of grasping strength was difficult as it required practitioners to take into account various factors such as handedness and occupation. Just as ergographs and aesthesiometers could only measure fatigue indirectly, the dynamometer captured transient phenomena that could not be considered a direct representation of brain activity: the instrument could never properly capture the 'gap' that separated the brain impulse and the movement of the hand.[129] Although Stanley Reiser, discussing the use of the stethoscope, identifies "a new class of disease signs" that replaced the patient's narrative in the nineteenth century,[130] the 'signs' elicited by technologies such as the dynamometer were limited and rarely used as stand-alone indicators of nervous disease. Their use was further complicated within the asylum environment: by definition, asylum patients' responses to questions and verbal reports of sensations were considered to be of doubtful utility, even when medical technologies were employed. This can be seen in some of the records of the West Riding—for example, "Tested [with the] aesthesiometer, if his answers are reliable, there is manifest reduction of sense-acuteness."[131] Taken together, however, doctors were relatively confident that a series of tests would elicit the required information by "turn[ing] the patient's body into a machine of its own revealing."[132] Significant value was attached to certain physical signs, demonstrated by the results of physical examination in terms of negative findings—such as "No positive evidence of altered gait when eyes are allowed to be fixed on floor."[133] The search for the tell-tale signs of general paralysis began as soon as patients entered the asylum, but it was a search that was ongoing—particularly as the condition's signs and symptoms changed over time.

The Patient and the Case Record

Throughout a patient's stay in the Asylum new observations or test results were added to their casebook records, which in many cases ran to several densely handwritten pages. Indeed, the labour of writing patient records was described by Sussex's A.H. Newth as "terribly trying." He had suffered his own muscular problems with an attack of scrivener's palsy (writer's cramp) due to writing casebook records, also developing a ganglion on his wrist.[134] The West Riding casebooks are often unruly despite their apparently rigid structure: doctors wrote beyond pre-printed sections, inserted newspaper cuttings between the pages, left spaces for photographs, and pasted in temperature charts or pulse tracings that sometimes obscured the text beneath. Fragments of experimental physiological work were complemented by written notes and observations, with note-taking and case-taking contributing to the process of knowledge-production just as photomicrography or dynamometer testing did. Casebooks were not necessarily intended to stand as complete histories of a patient, but acted as "clinical and managerial aids to those treating and attending the patient."[135] The casebook served to dissect the body "epistemically" as knives dissected it physically, and as such they provide a vital window onto contemporary medical practice.[136] As Volker Hess and Andrew Mendelsohn observe, case records also served to link different areas of an institution.[137] In the West Riding casebooks it is possible to glimpse the multiple practices (photomicrography, physiological research, interviewing patients) and sites (photographic studios, laboratories, admission rooms) within the Asylum, as well as the institution's connections to researchers elsewhere such as Horsley and Ferrier.

Casebooks contain multiple—albeit mediated—narratives and stories: the thoughts of various doctors, the evidence of family members and friends, and sometimes the reported speech of patients themselves. An interesting example from the West Riding casebooks shows that family members could also participate in discussions between patients and asylum doctors. William Douglas A., a glass painter whose record was supplemented by his own beautiful stained glass window designs, showed particular resistance to talking about his wife with Medical Officer Frederick St. John Bullen. Though it had been reported on his reception order that William entertained delusions about his wife being unfaithful to him, he—not unreasonably—saw this as a private matter, noting: "had I any suspicions, I might either have due grounds, or at least refuse to communicate

them to a stranger." In an attempt to resolve the matter, Bullen held an interview between husband and wife, during which William's conduct led Bullen to believe that his patient was suffering from a degree of "morbid suspicion, probably amounting to delusion."[138] It was a worrying portent of things to come: after being transferred to Colney Hatch Asylum and subsequently released, William would find himself in Holloway Prison after being charged with the manslaughter of his wife.[139] As part of medical material culture, then, casebooks can highlight the social aspects of medical encounters.[140] Catching that which was beyond direct visible or physical reach using a variety of technologies and tests, late nineteenth-century asylum doctors necessarily engaged in a form of social interaction with patients, and not simply in admission or family interviews: listening to and recording their accounts of seizures, putting them at ease when taking dynamometer or sphygmograph readings, and trying to ensure their cooperation in carrying out reflex and weight discrimination tests.

Besides the results of physiological tests and doctor's observations, many casebook records include traces made by patients themselves. Recent work in the history of psychiatry has emphasised the "need to explore the interactive dimensions of the doctor-patient relationship," emphasising features such as the recording of patient's words in case records.[141] Sarah Chaney has recently uncovered instances of friendships and forms of professional collaboration between some psychiatric patients and their doctors.[142] It seems that in many cases patients may have been more aware of the assessments and judgements being made about them than we typically expect. Upon admission to the West Riding, the statements contained in reception orders were at least occasionally put to patients for their response, as evidenced in the admission notes accompanying William S. in 1877: the doctor noted that he "[d]enied ever attempting intercourse with cattle" as had been recorded on his reception order.[143] B.C. Barrett, a male patient, seemed in good humour regarding the taking down of his history in the casebook, apparently saying "I should like to have a copy of that narrative of Dr Lewis … framed & hung-up in my room. It was grand."[144] Francis C., as well as reading his admission certificate, was keen to be an active participant in his examination: "So far from objecting to physical examination, he helps it. Asked to write down the reason for his silence, takes, after much hesitation, the pencil & scrawls illegibly."[145]

