

CHAPTER 2 CIRCLING THE BRAIN

The emergence of psychiatry in the early 19th century finally eclipsed humoral models of mental disorders. The same forces that laid the basis for the new discipline remade our world but brought in their train secularism and concerns about biological reductionism.

Among these forces was the confluence of elements that gave rise to the revolution in the natural sciences that began in Europe in the 17th century. Although it gave rise to the work of Galileo, Newton, Descartes, Harvey, Boyle, Leibniz and others, this was a period of profound social dislocation that led on to the Enlightenment, in which science was seen as our best hope for social progress, and as offering humanity some control over the forces of nature. As recent doubts have emerged about the capacity of science to effect meaningful social reform and about whether our control of nature is leading to environmental catastrophe, some critiques of science have portrayed it as a manifestation of capitalism. This interplay between scientific progress and social dynamics will follow us to the end of the book.

While the birth of physics and chemistry in mid-17th century have been celebrated, a new science of the brain, borne at the same time, has received much less attention. One of central figures in creating this new science was Thomas Willis. The new way of seeing the brain that stemmed from Willis meant we had to find new ways to fit ourselves into our bodies and into society. The emerging neuroscience was paralleled by an emergence of secularism. Compared with physics and chemistry, the new neuroscience was initially an all but dormant volcano. It took 200 years for the implications of efforts to fit us into our brains took proper shape and a further 100 years before the mountain blew its top raining down ash on us now today.

A second set of forces can be seen in the social changes that in the early 19th century led to the creation of asylums to house the insane. The asylums called forth a new cadre of physicians, the alienists, who offered medical input to the care of inmates confined in these institutions. Confronted with insanity in all its guises, it was inevitable that in the hands of these alienists views of madness would change, with knock-on effects for how we view ourselves.

A third group of forces lay in a need that opened up at the end of the 18th century to have an explicit set of rules to cover decisions as to when individuals should be held accountable for their actions. Late 18th and early 19th century legal cases threw up what appeared to be a new need to establish an equitable arrangement to manage cases of murder in which the defendant appeared to be insane. Who if anyone might be spared execution on the grounds of illness? The problem called for a new expertise, blending the legal and medical fields.

The New Brain

Nowadays images of the brain are ubiquitous. In magazines, and on television screens, we see the grays and blacks of CT (computed

tomography) and MRI (magnetic resonance imaging) scans. In drug adverts we often see different regions of the brain lit up in the colors of PET (positron emission tomography) scans. These images date back to the mid 1980s and only became common in medical settings in the mid to late 1990s, the Decade of the Brain. They seeped into popular consciousness at the start of the 21st Century as internet sites flourished, offering new services promising the ability to maximize our potential through a proper utilization of our brains¹.

Up till the late 1980s, the bones of the skull stood out on X-ray in solid relief, but within the bony surrounds of the skull there was a vacuum where the brain should be. In the mid 1970s movie *The Exorcist*, for instance, psychiatrists investigating the brain did so using angiograms that outlined the arteries snaking around the brain making it visible in something like the way a sprinkle of dust made *The Invisible Man* semi-visible.

Pneumoencephalograms were also used in which bubbles of air within the ventricles of the brain allowed clinicians to guess – “make inferences” - based on disturbances in the shapes of the ventricles as to the existence and nature of any pathology in the surrounding lobes of the brain. This was a neurological version of blind man’s bluff.

This recent astonishing transformation in the visibility of the brain in the last decades of the 20th century parallel a transformation that took place in the visualization of the brain in the mid 17th century, with the work of Thomas Willis in Oxford.

With the Renaissance and the early phases of the scientific revolution there was a growing emphasis on experiment, epitomized by Paracelsus chemical therapeutics and by Andreas Vesalius’ dissections of human corpses. Vesalius’ dissections directly contradicted Galen on a number of key points. The publication in Basel in 1543 of his *On the Structure of the Human Body* fueled the emerging questioning of Galenic concepts of how the human body functioned². A host of related anatomical discoveries outlining features, such as the refractory properties of the lens of the eye, emphasized continuities between animals and even machines and man. The most dramatic result of this new approach came when in 1628 William Harvey in *On the Motion of the Heart and Blood in Animals* demonstrated that the heart functioned as a muscular pump pushing blood through the arteries, which delivered it around the body, for it to be returned to the heart by the veins before being circulated through the lungs and redistributed through the body.

Prior to this the heart had been a mysterious organ in the human body, quite possibly the seat of the soul. It was the part of the body that most clearly responded to the influence of the emotions. The presumed involvement of the heart in thinking is still caught in a large number of everyday phrases such as learning things by heart.

¹ Dumit J (2004). *Picturing Personhood. Brain Scans and Biomedical Identity*. Princeton University Press, Princeton.

² Martensen, R.L. (2004) *The Brain Takes Shape, An Early History*. Oxford University Press, N York.

One of the first efforts to incorporate the nascent biological sciences into a new vision of what it means to be human came in the work of Rene Descartes. In response to the new anatomy and physiology, Descartes produced a radical view of man as a mechanical being inhabited by a soul. In the process he famously left unresolved the issue of where the soul took up its residence within body. In the *Passions of the Soul*³, the soul appears coterminous with the entire body but in Descartes' *Treatise on Man*, the residence of the soul is placed in the pineal gland⁴.

There were a number of reasons to think about localizing the soul in the pineal. This gland is the one single organ in the brain. Everything else comes in duplicates, one on the left and one on the right. The pineal is also in the midline of the brain. Most crucially the pineal hangs down into the cerebral ventricles through which the animal or nervous spirits inhabiting the brain were thought to travel, and on their travels they could be imagined subtly influencing this gland or being influenced by it.

For most of the previous two millennia in so far as anyone had seen the brain, the ventricles, or chambers of the brain, were the features of greatest interest. If any areas of the brain could be thought of as being a possible hall of residence for a spirit then the ventricles seemed to fit this bill. Hippocrates clearly considers the possibility that the diaphragm was the organ of thinking but rejects it in favor of the brain as the diaphragm "has no cavity into which it might receive anything good or bad that comes upon it"⁵. The cerebral ventricles were moreover filled with a liquor or humor that was called for by humoral models of human functioning. This fluid, which was variously termed animal spirits or a subtle fluid, could be conceived as distributing itself down through the channels of the nerves to various parts of the body to animate them. The white cords emanating from the brain, now called nerves, had been observed by Galen as early as the 2nd century AD.

The remainder of the brain surrounding the ventricles, which we now see as a solid mass that conceivably could house the cerebral computer that we imagine directs physical and psychological functions, didn't look so solid to the Greeks or Romans or during the dissections of the Renaissance. When heads were split open in battle, the brain contents literally leaked out. By the time post mortems or the dissections of corpses took place, particularly in hotter climates, the brain had little more shape than a mass of sago pudding would have. Within this mass the ventricles at least had some shape and as a result representations of the brain often featured an organ inside the head in which the ventricles occupied, even in Descartes' work, much more space than in fact they do, with the rest of the brain having no distinctive features.

³ Descartes R (1649/1989). *The Passions of the Soul*. Hackett Publishing, Indianapolis.

⁴ Descartes R (1662/1972). *The Treatise on Man*. Trans Hall TS, Harvard University Press, Harvard. The *Treatise* was however essentially written by 1633.

