Cerebral degeneration and Spanish alienists in the 19th century: cranial and facial features as explained by expert witnesses

S. Giménez-Roldán
Former head of the Department of Neurology. Hospital General Universitario Gregorio Marañón, Madrid, Spain.

ABSTRACT

Degeneration was a 19th century theory that arose to explain certain mental disorders. It was attributed to deterioration of an individual resulting from negative inherited traits. Skull shape and facial features were regarded as the keys to diagnosis. Some among Spain's first alienists, including Giné y Partagás, Esquerdo, Simarro, Vera, and Escuder, were called to testify as expert witnesses in famous criminal trials, most of which involved murders. In the five trials listed here, doctors used *de visu* descriptions of cranial anomalies and facial expressions, plus rather lax analyses of 'neuropathic histories' in order to declare the defendants insane, and thus exempt from criminal responsibility. These doctors' reports, while inaccurate, provide a valuable source of information about the somatic signs and hereditary background that were used by the first alienists in Spain to diagnose cerebral degeneration.

KEYWORDS

Degeneration, alienists, skull, physiognomy, inheritance, nineteenth century trials, forensic medicine

A terrible malady! What is it? Madness — or rather mania.
Not a single member of my family has been free from it.
I alone have escaped it.
(B. Pérez Galdós, *Doña Perfecta*)

Introduction

Degeneration theory was put forth by French alienists in the second half of the 19th century. According to this theory, certain mental disorders were the result of progressive degradation of the brain due to defective biological inheritance. This inheritance would constitute a deterministic force which the subject in question would be unable to escape; his days would be marked by social exclusion, poverty, and even crime.[1-4]

'Demented madmen', the usual term, were free from penal responsibility since they were thought to lack free will.[5] From this point of view, an individual might commit a crime in response to impulses from a brain undergoing degeneration, a process thought to be organic and incurable. However, only doctors exercising the new speciality of alienism could determine whether the accused suffered from this type of madness. To this end, they had to complete the appropriate report based on supposedly objective evidence.

Certain physical traits, including the shape of the head, facial expressions, and even body types were interpreted by 19th century alienists as 'stigmata', or evidence of cerebral degeneration. If the judges were convinced, these reports could be decisive in determining if the accused was insane or a true criminal.[6] Discovering a family history of 'neuropathic traits', usually referring to alcoholism, epilepsy, syphilis, or suicide, was a strong argument in favour of a diagnosis of insanity due to cerebral degeneration. The value assigned to these findings often gave rise to power struggles between alienists and jurists. Nevertheless, when alienists' reports were admitted by the judges, they often saved the defendant from the death penalty. On the other hand, this de facto demonstration

Corresponding author: Dr Santiago Giménez-Roldán
E-mail: sgimenezroldan@gmail.com

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of the danger the defendants posed to society meant that they would be sent to asylums, usually for life.[7]

To a greater or lesser extent, the earliest Spanish alienists subscribed to the French school of degeneration; Bénédict-Augustin Morel first framed the concept in 1857,[8] and in 1865, Jules Bernard Luys formulated a functional, localisationist hypothesis.[9] In 1895, Valentin Magnan and Paul Maurice published *Les Dégénérés* (*état mental et syndromes épisodiques*), an influential text that pushed aside Morel's mythical and religious concepts. They proposed that the struggle for survival, outlined in Darwinian terms, explained the societal pressure on certain families that would then transmit evident moral and physical flaws to their descendants. This effect was unavoidable, and would result in sterility and extinction of the family line.[10] In 1878, Italian author Cesare Lombroso's treatise on criminal anthropology would place an even greater emphasis, if possible, on physical stigmata as a means of identifying criminals.[11]

Meanwhile, Spanish society read up on every new twist of a series of trials that became enormously popular, and even inspired the events in novels by Pérez Galdós,[12,13] Baroja,[14] and Sender.[15] In any case, these trials lent prestige to the new science of alienism, as well as to its practitioners, some of whom owned lucrative private asylums.[16,17]

Figure 1. Alienists measuring Garayo's cranium in vivo. Despite his shackles, he appears to be quite satisfied by all the interest he has generated.

In this study, we analyse a selection of highly publicised trials that took place in Spain between 1881 and 1887. Each of them involved pioneering figures in Spanish neuropsychiatry, all of whom were staunch degenerationists. They included Juan Giné y Partagás (1836-1903) in Barcelona[17] and José María Esquerdo Zaragoza (1842-1912), who had studied forensic medicine under Pedro Mata in Madrid; and Jaime Vera (1858-1918) and José María Escuder, who had studied under Esquerdo[18]; and the exceptional Luis Simarro (1851-1921).[19] This study focuses on the expert testimonies provided by Spanish alienists based on their assessments of skull shape, facial expressions, and hereditary background.

Material and methods

We present a selection of newsworthy trials in which Spain's pioneers in psychiatry played significant roles. Using their findings, we analysed any descriptions of the cranial and facial features, and of any history of 'neuropathy' in the defendant's families. We reviewed the writings of the French degenerationists Bénédict-Augustin Morel,[8] Jules Bernard Luys,[9] and Valentin Magnan with Paul Maurice Legraine,[10] as well as Lombroso's pivotal text on criminal anthropology.[11] Other literature pertinent to this topic was also reviewed.