Forms of patient inscription like that of Francis C. demonstrate a literal 'writing in' to the medical record that could have clinical as well as social significance. As Alicia Puglionesi puts it in her analysis of drawing as an

instrument in the mind sciences, "paper, pencil, hand and brain served as … 'soul catcher[s]', fixing developmental, supernormal and pathological aspects of the self in a material form" and transforming simple patient inscriptions into scientific objects.[146] At the West Riding, this 'fixing' exercise sometimes took the form of illustrating a story told by the patient. A 20-year-old porter admitted to the Asylum in 1895 told the doctor of "a little black thing that came out of his mouth," drawing the object in the casebook.[147] In their interest in physical signs as indicators of cerebral disease and nervous function, asylum doctors might have the patient write their name or a short passage as a simple form of physical assessment, particularly if the patient was unable to speak. Handwriting was seen as a uniquely useful tool in late nineteenth-century psychiatry. As an expressive and intentional movement, its disturbance suggested illness, with resulting inscriptions constituting one form of graphical trace that sat alongside others in the casebook to aid diagnosis and chart progress or decline. In their illegibility or incoherence these traces provided a window onto the patient's mental state. Thus, slips of paper were inserted into casebooks that demonstrated the spidery handwriting of the general paralytic patient as their control over finer movements was lost. As general paralysis progressed, writing became increasingly difficult; Mickle described how a patient might "[write] a word or two, or a part of a word … and then, after a pause, [make] several irregular strokes or flourishes, or [put] down the pencil in momentary confusion or disgust."[148] Joseph B.'s attempt at writing a letter to his wife, consisting of the date and one nonsensical sentence, was tacked into a West Riding casebook with the doctor's note, "The result of 3 hour's work."[149] Like the confident pronouncements of general paralytic patients as regarded their physical prowess, their inability to write contrasted markedly with the grandiose content of their letters, addressed to politicians or monarchs with whom they believed themselves to be on intimate terms. Inscriptions by patients were a more permanent record of delusions than fleeting speech, then, but they were also particularly useful in illustrating motor disorders. Michael D., who had described his fits to the doctor (above), wrote his name into the casebook (Fig. 2) in order to demonstrate how he wrote vertically with his left hand, a trait thought to indicate some cerebral disturbance.[150]

In the West Riding Asylum the investigation of muscles and their movements took place across several sites, then, from the mortuary and pathological laboratory to the ward and admission room. Whilst physiological research played a large part in the drive for alienism to be recognised

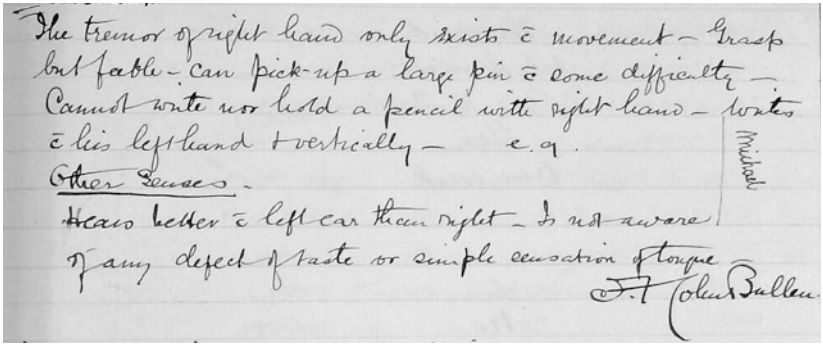

Fig. 2 Casebook record of West Riding patient Michael D., demonstrating his vertical handwriting (1890). Reproduced with permission of West Yorkshire Archive Service: Wakefield and the South West Yorkshire Partnership NHS Trust. WYAS C85/3/6/149

as something close to the natural sciences, investigating the links between body and mind was a complex and ongoing exercise that was dictated by the barriers of the living body and reliant upon technologies and methods that could make those invisible processes visible and quantifiable. The outward signs of inner degenerative processes were actively elicited (or 'surfaced') by asylum doctors and as such, we might construe many of the tests described in this chapter as intrusive methods concerned less with therapeutics than with furthering the march of alienist science. Their employment, though, was directly connected to the belief of many asylum doctors that general paralysis offered a model of mental disease that—if its mysteries could be solved—held out the hope of curing not just that condition, but a whole range of mental diseases. Yet many of the methods taken from physiology—however controlled the circumstances in which they were employed—were complicated in the asylum environment: a number of general paralytic patients either refused, or were physically unable, to cooperate with tests, and even when they did doctors were hesitant to take their responses as wholly accurate. One thing was certain, though: general paralysis was a disease that had a serious impact on the bodily fabric. The softening and atrophy of the muscles of the limbs, heart muscle, and even the cells made clear that doctors were dealing with a disease that required serious scientific and clinical attention—both to reduce its incidence and to ensure that those patients under their care

received careful attention in light of their vulnerability. It is these two issues—the voices of patients and the belief in an inherent bodily weakness among general paralytics—that come together in the next chapter, on bone fracture in the asylum.

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