⁵ Lloyd GER (ed) (1950). *Hippocratic Writings*. Trans Chadwick J, Mann WN, Penguin Books Harmondsworth Middlsex, pp 250.

The new Cartesian view was still an essentially ancient view of the brain, in which the ventricles and the fluid that they contained were critical, and pretty directly open to outside influences from God or the environment. It could still be affected by the wind or *pneuma*, which was the dominant metaphor for the presence of God in the world. Hippocrates had put this beautifully: “everything contains moisture to a greater or lesser degree and thus all things feel the effect of the south wind and become dark instead of bright, warm instead of cold, and moist instead of dry. Jars in the house or in the cellars which contain wine or any other liquid are influenced by the south wind and change their appearance”⁶.

Beautiful though this was, this view did nothing to force people to examine what might be happening within their brains when they contemplated the meaning of life, or they fell in love, or they had to tell their children about what it meant to be human.

There were many reasons to continue to think that the heart and the blood were the seat of the soul and the seat of life. The blood was clearly warm to the touch. Under the influence of Paracelsus, it came to be seen as a site of fermentation processes, which might deliver heat and energy to various parts of the body including the brain. The brain in contrast appeared to be a cold organ.

It was the genius of Thomas Willis and his colleagues in Oxford, with the use of preservatives, to revisit the brain and give it its modern shape⁷. Working in Oxford at a time of Civil War in England, Willis moved in the group of early scientists that established the first scientific society - the Royal Society. This Oxford circle included Robert Boyle, Robert Hooke, Christopher Wren, Richard Lower and others. Willis was heavily influenced by Harvey who spent his final years in Oxford and by William Petty, another anatomist.

The ferment of experimentation these early scientists stimulated, despite a surrounding Civil War, led in 1664 to Willis' breakthrough work *Anatomy of the Brain*. In this volume, the anatomical drawings of the brain were radically different to anything that had gone before. The most famous featured the under surface of the brain with its folds and fissures and a plethora of discrete features such as the brain stem, the pons, the medulla and the circle of arteries surrounding the base of the brain that have ever since been known as the Circle of Willis. Other views showed the corrugated infolding of the cerebellum and the cerebral cortex. There was little emphasis on the ventricles. This was a new solid brain. For the first time clinical and scientific attention was directed to what we now call the brain⁸.

⁶ Lloyd GER (ed) (1950). Hippocratic Writings. Trans Chadwick J, Mann WN, Penguin Books Harmondsworth Middlxs, pp 248.

⁷ Martensen, R.L. (2004) *The Brain Takes Shape, An Early History*. Oxford University Press, N York. Zimmer, C. (2004) *Soul Made Flesh*. William Heinemann, London.

⁸ Martensen, R.L. (2004) *The Brain Takes Shape, An Early History*. Oxford University Press, N York. Zimmer, C. (2004) *Soul Made Flesh*. William Heinemann, London.

The representation of the brain as a solid organ made it possible to start thinking systematically about how this might be the organ of thought. Prior to Willis, the cerebral ventricles, as containers of fluids, were assumed to be in some way open to the influence of environmental and other pressures, whether from the promptings of God through the pineal gland, or through the influence of the seasons or other contagious factors on the humors circulating through the ventricles. The new brain as envisaged by Willis appeared a closed organ, which if it were open to outside influence would be so through the medium of a more active subject perceiving and learning by using her senses and making judgments on what was happening to her.

Dissection made it clear the new brain had different strata – cerebral cortex, cerebellum and then midbrain structures. This pointed to the possibility of a new mental economy where different systems would have different functions not unlike the way different parts of society co-operated under the direction of a monarch. The new vision of the brain called for two new sciences – neurology and psychology. Willis himself coined the term neurology and his new discipline laid the basis for the ultimate localization of ancient disorders such as epilepsy and apoplexy.

John Locke, one of Willis' students, taking seriously the ideas of brain function put forward by his teacher, argued that human beings began life with a tabula rasa and through sensory inputs from outside, built up their personalities and thinking styles through impressions and associations laid down within the matter of the brain⁹. This led to a seminal work of modern philosophy – Locke's *Essay on Human Understanding*. Locke coined the term psychology in the 1680s to deal with the new learning¹⁰.

Besides its philosophical implications, the new work pointed to ways in which we might live that are now seen as characteristic of the Enlightenment. While good example had always been seen as important, if a person were not primarily influenced by the pneuma, but rather by the impressions and associations laid down from birth, pedagogy became of compelling importance and a correct education became an increasingly important religious and political tool¹¹.

In contrast to Locke's interest in the implications of the New Brain, another contemporary, the physician Thomas Sydenham abjured brain anatomy as a fruitless exercise likely to yield little of value for either the therapeutics of disease or for our understanding of how to live. But in common with Willis, Sydenham also put a renewed emphasis on clinical observation¹². He was one of the first to raise the possibility that there might be disease entities – that is something that ran a characteristic course regardless of who was affected. The traditional Galenic approach to illness involved treating the

⁹ Zimmer, C. (2004) *Soul Made Flesh*. William Heinemann, London.

¹⁰ Martensen, R.L. (2004) *The Brain Takes Shape, An Early History*. Oxford University Press, N York.

¹¹ Porter, R. (2003) *Flesh in the Age of Reason*. Allen Lane, London.

¹² Koutouvidis N, Marketos SG (1995). The contribution of Thomas Sydenham (1624-1689) to the evolution of psychiatry. *History of Psychiatry* 6, 513-520.

individual rather than treating a disease. If there were disease entities, Sydenham recognized they would need to be classified, just as the botanists were classifying plants¹³. This led him to establish one of the first classifications of the disorders encountered in medical practice – a first stab at what would later become the DSM system in psychiatry and International Classification of Diseases (ICD) for medicine in general.

The new thinking had implications for what would now be called the emotions but were then termed the passions. The word passions stems from the Greek pathos, which implies the experience of having one's body being acted upon - as in suffering. People suffered powerful impulses. This idea took shape in a context, which assumed that the body was porous and open to outside influences. The control of the passions accordingly became the duty of a rational individual. Such control could be exercised through the notion of moderation in particular, and this notion of moderation was bound up with a humoral model that strove for balance. In terms of managing or not unduly disturbing the humors, moderation was seen as a virtue when it came to diet, activity, and sexual activity.

Between 1700 and 1800, the term passion began to be replaced by a new term – emotion. The emotions in contrast to the passions were seen as stemming from within the individual and therefore potentially rather than subversive influences from outside were guides from within that might steer an individual along the right path. Where before there was no question but that the rational faculty should subdue all others, a world began opening up in which there might be competing sources of wisdom with much less certainty that “conventional rationality” was the supreme virtue¹⁴. The notion that one might opt to be guided by one's feelings emerged. This innate knowledge stood in contrast to Locke's tabula rasa.

All of these ideas were dangerous. Willis' work took place against a background of great uncertainty. The Civil War had turned the English world upside down¹⁵. While much of the political ferment was driven forward by radical religious sects, a new phenomenon began to appear for the first time - the possibility of a lack of belief in any overarching god or cosmic principle. It had previously been almost impossible to conceive of a desacralized or mechanical world¹⁶.