Results

Garayo, 'El Sacamantecas'

In 1870, Garayo strangled his first two victims, La Valdegoviesa and La Riojana, following arguments about the price of their sexual services. Three other young women who crossed his path were subsequently raped and murdered. He murdered his sixth victim, also a woman, during a robbery in 1879. There are several imaginative retellings of the life of Juan Díaz de Garayo Ruíz de Argandoña (1821-1881).[20] The sole first-hand account was provided by Ramón Apraiz; working with another eleven doctors from the province of Álava, he examined the prisoner in 1881 by judicial order[21] (Figure 1). Some described Garayo as "worthy and irreproachable labourer"; others, as a "brutal and monstrous male". In Spanish folklore, 'Sacamantecas' is a bogeyman who lives on human fat, and Garayo was given this nickname when

it became known that he had taken one of his victims' kidneys to eat. Juan Díaz de Garayo was born in Eguilaz, a village not far from Salvatierra in Álava province, on 17 October 1821.

José María Esquerdo (1842-1912) obtained permission from the provincial court in Burgos to serve as an expert witness, and travelled to Vitoria to examine the prisoner, then 37 years of age. In his efforts to prove that the murderer was also a madman, he inspected the shape of his head and described his appearance in the following terms:

> Under his sparse beard and dark, slightly jaundiced skin, his facial structure juts forward like a dogo's due to his prognathic lower jaw...his face takes on the short, wide, triangular appearance of a reptile's..., the tawny eyes of the Malay race, and a tiger's tense but certain tendency to spring. His physiognomy grants him a sinister appearance, with a fierce, intense gaze. All of these features are a reflection of his tormented soul. There can be no doubt that he was epileptic.
>
> Garayo, from a somatic point of view, presents an ill-made, deformed head —but such a deformity! Broad at the base, tapering at the crown, with a narrow forehead and ample occiput. The posterior curvature is so depressed that the apex of the head and the nape of the neck are on the same plane; the transversal diameter is greater than the antero-posterior diameter...and as for the two halves (of the skull), the right is much larger than the left.[22]

Esquerdo also found the subject's family history to be significant: the father's apoplexy was the result of derangement of his own parents, both of whom were alcoholics; and the subject's siblings, children, and nephews all suffered from insanity.

Based on this list of flaws, Esquerdo's conclusion was that the prisoner had 'congenital monomania' and could not, therefore, be held responsible for his crimes.

This finding was not supported by Ramón Apraiz, a steadfast follower of Pedro Mata's, and he gave his opinion in a series of lectures in the Vitoria Aethenium on behalf of the twelve local medical experts who examined Garayo at the court's behest. Their own conclusion was emphatic:

> On this basis, we deduce that Juan Díaz de Garayo is not an imbecile and does not display any type of monomania at this time, nor did he when he committed those crimes now familiar to you all...If it were in our power to decide, we would strongly recommend commuting the last sentence, but never permit him to enter an asylum.[21]

The court remained unswayed by Esquerdo's and Apraiz's arguments alike. The prisoner's death certificate (Ministry of Justice, section 3, volume 26, p. 214) provides his date of death (11 May 1881), although it omits the cause of death (execution by garotte at 8.30 in the morning). The day before, he received a visit by his sister Florentina, who was intoxicated. "Did you do it?" she spat, "Then pay the price."

The Father Galeote case

On 18 April 1886, Palm Sunday, the new bishop of the Madrid-Alcalá diocese fell dead upon the steps leading to the entrance of the Church of San Isidro (then the provisional cathedral) in Madrid's Calle de Toledo. The newspapers covered the incident the next day: Holy Week has begun with a chilling crime: the most august and solemn of our religious events has been sullied by a horrible act of sacrilege. At the very door of the Cathedral of Madrid, at ten in the morning, a priest murdered the bishop.

> The three revolver shots were fired by the priest, Cayetano Galeote y Cotillo, aged 47, of Vélez Málaga. He was known for his cordial manners and respectable way of life, and he was never seen without the robes of his office. "I am no murderer", he declared at the scene of the crime. "I have merely avenged my honour after my numerous pleas went unanswered". Only with difficulty was the Civil Guard able to prevent him from being lynched at the doors of the church; meanwhile, the bishop lay dying in the sacristy following the extraction of a 7 mm projectile that had caused profuse haematemesis and paralysis of his legs.[24] The crime was motivated by the bishop's plan to introduce reforms affecting the clergy in the capital, including modifications to the mass stipend received by some priests.[25]

Lawyer Villar Rivas requested expert reports from José María Escuder, Jaime Vera (another alienist and co-founder of the Socialist Party), and Luis Simarro, neuropsychiatrist and 'occasional histologist' as he called himself. In the session held on 4 October 1886, Simarro, who followed Valentin Magnan's teachings,[19] described the 'somatic disturbances' underlying the evidence of a 'degenerative mental illness':

> Compared to the subject's height, the skull is smaller overall than what would be normal, and the cranial volume is just larger than that of imbeciles and idiots; the subject is microcephalic. Galeote's skull displays a rare configuration; although its anterior half is less developed than the posterior half, this is not marked enough for compensatory development to have taken place. The base of the skull appears

> elevated; there are at least two factors suggesting this to be the case: the arrangement of the auditory conduits, which do not show normal characteristics, and the height of the palatal arch. Overall, the cranium is small and especially defective in the anterior region.[6]

Esquerdo defined Galeote's insanity as 'degenerative disability'. "His somatic stigmata are what rules out feigned insanity in this case", he told the defence lawyer.

> Galeote's looks were also against him: "We're facing a degenerate", Escuder declared. "Among the stigmata he has inherited, the vile aspect of his physiognomy lent by the prognathism of his lower jaw, and causing his resemblance to the lowest human races, is not the least among them. We also find a profoundly concave arched palate infringing on the base of the skull and reducing the volume of the brain". Esquerdo's visit to Vélez-Málaga showed him that not one of Galeote's 163 family members seemed to have escaped the inexorable laws of degeneration: "This neuropathic diathesis...with the mingling of blood...has transmitted the distinctive nervous inheritance to their descendants...no doubt because like attracts like."

The Supreme Court sought the death penalty, but a new committee consisting of six forensic specialists concluded that Galeote suffered from persecutory delusions that made him socially dangerous, but unfit for capital punishment. He was also supported by the testimony of his housekeeper, Tránsito Durdal, a 33-year-old woman rumoured to be his concubine. In any case, the doctors' diagnosis saved Galeote from execution, but not from being committed permanently to the insane asylum in Leganés, where he died in 1922 (Figure 2).[26]

The case of Doctor Manuel Morillo

Dusk had fallen on 28 October 1883 when a 26-year-old doctor, born out of wedlock, shot his ex-fiancée's father. The background story was that Morillo had refused to marry Amparo, aged 21, intending to keep the young woman as his lover instead. Amparo's mother threw herself into the fray, and took the second bullet, which destroyed her pulmonary artery. A guard struggled with the killer, who received a sabre cut to the face. These events occurred in Madrid, on the corner of San Vicente and Fuencarral.[27]

José María Escuder y Jiménez, a doctor at the Carabanchel Alto asylum, was one of the five experts contacted by the authorities to issue a report on Morillo's mental health. Morillo's defence was based on rather shaky arguments; he declared himself insane from birth, and that "the vertigo I felt when I pulled the trigger could

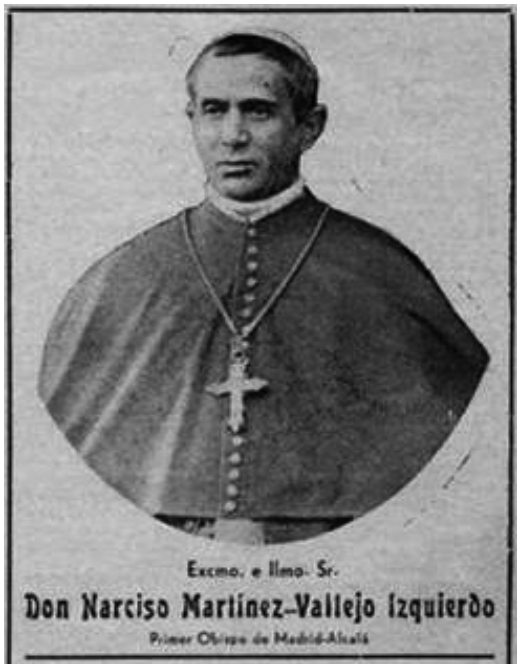

Figure 2. Don Narciso Martínez-Vallejo Izquierdo, the first bishop of Madrid-Alcalá, murdered by Father Galeote. The second image is the only surviving photograph of his killer (right), taken at the Leganés insane asylum.

be the result of epileptic mania", resulting from his unbridled passion for Amparo.

Escuder was surprised to find "pleasing features" in Morillo, rather than the repugnant visage of a degenerate. However, he did discover a few telling signs: strabismus, a palatal fistula, and "deformity of the base of the skull". The alienist drew up the accused's family tree, and revealed that no fewer than eight members of his family in five generations had suffered from 'dementia'. These findings were confirmed by the court in Castuera, Badajoz, the original seat of the Morillo family.[28,29]

However, these allegations were not considered. Morillo was sentenced to life in prison, although a report issued by the Royal Academy of Medicine was sufficient for his sentence to be commuted; instead of prison, he was sent to the asylum in Leganés, where he remained until his death.

Samuel Willie, the English murderer

Willie, a wholesale merchant born in London in 1862, was accused of shooting his Catalan business associates at the age of 32. Reading Don Quixote in his youth had inspired him to emigrate, and he had gone into business importing coal in Barcelona. But his partner, José Bofill, accused him of fraudulent weighing practices and adulterating loads. On the morning of 23 February, Willie telephoned his partner Bofill to make sure he was at work. While on his way to the office, he stopped at a gun shop to purchase a revolver and sufficient ammunition. Upon entering the office, he began firing frantically in all directions, even aiming at passers-by from the balcony. One of the Bofill brothers was killed and the other was severely wounded. Willie was taken to prison, where he tried, unsuccessfully, to jump from a third-story window. Thirteen months later, he remained in prison and seemed to be calm. His trial took place in 1894, and his defence included Juan Giné y Partagás, the Dean of the Barcelona Faculty of Medicine, and Antonio Rodríguez y Rodríguez-Morini, an assistant doctor at the asylum at the former Hospital de la Santa Creu, also in Barcelona. Another 13 experts were convened, all of them doctors. They included Artur Galceran i Granés, then a resident at the asylum of Sant Boi de Llobregat.