This science raised new questions. What did one tell one's children about what it meant to be human, about what our purpose in life was, about how the human body might shape human behavior? Even though almost all scientists at the time studied the book of Nature as another path to God¹⁷, Descartes left

¹³ Conrad LI, Neve M, Nutton V, Porter R, Wear A (1995). The Western Medical Tradition. 800 BC to AD 1800. Cambridge University Press, Cambridge.

¹⁴ Rational in this sense is somewhat equivalent to being logical in preference to being empirical.

¹⁵ Hill, C. (1972) The World Turned Upside Down. Penguin Books, Harmondsworth, Middlesex

¹⁶ Febvre, L. (1982) The Problem of Unbelief in the Sixteenth Century. Harvard University Press.

¹⁷ Shapin S (1994). A Social History of Truth: Science and Civility in Seventeenth Century England. Chicago University Press, Chicago.

his Treatise on Man unpublished, and the constant risk that Willis and his colleagues ran was of being accused of laying a basis for atheism and materialism. Their political skill lay in pushing forward the boundaries of science while at the same time persuading a variety of political masters that their new discoveries were consistent with traditional values and with the maintenance of order in society. This new knowledge was no less dangerous if not contained within a moral framework than 20th century nuclear knowledge would later be.

The New Brain & Its “Nerves”

Both Sydenham and Willis regarded hysteria as a convulsive disorder. In referring to it as the "so-called uterine disease", Willis made one of the first breaks with traditional views on this disorder. He claimed instead that its etiology lay in an alteration of the nerves and brain, invoking a mechanism that could be regarded as a prototype of the modern reflex¹⁸. By means of the nervous system, he wrote, "are revealed the true and genuine reasons for very many actions and passions that take place in our body that would otherwise seem most difficult to explain: and from this fountain, no less than the hidden causes of diseases and symptoms, which are commonly ascribed to the incantations of witches, may be discovered¹⁹".

In 1682, Sydenham classified hysteria as the commonest chronic nervous disease. It took almost a further 100 years for hysteria to become more clearly established as a disorder of the nerves – a neurosis. The term neurosis was formally introduced by the Edinburgh physician William Cullen, in 1785, although the idea that general lassitude or suboptimal behavior of obscure origin could be put down to "nerves" had probably been put forward as early as 1765 by another Edinburgh physician Robert Whytt²⁰. Cullen defined the neuroses as disorders that involved disturbances of nervous functioning, without any obvious lesion or inflammation of the nerves (neuritis) being apparent at post-mortem. In much the same way the word nephrosis had been coined to categorize functional disorders of kidney in the absence of demonstrable abnormality or inflammation (as in nephritis). For Cullen, who was a medical classifier like Sydenham, hysteria was one subdivision of the spasmodic neuroses - all or which involved abnormal movement of muscles or muscle fibers. The neuroses also included tetanus, epilepsy, colic, diabetes, palpitations and whooping cough. This classification system survived over a century. As late as 1899, Kraepelin still classified epilepsy, chorea, tetanus, and migraine along with hysteria as neuroses²¹.

The recognition of nerve cells and the idea that nerve fibers conducted impulses between nerve cells lay a hundred years in the future, so it is not clear

¹⁸ Clark E, Jacyna LS (1987). Nineteenth Century Origins of Neuroscientific Concepts. University of California Press, Berkeley.

¹⁹ Willis T (1664). The Anatomy of the Brain. P 14; Cited in Diethelm

²⁰ Pinero JML (1983). Historical Origins of the Concept of Neurosis. Trans Berrios D, Cambridge University Press Cambridge; French RK (1969). Robert Whytt, the Soul and Medicine. Wellcome Institute for the History of Medicine, London.

²¹ Kraepelin E (1899). Psychiatrie. Ein Lehrbuch für Studierende und Aertze. Barth, Leipzig, Volume 1 Trans Metoui H (1960), Science History Publications, Canton MA,

what Cullen meant by neurosis. It seems likely that he saw the neuroses as malfunctions of the system as a whole, with no one definite, localized disturbance. These generalized disturbances of function displayed themselves in symptoms of pain, increased or decreased sensitivity to internal or external stimuli, spasms and general disorders of muscular movement and in weakness.

This was a nervous system still permeated in some way by an immaterial spirit. Philippe Pinel, the first of the great French alienists, who had Cullen's work translated into French, for example, could still see the neuroses as caused by the passions of the soul. With Cullen and Pinel, the notion of a neurosis became fashionable and there was a huge expansion in the number of diseases that were considered neurotic.

However, shortly afterwards one of the so-called neuroses, apoplexy (stroke), was discovered to have a very real and demonstrable cause in loss of brain tissue. By 1840, it was clear that many of the disorders that Pinel and Cullen had described as neuroses had been demonstrated to have either a localizable basis in nervous destruction or indeed to have nothing to do with nerves. For the remainder, who had "neurotic" behavior in the absence of a localizable lesion, a new explanatory notion emerged – the reflex.

When Descartes suggested that men and animals might function in many respects like automata, he postulated that physical and mental operations might take place by means of tugs and pulls using some equivalent of ropes and pulleys and springs, or by a hydraulic process involving fluid and valves²². The obvious candidates for such threads or pipes were the nerves. Descartes suggested that on stimulation by pain, for example, delicate threads lying in the nerve bundles are moved, which open valves within the brain and release animal spirits (sensitive and irritable substances), which then lead to muscular movement. However he did envisage this as an automatic and unconscious reaction, of the kind that we now mean when we use the term reflex.

For example, he meant that the physical sight of fire would be associated with a mental image of flames. Animal spirits in the brain on catching a glimpse of such an image would be reflected in fright toward the muscles disposing them for flight. Until about 1830, the primary meaning of the term reflex connoted some form of reflection in the sense of judgment. Although some actions may seemingly occur beneath the level of awareness, as in mechanically removing one's foot from a flame that one is not looking at or in knee jerks, these did not happen without the reflection of the soul. Such acts were after all invariably wise.

Robert Whytt, a hundred years after Descartes, argued that some lower faculty of the soul might govern some acts. The case of anencephalic infants, who were nevertheless capable of movements, pointed to the possibility of an unconscious agency. This was a deeply troubling for those who believed that all human acts had to be governed by some wisdom of the soul²³. So also

²² Descartes R (1639/1989) 'The Passions of the Soul: Article 16 (17)

²³ French RK (1969). Robert Whytt, the Soul and Medicine. Wellcome Institute for the History of Medicine, London.

were experiments on removing the brains of animals, which did not necessarily lead to complete passivity of the animal. These findings troubled many scientists and philosophers, for whom the nervous system was still primarily seen as a whole piece – without subdivisions.

In 1810, the Austrian physician Franz Gall postulated a nervous system organized in layers as part of his new science of phrenology²⁴. The potential autonomy of the different layers toward in this system pointed to the possibility that things could happen outside the control of the soul. The disturbing implications of this view forced Gall to move from Vienna to Paris.

The unified nervous system was fractured by the work of François Magendie and Charles Bell, who separately in 1823 provided the physiological basis for Marshall Hall's demonstration in 1832 that the spinal column was not just a system for carrying messages from the brain but one that contained reflex systems that could operate independently of the brain²⁵. This made it possible to conceive of actions being automatic and unconscious. But in introducing the term "reflex" for such automatic and unconscious acts, Hall stood the original notion of a reflex on its head.

Hall envisaged reflexes as playing a part in the functioning of the spinal cord. He did not envisage their extension to the central nervous system. But progressively over the following 30 years, the German alienists Wilhelm Griesenger and Carl Wernicke (chapter 5), the British neurologists Thomas Laycock and Hughlings Jackson, and others postulated higher and higher reflexes to account for increasingly more complex behaviors.

The view of man that was taking shape was radically different to anything conceived by previous generations. Clearly some idea of an unconscious had been around since the Greeks but essentially earlier ideas of unconsciousness took the form that the soul had depths, some of which might be effectively impenetrable. The reflex laid the basis for mechanical operations that could function without either a soul or consciousness. As Laycock put it "many will consider it dangerous to concede that apparently pure mental acts are only the results of vital machinery excited into action by physical agencies²⁶". "Researches of this kind", he argued, "whether instituted on the insane, the somnambulist, the dreamer, or the delirious must be considered like researches in analytical chemistry. The reagent is the impression made on the brain; the molecular changes following the application of the reagent are made known to us as ideas"²⁷.

²⁴ Clark E, Jacyna LS (1987). *Nineteenth Century Origins of Neuroscientific Concepts*. University of California Press, Berkeley.

²⁵ Clark E, Jacyna LS (1987). *Nineteenth Century Origins of Neuroscientific Concepts*. University of California Press, Berkeley. Hall TS (1969). *History of General Physiology*, Volume 2, University of Chicago Press, Chicago.

²⁶ Cited in Clark E, Jacyna LS (1987). *Nineteenth Century Origins of Neuroscientific Concepts*. University of California Press, Berkeley, pp 143.

²⁷ Laycock T (1844). *On the Reflex Functions of the Brain*. Cited in Dewhurst K (1982). *Hughlings Jackson on Psychiatry*. Sandford Publications, Oxford.

The notion of a reflex gave substance to an idea postulated by Willis that the nervous system might become disturbed in sympathy with disturbances in other organs such as the kidneys, teeth or uterus by a reflex mechanism operating outside consciousness. For example inflamed kidneys might lead to spinal irritation and thereby to a disturbance of other organs or a generalized nervous irritability. This was not just an armchair theory of the neuroses. It led to the removal of kidneys and teeth in patients, who far from having renal or dental problems, had presented with complaints of being generally unwell. Where hysteria was concerned, the notion of a reflex overcame the difficulties that resulted from an exclusive reliance on a uterine pathology. Rather than have the uterus migrate, it was now possible to have nervous impulses from the uterus diffuse upwards bringing abnormal sensations to other areas of the body. One obvious treatment for such a condition was hysterectomy. These ideas still had a potent appeal in America in the 1920s where they laid the basis for the extraordinary program of organ extraction from psychiatric patients overseen by Henry Cotton in New Jersey²⁸.

The political and social implications of the new science were profound. Much of the speculation about cerebral reflexes was made possible by demonstrations of hypnotic “reflexes”. And the earliest form of hypnosis, mesmerism, was closely linked to the revolutionary foment that overthrew the French monarchy in the 1790s. Mesmerism had been banned as a consequence by the medical establishment for almost a century and by the Catholic Church for almost two centuries²⁹.

Later in the 19th century, the new neurophysiology was allied with evolutionary theory, which was widely regarded as another push toward atheism and materialism. The automatic and unconscious nature of reflexes raised the possibility that consciousness might be an unimportant spectator of human activity rather than its guiding focus. Thomas Huxley dramatically put forward this point of view in defense of Darwin, suggesting that consciousness was no more important to human functioning than the whistle of a locomotive was to the running of a train or that conscious awareness was akin to the mist or steam that hovers over machines while they work.

Not everyone saw the new biology as giving rise to a reductionist materialism. For Charles Sherrington the new brain was an enchanted loom. Another successor of Willis, another neurologist, was Sigmund Freud. Ever one to incorporate the latest biology into his theories, in 1895, just when his studies of hysteria were leading to the birth of the modern psyche, and Kraepelin was outlining manic-depressive insanity, Freud wrote the Project for a Scientific Psychology³⁰. This unpublished text postulated that individual memories might reside in the then just discovered nerve cells, and a reflex linking of memories might be responsible for complexes and for repression and might in addition provide a scientific basis for therapy.

²⁸ Scull A (2005). Dr Cotton

²⁹ Healy D (1993). Images of Trauma. From Hysteria to Post-traumatic Stress Disorder. Faber & Faber, London, chapters 9.

³⁰ Freud S (1895). In Standard Edition of the Complete Psychological Works of Sigmund Freud, ed Strachey J, Hogarth Press, London, volume 1, pp 295-391,

Freud abandoned this idea, deciding that this was not the way that minds fit into brains. Instead in turning to the idea that character formation hinged on how we handle our biology, our instincts and impulses, he created psychoanalysis, a mode of viewing man that with its emphasis on handling our passions has clear continuities with earlier humoral views.

While Freud was deeply suspect in many quarters, given his framing of religious belief as neurotic, the layered vision of the brain that he opened up was one that seemed much more compatible to many with notions of meaning in human life than the apparently even more materialistic behaviorism with its conditioned reflexes that appeared soon after. In many Catholic countries, for example, the depth psychologies were acceptable where behaviorism wasn't³¹.

The Brain in the Asylum

There have been great disputes about the impetus to the creation of the asylums that go to the heart of what psychiatry is. Did it originate as an agent of social control³², or was it as much a branch of medicine as any other³³. I take the expressed humanitarian wishes of the early advocates of asylums at face value (see chapter 3). The dictates of humoral medicine mandated an orderly environment with good food, regular exercise and appropriate discipline as a means to restore wits to the witless. However there are issues of social cohesion and control involved in managing maniacs and this issue will return with all its bloody wounds still gaping at the end of the chapter.

Whatever the impetus to their creation, with the opening of the asylums in the early 19th century an emerging group of physicians, the alienists, were faced with the first collections of mentally disordered patients in the one place at the same time. Before the asylums it was simply not possible for physicians or others who might comment on the human condition to have seen sufficient numbers of and a full range of types of insanity to be able to offer views of insanity that were likely to endure. Perceptive observations of idiosyncratic features or occasional syndromes were all that could be expected. But when larger numbers of the insane were collected in the same place for the first time, it became inescapably clear that not all raving madmen had the same condition. This recognition kick-started the first specifically psychiatric attempts to classify the various manias.

The name firmly linked to the first widely influential classification in psychiatry was Jean-Étienne Dominique Esquirol. Born in Toulouse in 1772, Esquirol went to Paris and took up medicine relatively late. He joined the most famous

³¹ Healy D (1996). Irish Psychiatry in the Twentieth Century: Notes Towards a History. in 150 Years of British Psychiatry, Vol 2 ed Freeman H & Berrios GE, Athlone Press, London, 268-291.

³² Foucault M (1972). Histoire de la Folie a l'age classique. Gallimard, Paris; Scull A (1979). Museums of Madness. Allen Lane, London; Scull A (1994). Somatic treatments and the historiography of psychiatry. History of Psychiatry 5, 1-12.