Joan Giné y Partagás is regarded as the first Spanish alienist. He finished his doctoral thesis in Madrid, and he also shared the progressive, republican, anticlerical views of his professor, Pedro Mata. He made a name for himself as a forensic expert by defending the rights of the mentally ill in the journal *Revista Frenopática de Barcelona*.[17]

The report by Giné y Partagás rested on Willie's genetic inheritance as the "key element for a diagnosis of degeneration". As such, it highlighted the subject's brother, who showed signs of idiocy and died at the age of six months; a great-grandfather who slit his own throat in a fit of madness; and a grandfather who hanged himself. Furthermore, several members of the family were also alcoholics. In contrast with what the doctor expected to find in degenerates, however, Willie's skull showed balanced proportions and its morphology also appeared to be normal. "The subject is of average stature, with fine white skin, well-defined muscles, a narrow nose, red lips, a benevolent, smiling face, and fine, limp, tidily arranged hair".[29]

Although these findings were at odds with the look he had anticipated, the alienist diagnosed Willie with degeneration, "although his stigmata are solely physiological and not anatomical" –this may have been an allusion to the hypothesis of J.B. Luys. He also used psychiatric arguments to justify the events under scrutiny: "They were the work of an impulse, an irresistible obsession, and anguish". Contradicting Lombroso, he concluded that in Willie's case, "the face is not the window on the soul".[30]

Martín Larios, an aristocrat in love

The Marquis of Larios was the typical nineteenth-century despot who got rich on the textile and sugar trades, and later, from the railroads. Following the death of his wife (and cousin) Aurelia Larios, he entered into a secret marriage in 1887 that was not recorded by the civil register. When his mother and brother caught wind of this development, they launched a case to declare him incapacitated on the grounds of his memory loss, incoherent ideas, and irritability. What was really at stake was a fortune worth 34 million pesetas at the time, and the title of Marquis, which one of Aurelia's children stood to inherit.

In 1880, Jean Martin Charcot, already 62 years old, travelled to Spain for the last time to examine this subject; the day before his return journey, he was received by Maria Christina, the queen regent.[31] Together with Alfred Hardy, Charcot concluded that Larios exhibited memory disturbances, loss of sphincter control, and "ambitious delirium", possibly as the result of the first stage of

general paresis; however, they did express reservations about that diagnosis "based on finding pupils of equal sizes and no tremor".[31]

They then reached out to a team of Spanish neuropsychiatrists consisting of neuropsychiatrist and journalist José María Escuder, who was to draft the final report; Jaime Vera, who had debated criminal anthropology in the Academy of Jurisprudence; and the well-known neuropsychiatrist Luis Simarro. They highlighted that the Marquis had to make lists of his daily tasks, believed he was a direct descendent of kings, and had designed a device for hanging shaving brushes in the hope that his invention would earn millions.

> Abstaining from any speculation about his cranial features, these doctors performed a rigorous physical and neurological examination. They measured his strength with a dynamometer, inspected his eyes with an ophthalmoscope, took his pulse with a sphygmomanometer, and performed an electrical assessment of the facial nerve. They reported slight spastic tremor in the legs, mild instability when turning around, a convulsive tic of the facial muscles, and mild postural tremor affecting his ability to write. In addition to the above, these doctors found post-paralytic hemispasm present from birth, dysarthria, right-sided deviation of the tip of the tongue, strabismus due to left abducens nerve palsy, and hyperactive deep tendon reflexes. Added to their report was an exhaustive neuro psychological examination.[32]

They concluded that the findings "reflect the main symptoms of the disease named general paresis in its initial stages". While there was no serology study to confirm this, the Marquis's symptoms are more compatible with arachnoiditis of the basal cisterns caused by meningovascular syphilis, although this would not preclude incipient general paresis.[33] Strangely enough, the Spanish alienists concluded that "Martín Larios y Larios is able to reason fully". Martín won his case, and continued living in the lap of luxury with his new wife, Pilar de León, in Villahermosa, his palace in Madrid which currently houses the Thyssen museum.

Remarks

Cranial features, degeneration, and crime

Nineteenth-century scholars showed a keen interest in human and animal skulls, including their anthropological significance, malformations, changes in specific systemic processes, and differences between human populations. Some, such as Federico Olóriz Aguilera (Figure 3), kept enormous anatomical collections. While it is likely that Esquerdo and his students had seen cranial anomalies in their patients at the Carabanchel Alto asylum, extrapolating this experience to the Garayo, Galeote, or Morillo cases would have been arbitrary, and in any case, largely unscientific. Ángel Pulido, one of Esquerdo's staunch followers, nevertheless contradicted his teacher with his more prudent attitude; he regarded cranioscopy as "an objective examination of the cranium, although no one today would regard it as more than a somatic aid; the data it provides are of great value at times, and of little impor-

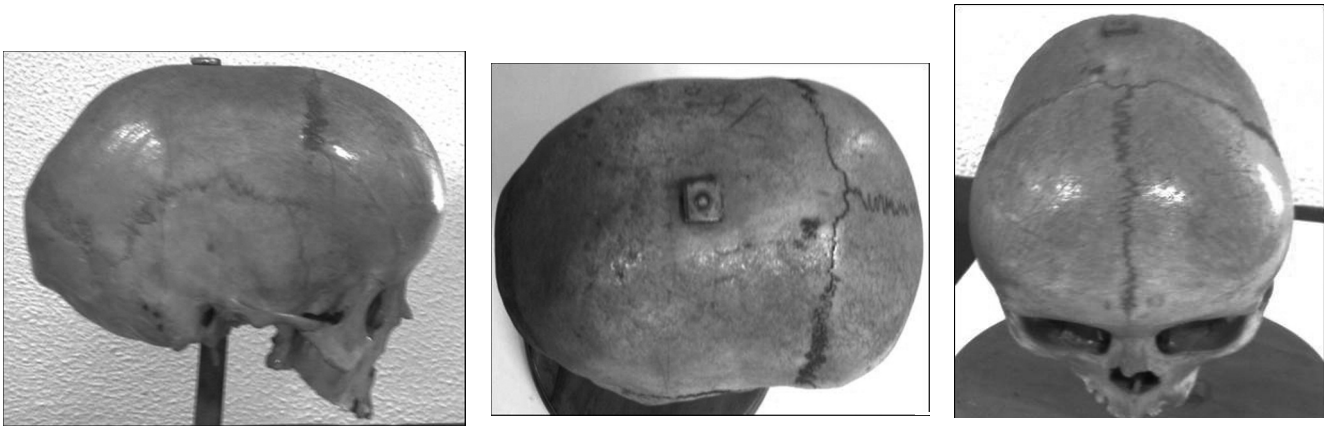

Figura 3. Scaphocephalioc skull displaying agenesis of the sagittal suture and persistence of the metopic suture. Federico Olóriz collection, Madrid Museum of the Second Chair of Anatomy. Photo by the author, with permission.

tance in others". Without expressly mentioning Broca, he sings the praises of modern craniometry, with all of its complex indexes and planes.[34]

Although these Spanish alienists were surely familiar with basic phrenology, it had very little influence on their expert reports. It had already been discredited in their time; only one article published in 1843, in Mariano Cubí y Soler's journal *Frenología* listed the unfavourable findings of a cranioscopic study that one Dr James had performed on a criminal's head.[35]

In his theory on physical, intellectual, and moral degeneration of the human species, Morel stated that the shape of the skull was a key means of identifying 'degenerate' individuals (Figure 4).[8] Spanish alienists followed this line of reasoning between 1880 and 1887. For example, José María Esquerdo's examination of Garayo's head revealed a list of traits which today might suggest platybasia or basilar invagination, together with plagiocephaly or cerebral hemiatrophy, which would be an unlikely combination. Escuder, Vera, Simarro, in contrast, did not hesitate to diagnose Galeote with microcephaly, an underdeveloped frontal bone, and "flattening of the posterior cranial fossa" as in Morillo's case, based on a simple visual inspection.

In contrast with the inventive scenes published in the satirical magazines of that time, Spanish phrenologists never applied the strict craniometric indices that Paul Broca (1824-1880) had established in 1875, using complex devices of his own invention.[36] The study of the skull accounted for a large part of Broca's scientific output (Figure 5).[37] He dedicated a volume containing more than 200 pages to the idea of identifying the skull's characteristics throughout evolution and among different human populations. Only occasionally did Broca publish notes on the skulls of murderers, as in the Lemaire[38] and Prévost[39] cases.

The weight of facial expression in court cases

One idea that remained entrenched among alienists was that degenerates would show regressive or atavistic facial expressions. Esquerdo believed he had found such a thing in Sacamantecas, whose fierce gaze reminded him of a fighting dog or a reptile. In Galeote, Escudero also highlighted facial features typical of "the lowest races of humanity", those supposedly evolving at a slower rate than the white race, which was placed at the top of the pyramid. Galeote's prognathism was also thought to be a vestige of primitive times in human evolution. This idea was to remain popular for many years, supported by a singular

Figure 4. Cranial alterations in degenerates, according to B.A. Morel (1857). Left: Fig. 3, plate IX: Nicholas, aged 48. Feeble-minded. Flattened posterior part of the head. Right: Fig. 4, plate IX: Julien, aged 24. "Cerebral atrophy. Microcephalism. General lack of development".

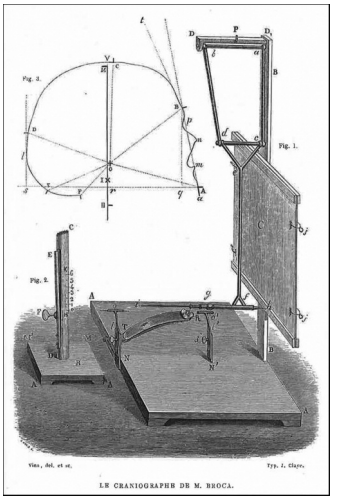

Figure 5. Left: statue of Paul Broca with a skull in one hand and a compass in the other. Initially placed in his native Sainte-Foy-La Grande, it was moved in 1887 to Boulevard Saint-Germain in Paris, where it was destroyed in 1942. Right: craniograph invented by Broca for making various anthropological measurements.