³³ Shorter E (1996). A History of Psychiatry. From the Era of the Asylum to the Age of Prozac, J Wiley & Sons.

of the early French alienists, Philippe Pinel, and after working with Pinel at the Salpêtrière for almost 20 years he took charge of Charenton hospital on the outskirts of Paris. Pinel's public profile in liberating the insane from their chains has in the public mind eclipsed the reputations of subsequent 19th century alienists, including that of Esquirol, but in terms of enduring contributions to psychiatry, Esquirol's achievement was the greater.

Faced with hundreds of patients in the Salpêtrière and later at Charenton, institutions that he was responsible for redesignating as asylums rather than hospitals, Esquirol distinguished monomanias from mania proper. Others grappling with these issues in Germany and England came up with the term partial insanity. This was a notion that had been up to that point literally inconceivable. But it was a concept that seemed all but demanded by many of the new inmates of the asylum who could appear almost normal in every respect until one touched upon the point at which their belief systems became fixed. Esquirol argued that rather than being entirely manic or insane, these patients had a disturbance of one of their faculties only and this disturbance led to their particular monomania or partial insanity.³⁴

The great idea standing in the way of views such as these up to this point was one of the dominating notions of Western civilization – the soul. Traditional definitions of the soul concurred that it was indivisible. Everyone agreed that the soul was the rational center of a human being. If a person's behavior became irrational, mad or deranged, it followed that a bit of the soul could not be mad or deranged but that the entire person had to be deranged. This led observers to expect to see mad men as wholly deranged or raving. And as the majority of madmen were probably delirious or frenzied, the appearances of madness supported rather than refuted this.

This backdrop meant that clinicians or anyone else interested in the issue of madness would have great difficulty with the notion of a periodic or recurrent disorder. It was difficult if not impossible to conceive of a soul being somewhat restored to sanity only to relapse again. It was easier to maintain the belief that once insane always insane. Apparent well being in between episodes was more likely to be interpreted as a lucid interval rather than a restoration of sanity.

Toward the end of the 18th century, the emergence of Faculty Psychology in Edinburgh with Thomas Reid, and the philosophers of the Scottish enlightenment, in conjunction with the neurophysiology of Whytt and Cullen helped provide a model that overcame some of the difficulties. While not denying the unity of the soul these authors introduced the operational notion of faculties, arguing for faculties of cognition, emotion and volition. The introduction of faculties took place in just the same way that models of neurotransmitter receptors were adopted in the 1960s. In both cases there was a backdrop of orthodox hostility, and the proponents of the new thinking did not argue for the reality of either faculties in the 1780s or receptors in the

³⁴ Esquirol JED (1838). *Des maladies mentales considerees sous les rapports medical hygienique et medico-legal*. Paris, Bailliere, transl by EK Hunt (1845) as *Mental Maladies: A Treatise on Insanity*, New York: Haffner Publishing Company, 1965.

1960s but rather for the utility of a convenient fiction. This new model of the soul made it possible to think that one or other of the faculties of the soul might be disordered without the rest of the brain or mind being disturbed. This conceptual breakthrough married to a growing awareness that not all mad patients appeared the same underpinned Esquirol's proposal that there might be monomanias distinct from full-blown mania.

"Writers, since the time of Hippocrates have denominated that form of delirium which is characterized by moroseness, fear, and prolonged sadness, Melancholy... Some moderns have given a more extended signification to the word melancholy, and have called melancholic, every form of partial delirium, when chronic, and unattended by fever. It is certain that the word melancholy ... often presents to the mind a false idea. This... has caused me to propose the word monomania, a term that expresses the essential character of that form of insanity in which the delirium is partial. ... Monomania expresses an abnormal condition of the physical or mental sensibility with a circumscribed and fixed delirium"³⁵.

It became possible for example to think that there might be disorders of an emotional or mood faculty, which did not involve an intellectual disorder. Esquirol proposed intellectual, affective and instinctive monomanias. One of these monomanias was Lypemania. Derived from the Greek λυπηνης, which means sad and was used to describe the woman of Thasos, lypemania was painted as a state in which individuals were excessively sad and miserable, but typically without other features of traditional insanity: "a cerebral malady characterized by partial, chronic delirium, without fever and sustained by a passion of a sad, debilitating or oppressive character"³⁶. Benjamin Rush a few years before had described much the same condition and given it the name tristimania. In mid-20th century this state would have been called endogenous depression. This new disorder, depression, as it was later called, was seen as a different disorder to melancholia, which involved delusional beliefs. Lypemania didn't. Melancholia was a subdivision of mania, lypemania wasn't.

In addition to lypemania, Esquirol described volitional monomanias, such as obsessive-compulsive disorder (OCD), graphomania, nymphomania, kleptomania, dipsomania, homicidal monomania and other syndromes, some of which are still recognized. Esquirol's resulting classification system had similarities to DSM IV, which has a tendency to regard almost every prominent symptom as a new illness in its own right. There are distinct echoes of kleptomania or graphomania in modern disorders like compulsive shopping disorder.

This explosion of different syndromes paralleled developments in Faculty Psychology where the three primary faculties multiplied up to 40 different faculties. These putative faculties underpinned Franz Gall's development of phrenology, according to which different parts of the brain were the presumed seat of different faculties and the relative developments of these faculties led

³⁵ Esquirol Ibid., p 199-200.

³⁶ lypemania

to different bumps and protuberances on the skull, which “scientists/skilled practitioners” could use to measure the abilities or character of the person.

The idea of monomania or partial insanity took root across France, England, Germany and Italy. Esquirol’s role was more one of offering a formula that captured these changes rather than as the sole instigator of such changes. James Prichard and Forbes Winslow in England for instance described conditions that equally appeared to involve behavioral disturbances without intellectual disturbances. In 1833, Prichard outlined the notion of moral insanity³⁷. “This form of mental derangement has been described as consisting in a morbid perversion of the feelings, affections, and active powers, without any illusion or erroneous conviction impressed upon the understanding”³⁸.

Prichard’s moral insanity has typically been taken for the past 50 years or more to be a forerunner of the modern concept of psychopathy but it could not have indicated any such thing. Patients with what would now be termed personality disorders simply did not get into the asylums. Asylum physicians were quick to distinguish between fools and the occasional knave that came their way and they discharged the knaves. The knaves had little to gain from asylum admission.

Prichard’s morally insane like Esquirol’s lypemantics had a disorder of their behavior in the absence of any defect of intellectual functioning, in contrast to the vast majority of patients entering the asylum who were frankly deluded. Having a derangement of intelligence had been the essence of madness. It took time to realize that there were other patients confined to the asylum because of grossly impaired functioning who were simply not deluded. And this realization depended on and in turn supported notions that there might be emotional and volitional faculties that were distinct from an intellectual faculty.

Despite these changes in the perceptions of brain function and madness, there was little change when it came to making links between mania and melancholia. English, Dutch and German physicians continued to see mania and melancholia as stages on the path to insanity³⁹.

Thus John Haslam, the superintendent of the Bethlem Hospital in 1798, points to the common ground between mania and melancholia: “I would strongly oppose to them being considered opposite diseases. In both, the association of ideas is equally incorrect, and they appear to differ only, from the different passions, which accompany them. On dissection, the state of the brain does not show any appearances peculiar to melancholy, nor is the treatment which

³⁷ Prichard JC (1835). *Treatise on Insanity and Other Disorders Affecting the Mind*. London, Sherwood, Gilbert & Piper. See Berrios GE (1999). J.C.Prichard and the concept of ‘moral insanity’. *History of Psychiatry* 10, 111-116.; Prichard JC (1835/1999). *Moral Insanity*. *History of Psychiatry* 10, 117-126.