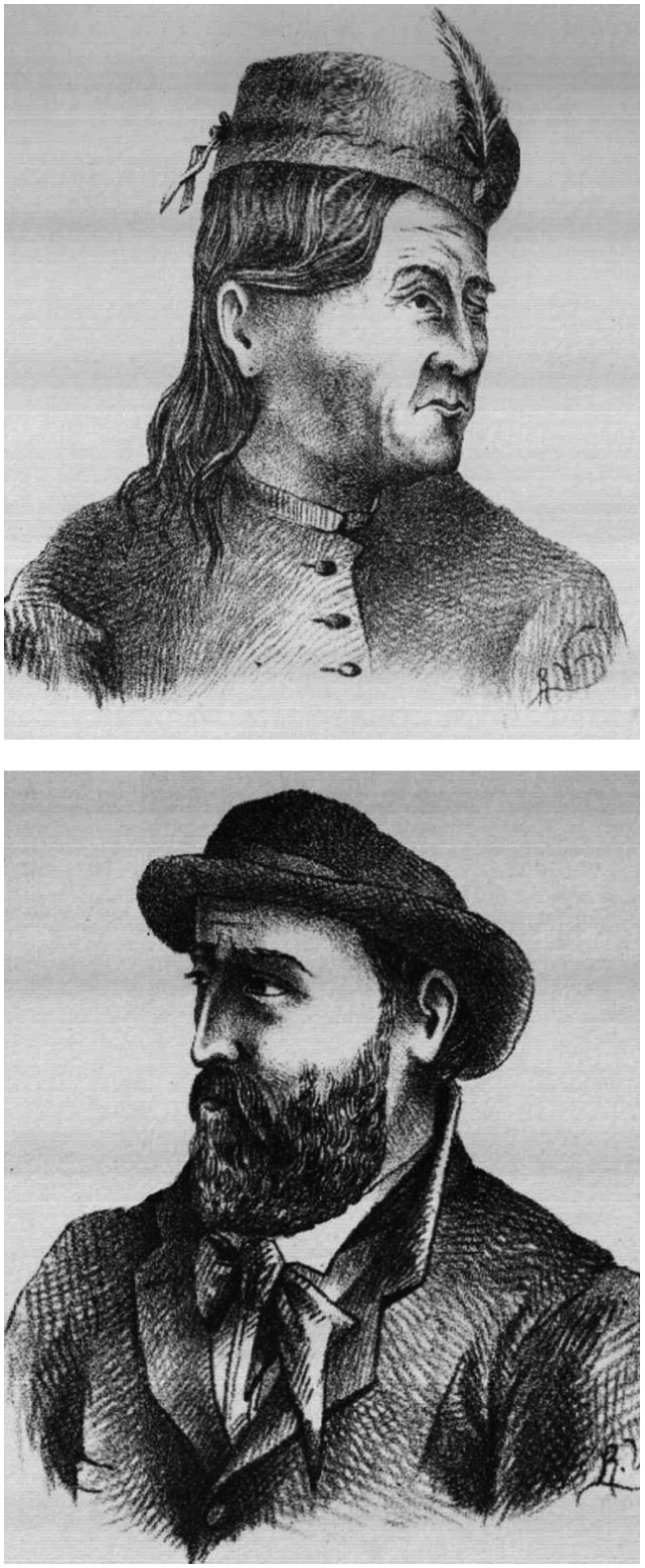

Figure 6. Facial expressions of patients with mental disorders, according to J. Giné y Partagás in his *Tratado de Freno-patología* (1876). Above: chronic mania with phrenopathic accesses. Below: acute mania with delirium and overdeveloped self-regard.

study of the skulls of 36 convicted murders executed by guillotine. Broca also hypothesised that prominent supraorbital ridges were a feature of prehistoric races.[40]

Giné y Partagás also believed this finding to be important, and highlighted it both at the Nueva Belen asylum and in court reports, as he did in the case of Willie the Englishman. Using psychiatric insight where Esquerdo had not, Giné analysed other elements in addition to the simple morphology of the head and the harmony of the facial features. For example, his phrenology textbook *Tratado teórico-práctico de freno-patología*, includes amateurish but extremely vivid drawings of the picturesque costumes of patients in the manic phase, with their extravagant hats and lost gaze (Figure 6).[41]

A history of neuropathy

The doctrine of eugenics by Sir Francis Galton (1822-1911) stated that inheritance was responsible for character in humans and explained everything from talent to social success. He postulated that this took place through a process of natural selection similar to that described by his cousin Charles Darwin. However, inheritance could also be negative, leading to progressive and inexorable decadence and giving rise to 'degenerate' individuals whose catastrophic inherited traits would leave them powerless to escape crime and insanity.[42,43]

Spanish alienists made liberal use of the neuropathic histories of those they examined. Their intent was to declare such defendants as Garayo, Galeote, Morillo, or Willie insane and prevent them from being executed. Applying questionable standards, they searched for a family history of epilepsy, alcoholism, feeble-mindedness, idiocy, or insanity, and even hysteria and hot-headedness. The file prepared for Morillo's trial,[25] for example, included a detailed family tree which José María Escuder prepared. He travelled to the accused's hometown of Castuera, Badajoz, so as to be able to show the court the numerous cases of "madness" among Morillo's family members, but the evidence (of alleged dementia, feeble-mindedness, hysterical mania, etc.) was in fact quite unreliable (Figure 7). The weak basis of this 'history of neuropathy' is evident in Morel's text[8]; many of the cases shown in the illustrations (quite well-drawn, it must be said) were originally from the Pyrenees where cretinism was endemic, or they displayed signs of rickets due to dietary deficiencies. Today, these subjects would be regarded as the victims of easily preventable exogenous

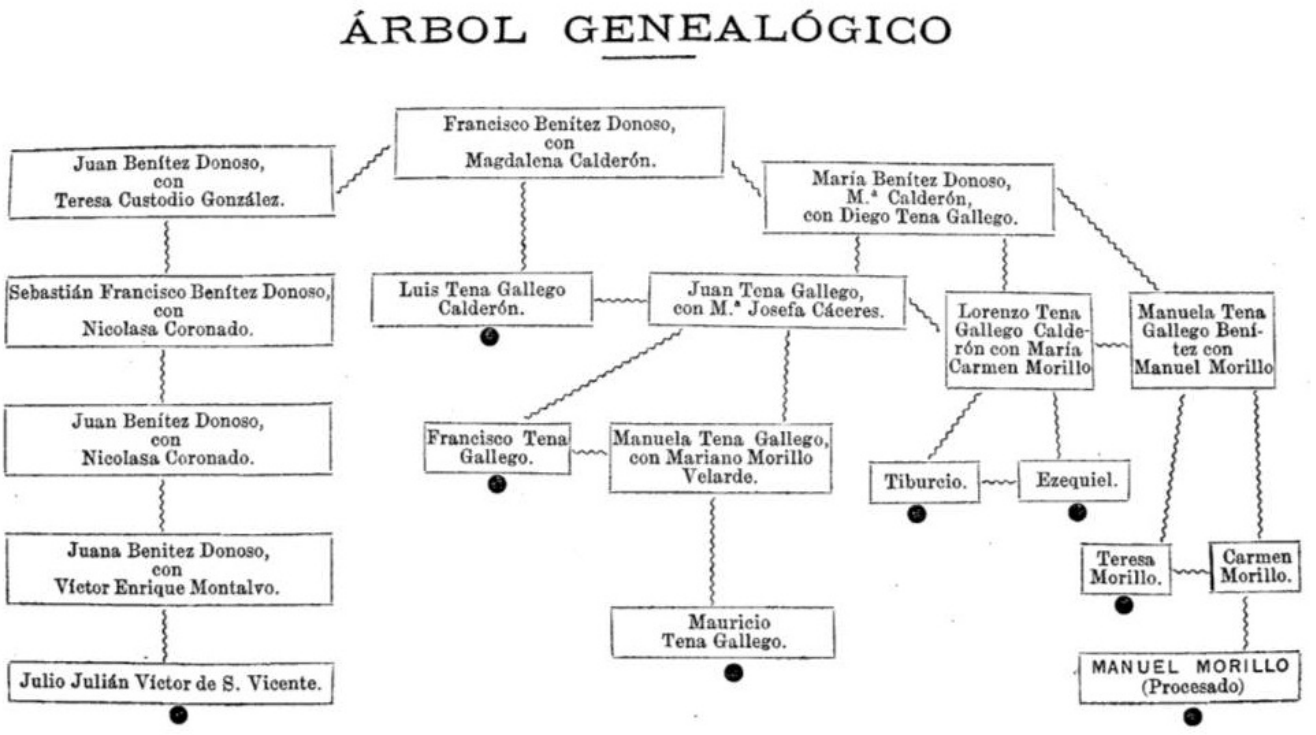

Figure 7. Confusing family tree pertaining to Manuel Morillo, provided by Escuder in his defence. The doctor probably did not examine any of these alleged 'lunatics' in person; he relied on imprecise data provided by the locals in Castuera, Badajoz.

processes, rather than bearers of an obscure hereditary neurodegenerative disease.

The search for the anatomical basis of degeneration

Esquerdo travelled to Vitoria for the express purpose of examining the brain of El Sacamantecas. He described a small, flattened organ with a diminished, discoloured 'rhomboid body' and abnormally large lamellar corpuscles; he noted in passing that the external occipital crest was larger than normal. He quite arbitrarily decided that these findings confirmed the subject's mental illness. In his series of well-known lectures titled "Madmen who don't look it", he spoke out against the judicial error he felt had been committed in the Garayo case.[22]

Jules Bernard Luys,[9] an avid degenerationist, proposed a functional explanation of mental disorders based on circulatory changes. Different 'moral causes' would result in cerebral hyperaemia phenomena due to 'vascular excitation'. In turn, these phenomena would cause manifestations of nervous excitation, including delirium, mania, or agitation, or even ischaemia linked to depressive melancholy. Certain regions of the brain in the 'simple-minded insane' were especially susceptible; these included the anterior part of the second frontal gyrus and the 'prolongation' of the paracentral lobe in the parietal region. Hyperaemia phenomena would disappear after death and therefore remain undetected in autopsy studies in most cases. On some occasions, however, small, residual haemorrhagic foci and presumably dilated arterioles might be observed (Figure 8).

Years later, Magnan and Legrain showed more caution in assessing the value of the anatomoclinical method for studying 'cerebropathies'. *La méthode n'a pas produit à ce jour une avance au point de vue des classifications*"[10(p42-43)]. They underscore that true psychosis often arises in cases *sine materia*. Degenerative stigmata, including those affecting head morphology, would simply indicate an anomaly in development.[11(p91)]