³⁸ Cited in Shorter ES (2005). *A Historical Dictionary of Psychiatry*. Oxford University Press, Oxford, pp 228.

³⁹ Cited in Jackson SW (1986). *Melancholia and Depression*. Yale University Press, New Haven. Ct. pp 257

I have observed more successful, different from that which employed in mania". “.. we see everyday the most furious maniacs suddenly sink into a profound melancholy; and the most depressed and miserable objects become violent and raving”⁴⁰.

And Alexander Crichton in Edinburgh noted cases of melancholia “terminating, or at least alternating, with the state of furious delirium, having all the true character of mania⁴¹.” These ideas if anything may have become even stronger under the influence of Esquirol’s notions of partial insanity. It was even easier to see mania as the progression from partial to complete insanity rather than a swing from one pole to another.

On this issue, Esquirol himself in 1835 wrote that “I have already mentioned that all the species of insanity may be variously combined, and frequently interchange one with another. It may be proper further to note that the same patients sometimes go through several kinds of insanity – which may be reckoned in such places as so many degrees of stages – during the course of the same illness. Of these combinations, and changes, there is an almost endless variety. One remarkable, and not uncommon transition of insanity, is from great dejection, and distress, to ease and cheerfulness and sometimes to an uncommon flow of spirits⁴²”.

Two developments were to change this. One was an astonishing scientific breakthrough, the like of which would transform any future DSM as completely as it challenged Esquirol’s new edifice. Using post mortem samples, Auguste Bayle demonstrated that one of the disorders that appeared in the asylum, general paralysis of the insane, was a distinct illness, showing distinctive post mortem brain changes not found in other manias⁴³. The significance of this was that it became clear that general paralysis of the insane or tertiary syphilis, involved a multipolar clinical picture in which patients might at one point be elated and grandiose, at others depressed and paranoid and towards the end might have dementia. Bayle’s discoveries put a premium on following the clinical development of a disorder and argued against viewing symptoms or even dramatic syndromes as discrete illnesses in their own right.

Bayle created a new anatomo-clinical method that called for a greater appreciation of disease entities than Esquirol had taken into account. Jean-Pierre Falret, one of Esquirol’s pupils, brought out the multiple problems

⁴⁰ From Haslam J (1798). *Observations on Insanity*. London, Rivington, cited in Jackson SW (1986). *Melancholia and Depression*. Yale University Press, New Haven. Ct. pp 260.

⁴¹ Crichton A (1798). *An Inquiry into the Nature and Origin of Mental Derangement*, Cadell and Davies, London, cited in Jackson SW (1986). *Melancholia and Depression*. Yale University Press, New Haven. Ct. pp 260

⁴² Esquirol JED (1838). *Des maladies mentales considerees sous les rapports medical hygienique et medico-legal*. Paris, Bailliere, transl by EK Hunt (1845) as *Mental Maladies: A Treatise on Insanity*, New York: Haffner Publishing Company, 1965

⁴³ Bayle A (1826). *Traité des maladies du cerveau et de ses membranes*. Paris, Gabon. See also Bayle A (1822). *Researches on Chronic Arachnitis*, published in *Anthology of French Language Psychiatric Texts*, ed Cousin F-R, Garrabé J, Morozov D, *Les Empêcheurs de Penser en Rond*, Paris, pp 148-158.

inherent in the monomania concept⁴⁴. First the idea of monomania made it difficult to distinguish between normality and insanity. If an intensely passionate fixation on an unattainable individual was to be regarded as a monomania, how could this be reliably distinguished from a normal love that was also intensely passionate? Second could we ever be sure that a single prominent symptom such as a delusion was in fact the only delusion present? And third what were the implications of a particular delusion about the secret service for instance turning up in quite different mental states and with varying levels of intensity?

And yet the concept of monomania facilitated the description of new disorders like obsessive-compulsive disorder that survive to this day. It was a necessary transitional concept. In its place, Falret suggested that clinicians needed to reach to the disease ground in which a variety of monomanias might take root and flourish. This disease ground might involve an expansion of behaviors as in classic mania or a contraction as in melancholia. This change in mood set the stage for the separate description by Falret and Jules Baillarger in the 1850s of a new disease - *folie circulaire* or *folie a double forme* - the first descriptions of bipolar disorder or manic-depressive illness.

A second part of Falret's critique spoke to the growing interface between psychiatry and the law. Esquirol's volitional monomanias, and in particular his concept of homicidal monomania, posed huge legal difficulties. If we diagnose an insanity just because someone has done something "mad", we set up a medico-legal crisis. If patients were raving mad, the legal system knew what to do, but if they were only partially mad, should they be executed or pardoned? Falret argued that the grounds for finding a patient not-guilty or less responsible must lie in the clear demonstration that the patient had a disease rather than just an irresistible impulse.

Insanity and the Law

It is beyond the scope of this book to chart the evolution of medical jurisprudence as it relates to insanity⁴⁵. But a set of watershed developments took place in the 19th century, during the same years in which the concept of manic-depressive illness took shape, and it is on these that we will focus.

On a simple population basis, unless human nature has changed, murders must have been less frequent through to the 19th century than they had been before, and insanity was less frequent, and murders by madmen less frequent again. If only for this reason there was less pressure on any society from the Romans through the developing democracies of the 19th century to work out a set of rules to manage the trial and disposition of such cases. There was also

⁴⁴ Falret J-P (1854). Of the non-existence of monomania. In *Leçons clinique de médecine mentale faites a l'hospice de la Salpêtrière*, Paris, Baillière, also in *Anthology of French Language Psychiatric Texts*, ed Cousin F-R, Garrabé J, Morozov D, *Les Empêcheurs de Penser en Rond*, Paris, pp 108-126.

⁴⁵ Walker N (1968). *Crime and Insanity in England*. Edinburgh University Press, Edinburgh. Rosenberg C (1968). *The Trial of the Assassin Guiteau*. *Psychiatry and the Law in the Gilded Age*. University of Chicago Press, Chicago.

no body of specialists to offer views on how individual cases and on how medico-legal issues in general should be viewed.

The prototypical case involved a senseless murder by someone in a frenzied or delirious state, or by someone who was an idiot from an early age. Many delirious states led on to death, and so that the risk of further offending was not a salient issue. Where death appeared less likely, committal to prison would follow, often without a trial. These offenders were quite alienated from their wits and would have been unable to defend themselves in Court. The judgment of many societies was that they were sufficiently punished by their insanity or their idiocy to make further punishment unnecessary. In all other cases, no matter how eccentric the defendant, if not grossly alienated from his wits, murder was likely to lead to execution.

Courts at the time had to deal with a series of offences not typically found today. In the 16th and 17th centuries, issues in which the question of sanity came to the fore included witchcraft, blasphemy, and heresy. These were intensely political in the sense that blasphemers or heretics threatened the social order. Were these returning Messiahs deluded or political? In England, a Puritan revolution, based on what for Church of England believers was heresy, had brought down Charles I.