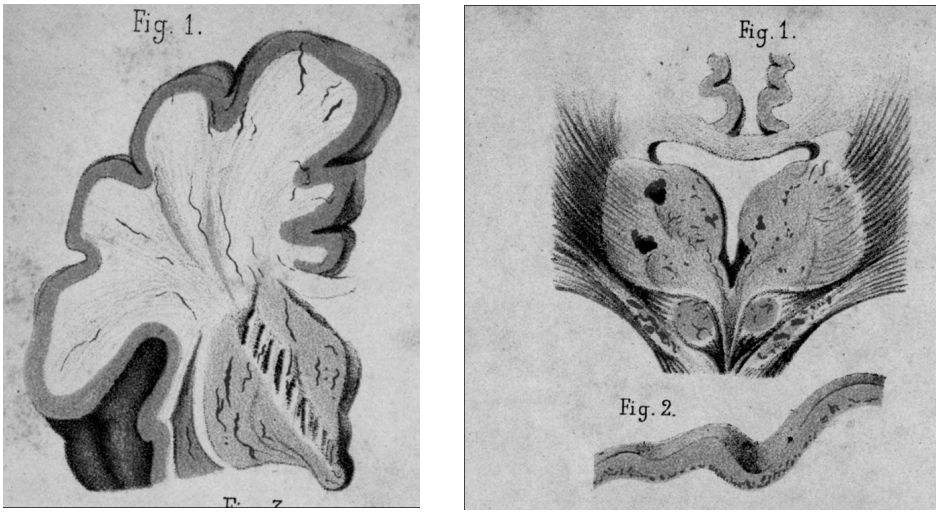

Figure 8. Anatomical pathology study in patients with cerebral degeneration, according to J.B. Luys (1865). Left: woman aged 58 with recurring fits of mania due to encephalic congestion. Diffuse hyperaemia. Vessel dilation in the striate body. Right: brain of a 68-year-old woman studied at La Salpêtrière, who "mistook the people speaking to her for others" and experienced hallucinations and fits of rage. Congestion of the thalamus with old focal haemorrhages.

The neuropathology of morality

In 1861, a general surgeon at the Hôpital Bicêtre in Paris had the good luck and discernment to examine the external appearance of brains from a hatter named Leborgne and an old woman named Lelong; both had had difficulties with verbal expression, and both displayed lesions in the anterior part of the left hemisphere. Nine years later, two young German physiologists observed that electrical stimulation of the part of the cortex anterior to the sulcus centralis in unanaesthetised dogs (restrained on an ironing table belonging to one Frau Hitzig) caused limb twitches on the contralateral side. The surgeon was Paul Broca[44] and the physiologists were Fritsch and Hitzig[45]; their studies of speech and movement disorders following circumscribed lesions to the cerebral cortex were ground-breaking.

When the Spanish alienists palpated the protrusions and irregularities of the cranial vault of the accused, they assumed that their crimes and alleged madness resulted from imprecise, focal degenerative changes within the brain. They were probably aware of cranioscopy and the mosaic of specialised areas so imaginatively invented by the phrenologists; in Spain, Mariano Cubí preached that doctrine with all the zealousness of a convert.[46] However, the alienists claimed to be scientists. They therefore examined the brains of madmen, as Jules Bernard Luys had done while working in La Salpêtrière as a psychiatrist.[9] And like Benedikt in Vienna in 1875, using brains from Hungarian and Croatian subjects,[47] they also searched for criminal traits. In this context, Esquerdo travelled to Vitoria to examine the brain of one Garayo, executed as a serial killer.[22]

In or around 1881, when the Garayo case was unfolding in Spain, Edward Charles Spitza, a famous specialist in brain disorders in New York, was subpoenaed to testify as to the mental state of Charles Julius Guiteau, who assassinated President James A. Garfield. Somewhat dogmatically, he declared Guiteau 'probably insane'; the diagnosis was supported by his family history of mental illness, his ideas, and his behaviour. He also detected certain neurological signs, such as paresis of the facial and hypoglossal nerves, and some motor nerves of the eye. Guiteau had contracted syphilis some seven years earlier; he had also tried to kill his sister with an axe, believed that he would be named to the Council of Paris, and claimed that God had ordered him to kill the President. Spitza's allegations that Guiteau could not be held responsible for homicide did not sway the case, and Guiteau was sentenced to death by hanging. Although it was concluded that the convict's brain was 'normal', the autopsy found patches of arachnoidal thickening and opacities over the convexities. Guiteau's brain, housed in the collection of the National Museum of Health and

Medicine of the Armed Forces Institute of Pathology in Washington D.C., has yet to undergo a microscopic examination.[48] In the end, Guiteau probably had neurosyphilis, which would mean that Edward Charles Spitzka was right.

In 1936, Karl Kleist (1879-1960), a pioneering neuropsychiatrist and member of the National Socialist German Workers' Party and the Court of Genealogical Health,[49] presented his theory of morality and moral pathology (including criminal acts, indecent conduct, and sexual deviancy). According to his theory, moral pathology represents a dysfunction related to the orbitofrontal cortex. The presentation was a failure; Oswald Bumke, who had succeeded Kraepelin in Munich, sarcastically remarked that a lesion to the optic nerve does not mean that the vision centres are found in that location.[50] Nevertheless, a recent literature review shows an association between prefrontal lesions and aggressive or criminal acts, although the frequency is lower than what had been assumed.[51] The story of delinquency and the brain has not yet come to an end. Today, it is not uncommon for scanners to be brought to prisons in the United States so that shackled and orange-jumpsuited psychopaths convicted of criminal acts can undergo functional magnetic resonance imaging during tests that explore moral decisions. Some have argued that the paralimbic alterations the tests reveal could leave these prisoners unable to overcome the impulse to kill. If this is so, these individuals might be regarded as dangerous mental patients, and therefore not responsible for their actions.[38,52]

Psychologists Young and Dungan have asserted, somewhat unhelpfully, that morality might be "everywhere and maybe nowhere".[53] Consisting of complex cognitive processes, morality is expressed in numerous domains that require the participation of the brain as a whole. There is no neural substrate that would exclusively support moral cognition, if any such thing exists.

In conclusion, the trials in which the first Spanish alienists participated as expert witnesses are an excellent source of information about the diagnostic value that degenerationists assigned to examinations of the skull, facial expression, and genetic inheritance. It is true that their criteria, which were influenced by 19th-century interpretations of Darwinism, have not stood the test of time. Nevertheless, the underlying idea of a potential relationship between criminal acts and circumscribed brain alterations is still being debated today.

Conflicts of interest

The author has no conflicts of interest to declare.

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