In attempting to deal with the problems facing them, judges formulated the issues in a manner that suggests there were considerable developments in thinking about insanity taking place outside of the asylums. For example in the quote below, Matthew Hale, England's Lord Chief Justice, in 1676, anticipates many of the difficulties Esquirol and Falret struggled with and seems to be speaking a much more modern language than most alienists of his day.

“There is a partial insanity of mind...; some persons that have a confident use of reason in respect of some subjects, are yet under a particular dementia in respect of some particular discourses, subjects or applications; or else it is partial in respect of degrees; and this is the condition of very many, especially melancholy persons, who for the most part discover their defect in excessive fears or grief, and yet are not wholly destitute of the use of reason; and this partial insanity seems not to excuse them in the committing of any [capital] offence; for doubtless most persons, that are [suicides], and others are under a degree of partial insanity when they commit these offences... It is very difficult to define the indivisible line that divides perfect and partial insanity... the best measure that I can think of is this; such a person as laboring under melancholy tempers hath yet ordinarily as great an understanding, as ordinarily a child of fourteen hath, is such a person as may be guilty of treason or felony”⁴⁶.

Hale distinguished mental illness from witlessness that existed from birth, and noted that mental illness could be caused by “distemper of the humors of the

⁴⁶ Hale M (1736/2003) *Historia Placitorum Coronae*. Vol 1 Lawbook Exchange. Clark New Jersey, Chapter 4, Concerning the Defect of idiocy, madness and lunacy, in reference to criminal offences and punishments. page 30

body, as deep melancholy or adust choler; sometimes from the violence of a disease, as a fever or palsy; sometimes from concussion or hurt of the brain, or its membranes or organs⁴⁷". He also noted the possibility of witlessness induced by drink or drugs and distinguished levels of responsibility depending on whether the person themselves or the doctor had administered the drug.

In Hale's time the standard maxim was that the mad could have no guilty intention. Clearly this applies to the delirious, but as Hale's observations hint the issue of homicides in which the apparently mad had an intention to kill were becoming an issue. As a result the test applied was whether the mad man had the capacity to know right from wrong to any greater extent than for example a child of fourteen might have. Based on an inability to tell right from wrong it might be legally justifiable to excuse a mad man who appeared to have intended his act.

The key drivers of change were a series of prominent homicidal acts in the 18th century in which the defendant did not seem furiously mad. In 1723, Ned Arnold attempted to murder Lord Onslow. Arnold had been eccentric from a young age, was a vagrant and was widely noted by local villagers to have believed for some years that Onslow was a source of all his troubles. He was reported as having attempted at times to tear out his breast in order to release Onslow from inside of him where he was wreaking mischief. However on the day of the crime he had prepared for the offence. He had established Onslow's likely route. He had bought shot and made sure he was lying in wait.

In summing up Mr Justice Tracy stated: "A man that is an idiot, that is born so, never recovers, but a lunatic may, and hath his intervals; and they admit he was a lunatic. You are to consider what he was at this day, when he committed this fact. Then you have a great many circumstances about the buying of the powder and the shot; his going backward and forward; and if you believe he was sensible, and had the use of his reason, and understood what he did, then he is not within the exemptions of the law, but he is as subject to punishment as any other person."⁴⁸ The jury found Arnold guilty and he was sentenced to death. Onslow intervened and he was imprisoned for life.

The key trial was that of Mathew Hadfield who shot at George III as he entered the royal box at Drury Lane Theatre on May 15th 1800. Hadfield was apprehended and questioned by the King's brother, the Duke of York, who later stated in Court that: "he said he was tired of life, that he thought he should certainly be killed if he were to make an attempt upon his Majesty's life". Hadfield had been injured in action against the French. A wound to his head had penetrated his skull so that the jury was able to inspect the membrane of the brain itself. Officers from his regiment testified that before he had been wounded he had been an excellent soldier but that afterwards he

⁴⁷ Hale M (1736/2003) *Historia Placitorum Coronae*. Vol 1 Lawbook Exchange. Clark New Jersey Chap 4. pp 29-37.

⁴⁸ Cited in Walker N (1968). *Crime and Insanity in England*. Edinburgh University Press, Edinburgh, pp 56.

had been incoherent and had clear symptoms of derangement. Alexander Crichton, called for the defense said: “when any question concerning a common matter is made to him, he answers very correctly; but when any question is put to him which relates to the subject of his lunacy, he answers irrationally... It requires that the thoughts which have relation to his madness should be awakened in his mind, in order to make him act unreasonably”.

The case posed problems for Hadfield’s attorney, Erskine, in that his client clearly knew right from wrong, and this act should lead to his execution. Erskine argued that in the cases which gave rise to real difficulty “reason is not driven from her seat, but distraction sits down upon it along with her, holds her, trembling upon it, and frightens her from her propriety”. The madman reasoned from premises which were false: “not false from any defect of knowledge or judgment, but because a delusive image, the inseparable companion of real insanity, is thrust upon the subjugated understanding, incapable of resistance because unconscious of attack”⁴⁹. Hadfield, Erskine argued, had a delusion “that he must be destroyed, but must not destroy himself”.

He went on to state: “The prisoner, for his own sake, and for the sake of society at large, must not be discharged; for this is a case which concerns every man of every station, from the King upon the throne to the beggar at the gates; people of both sexes and of all ages may, in an unfortunate frantic hour, fall a sacrifice to this man, who is not under the guidance of sound reason; and therefore it is absolutely necessary for the safety of society that he should be properly disposed of, all mercy and humanity being shown to this most unfortunate creature”.

While Hadfield was committed to an asylum, the defense of insanity had been accepted in someone who was not delirious and once accepted it carried the implication that an accused might walk free if he had a remitting disorder that mitigated the guilt at the time of the offence.

The dominating case of the 19th century involved Daniel McNaughton, the illegitimate son of a Glasgow wood turner⁵⁰. McNaughton had expectations of becoming his father’s partner but the two fell out and he set up on his own. He became increasingly eccentric and believed he was being persecuted by the police - a newly established institution set up by the Prime Minister, Robert Peel. In an effort to escape persecution he went to France but found he was still persecuted there. His delusion became focused on Peel. Moving back to London, he bought a pair of pistols. Hanging around Whitehall near Peel’s office, he appears to have mistaken William Drummond, Peel’s private secretary, for Peel himself and on January 20th 1843 he followed Drummond and shot him in the back. Drummond died five days later.

⁴⁹ Cited in Walker N (1968). *Crime and Insanity in England*. Edinburgh University Press, Edinburgh, pp 77 et seq.

⁵⁰ West DJ, Walk A (1977). *Daniel McNaughton. His Trial and the Aftermath*. Headley Bros, Ashford Kent.

The trial and not-guilty verdict were controversial, and led to a formulation of a set of rules, since called the M'Naughton rules. These permit a not guilty verdict in the case of partial insanity but do so on very strict provisions. An individual who hears the voice of God telling them to kill someone is clearly insane but under the rules hearing the voice of God telling you to kill someone when killing is against the law of the land does not excuse a crime. Hearing the voice of God say that an individual was just about to try to kill you would provide a defense on the basis that, whether insane or not, self-defense is a legitimate defense to a charge of murder.

This skirted a key question, which is how many of us would be able to gainsay the voice of God if we heard it. Five years before the M'Naughton trial, the American alienist, Isaac Ray, argued that insanity has generally such a destabilizing effect on the mind that it is simply not possible to say that the insane individual formed the intent to commit a crime in the usual way. Ray argued against the notion that patients should only be acquitted if there was a very clear link between their delusions and the event for which they were charged⁵¹.

As he put it in his treatise in 1838: "insanity was a much less frequent disease than it is now and the popular notions concerning it were derived from the observation of those wretched inmates of the madhouses whom chains and stripes, cold and filth, had reduced to the stupidity of the idiot, or exasperated to the fury of a demon. Those nice shades of the disease in which the mind, without being wholly driven from its propriety, virtuously clings to some absurd delusion, were either regarded as something very different from real madness, or were too far removed from the common gaze, and too soon converted by bad management into the more active forms of the disease, to enter much into the general idea entertained of madness. Could Lord Hale have contemplated the scenes presented by the Lunatic Asylum of our own times, we should undoubtedly have received from him a very different doctrine for the regulation of the decisions of after generations"⁵².

The severity of the rules appear to have been a means of assuaging public anger at the apparent shift towards diminished criminal responsibility in the cases of Hadfield and M'Naughton. The public disquiet at the trial and the growing difficulties in the domain of deciding criminal responsibility in the case of the mad was fueled by an increasing series of books dealing with just these issues. All of the major alienists from John Haslam at the start of the century through Isaac Ray to Emil Kraepelin at the end of it gave lectures on and wrote on forensic issues⁵³.

⁵¹ Quen JM (1983). Isaac Ray and the development of psychiatry and the law. *Psychiatric Clinics of North America* 6, 527-538. Zilboorg G (1944). *Legal Aspects of Psychiatry*. In *One Hundred Years of American Psychiatry*. American Psychiatric Association, Columbia University Press, New York, pp 507-588.

⁵² Ray I (1838). *A Treatise on the Medical Jurisprudence of Insanity*.

⁵³ Haslam J (1817). *Medical jurisprudence as it relates to insanity according to the law of England*.

For all of these alienists and for society, the new brain and its nerves raised specters. The discussion was moving beyond irresistible impulses and command hallucinations to a faulty or degenerate neurobiology. The term degeneration had been introduced in 1857 by one of Falret's students Bénédict Morel. It referred to the passing on of a biological taint from parents to children that would lead to alcoholism, criminality and insanity. This notion became one of the dominant themes of the new social sciences and of psychiatry⁵⁴. Degeneracy underpinned the mental illnesses that were taking shape in mid-century but it was also a first attempt to account for social problems in terms of biology.

It was also the key theme in the definitive book of the period, published in 1876, Cesare Lombroso's deeply shocking *l'Uomo Delinquente* (Criminal Man)⁵⁵. This rather than Prichard's moral insanity presented the first picture of the psychopath, the unfeeling and remorseless criminal, the Hannibal Lecter figure that continues to stalk our imaginations and policies. The shock came in Lombroso's bald statement that there was no hope of reform for these individuals. This claim at once undercut religious notions of redemption, which hold that all sinners can be saved, as well as secular hopes of salvation through educability, and then medical hopes of a cure.

Shortly after the publication of the first edition of *Criminal Man*, in 1881, Charles Julius Guiteau assassinated President James Garfield. Guiteau was undoubtedly insane but how much did his insanity contribute to the crime? The Court heard about the work of Lombroso and the latest links between criminality and heredity on the one hand along with indicators that Guiteau could not be regarded as responsible for his actions. But the issue of responsibility lies at a profound intersection between biology and social order. To accept Guiteau was incapable of doing otherwise suggested to the Court a materialism that was not acceptable. Despite a distinguished slate of experts for the defense, and an American tradition as exemplified by Isaac Ray of regarding insanity as exculpatory, Guiteau was convicted and executed⁵⁶.

In an effort to diagnose the psychopath, in keeping with the science of his day, Lombroso assembled a visible set of physiognomic and behavioral signs that made the diagnosis more probable. Such soft signs are widely used in psychiatry today but his efforts to quantify the Mark of Cain were disparaged as no more robust than Gall's phrenology had been, by a later generation trained by Freud to interrogate the subject in new ways rather than look at him, and subsequently by a generation of psychopharmacologists. Although the dominant figure at the end of the 19th century, to whom alienists like Kraepelin looked, Lombroso had vanished from the stage in mid-20th century.

⁵⁴ Pick D (1989). *Faces of Degeneration. A European Disorder c1848 – c1918*. Cambridge University Press, Cambridge,

⁵⁵ Lombroso C (1876). *L'uomo delinquente studiato in rapporto alla antropologia, alla medicina legale ed alla discipline carcerarie*. Milan. Lombroso C (2006). *Criminal Man*. Editions 1, 2 (1878), 3 (1884), 4 (1889), 5 (1896). Translated by M Gibson, N H Rafter. Duke U Press, Durham.

⁵⁶ Rosenberg CE (1968). *The Trial of the Assassin Guiteau. Psychiatry and the Law in the Gilded Age*. University of Chicago Press, Chicago.

But if human beings are ever going to fit fully into their bodies, the question of the causality of evil is clearly a key matter. Can cohesive societies emerge from biology? The psychopath is a figure that stalks the secularism that the new biology brought in its train, a symbol for fundamentalists that secularism breeds amorality. These issues are not yet resolved. Pleas today that some murderers are genetically loaded are likely now to lead to guilty verdicts – and execution on the basis that the propensity cannot be changed⁵⁷.

The profound dilemmas facing jurists, medical experts, and the public when Guiteau was put on trial can be recaptured by considering the issue of treatment-induced homicide now. There is little question that many antidepressants can increase agitation in the period immediately after treatment has begun, and that this can lead on to violence. But it is also clear that jurisdictions faced with homicide cases involving possible treatment induced violence are completely at sea. The law has not evolved to handle such cases⁵⁸. If drugs can contribute to increase risk, do we know enough to distinguish the real situation in which they do contribute from inappropriate “treatment-induced” defenses? And how frequently would real treatment induced problems have to happen before the requirements of the social order would trump the rights of an individual to a fair defense? As Hale noted if a man’s toxic state is due to the unskillfulness of his physician, what then?

Whatever about the humane and medical impulses of the early asylum builders, there is no extricating psychiatry from the law. At some fundamental point psychiatry is involved in the government of the people by the people. The hope of 19th century alienists was that a new science of insanity would make the process of distinguishing guilt and innocence more rational. As Jean-Pierre Falret had suggested the hope lay in finding a set of diseases that might form a middle ground between biology and old style insanity.

This hope almost certainly played a great part in the willingness of the profession and later the public to embrace manic-depressive insanity and dementia praecox (schizophrenia) when these were proposed by the German alienist Emil Kraepelin in 1899. Clear mental diseases involving a potentially remediable disordering of biology offered a possible way to reconcile biology and society. If one of those diseases came linked to substance misuse, personality problems and irresponsible behavior and it could be treated the specters raised by Lombroso might be laid to rest.

⁵⁷ Mobley.

⁵⁸ Healy D, Herxheimer A, Menkes D Antidepressants and Violence. Problems at the Interface of Law and Medicine. PLoS Medicine 3, Sept, DOI: 10.1371/journal.pmed.0030372