MAXIMILIANO RUBÍN AND THE CONTEXT OF GALDÓS'S MEDICAL KNOWLEDGE

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The Medical Context

Galdós's interest in doctors, medicine and abnormal mental states is well known and has been the subject of many studies.[1] More than 50 doctors populate the pages of his fiction prompting Granjel to refer to a "colegio médico galdosiano" (167). Almost invariably these physicians are portrayed in a favorable light (García Lisbona, 105, note 3), epitomized particularly in the combination of scientific outlook and humane concern of Galdosian characters such as Augusto Miquis, Teodoro Golfín and Moreno Rubio. References to medications abound in the novels [2] while the medical sciences appear in a significant sample of Galdós's journalistic articles more often than any other science.[3] It is somewhat surprising, therefore, that Galdós's knowledge of the medical sciences of his time should remain incompletely explored. It is the purpose of this paper to draw attention to the depth of Galdós's understanding of the medical advances of his day, which still remains under-appreciated.

Galdós wrote at a time of revolutionary changes in medicine. Gradually replacing the older vitalistic and humoral conceptions of disease, positivist medicine emanating especially from France identified anatomical abnormalities associated with many diseases (Laín Entralgo 273-308). Microscopical studies by Virchow and others from the 1840s onwards identified the cellular basis of disease. From the 1860s Pasteur and Koch showed the role of bacteria in infection while Lister found practical applications in his antiseptic, and later, aseptic techniques that revolutionized the scope and safety of surgery. In the decades of the 1870s and 1880s, when Galdós was writing many of his finest novels, dozens of disease-producing micro-organisms were identified.[4] Prominent discoveries in human disease were the germs responsible for leprosy, tuberculosis, cholera, diphtheria, tetanus, anthrax and bacterial meningitis. These advances contributed to the high social esteem in which Madrid physicians were held in the 1880s, an admiration that Galdós shared.[5]

It might be asked how and where Galdós acquired his remarkably extensive knowledge of medicine. I know of no records of his research to indicate where he looked,[6] but there are ample indications of likely sources. Firstly, he could be an indefatigable researcher when he wanted background information to give authenticity to his novels: financial speculation in *Lo prohibido*, the textile trade in *Fortunata y Jacinta* and women's fashion in *La de Bringas* are good examples. Berkowitz describes how he would pursue individuals and sources of all kinds in search of the information he wanted (*Biblioteca* 9-10); Leopoldo Alas notes the penetration with which he gathered information that he wanted.[7] His special interest in medicine and doctors led him to cultivate the friendship of some of the leading Madrid physicians of his day. Foremost among these was his close, almost 40-year, friendship with Manuel Tolosa Latour (1857-1919) that is well

documented, as are his letters soliciting and receiving from Tolosa detailed medical information.[8]

Tolosa Latour was Galdós's probable contact with a remarkable group of physicians who played prominent roles in Madrid medicine in the last quarter of the Nineteenth Century, for he had been one of the disciples of the charismatic *alienista* José María Esquerdo who lectured in General Pathology as well as psychiatry in the newly liberated environment of medical education that followed the *Gloriosa Revolución* of 1868 (Eleizegui 29). Tolosa's fellow students included the *alienistas* Jose María Escuder and Victoriano Garrido, the *alienista*-neuropsychologist Luís Simarro, the alienista-politician Jaime Vera, the criminal anthropologist Rafael Salillas and the medical journalist and campaigner Ángel Pulido (Ortega 65). In addition to this network, Galdós played host at home to other leading physicians like the surgeon Enrique Diego-Madrazo, who was one of those responsible for introducing Lister's surgical techniques into Spain, and the professor of surgery at San Carlos, Alejandro San Martín, famous for introducing new surgical techniques and for his role in the adoption of inhalational anaesthesia (Marañón, 171).[9]

The 1880s saw much medical publishing in Spain with texts and encyclopedias translated from the French, English and German as well as works by Spanish authors. While knowledge of foreign languages and medical practice might be poor in the provinces (Seguin 458-59), the medical elites of Madrid and Barcelona were not only multilingual but also attended conferences abroad and obtained practical experience in major medical centers in France, England and Germany as a necessary part of their medical training. The medical books in what survives of Galdós's library provide a sample of what Galdós had available to him (de la Nuez Caballero).[10] Two volumes on nervous diseases by the Catalan, Armangué y Tuset, are to be found together with a translation from the English of volume II of the Bourroughs Wellcome *Libro medico azul* by Charles Christie, and a translation from the French of the fourth Spanish edition (eighth French edition) of Sigismond Jaccoud's *Tratado de patología interna* with its dedication to Galdós by Tolosa Latour. A Spanish text dedicated to Galdós by the author, though uncut, is Diego-Madrazo's *Lecciones de Clínica quirúrgica*.

Heightened awareness of medicine was not only thrust upon the inhabitants of Madrid by the remarkable medical discoveries and the consequent changes in medical practice of the 1880s, but also by the dire state of the capital's public health. Cities such as Paris, London, Birmingham and Manchester experienced explosive population growth in the preceding two thirds of the nineteenth century fed by migrants from rural districts in search of work. The population of Madrid increased from 398,000 in 1880 to 470,000 in 1890 and would reach 540,000 by 1900, an increase fed by migration from the land that more than offset the high mortality that particularly affected the young, who accounted for more than 40% of the deaths in the city while only responsible for 12% of the population (Goldman 158). Crowding of the poor in *corrales* on the Calle Toledo is described with documentary veracity by Galdós, in his *Visita al cuarto estado* in *Fortunata y Jacinta,*[11] while the squalid conditions of under-the-roof dwellings of the casas *de dormir* and *casas de vecindad* of the notoriously ruinous *barrios bajos of Inclusa*, *El Hospital* and *Latina* (Bernaldo de Quirós and Llanas Aguilaniedo 123-132) provided an ideal environment for the spread of the typhus, cholera, diphtheria, tuberculosis, fevers and meningitis that Galdós describes.[12]

Attempts to prevent these diseases were not helped by lack of understanding of the mode of their transmission. The ancient *miasmatic* theory that disease was caused purely by bad smells

continued to be influential in Spain as in England until the end of the century, while Max von Pettenkofer's variant *telluric* theory, in which epidemics were attributed to a pathological quality of certain soils,[13] actually delayed implementation of measures to control the spread of water-borne diseases. Faced with such onslaughts of disease, community physicians tried to understand their origins and predisposing conditions with the best medical ideas they had to hand. They recognized the importance of poverty, dirt, overcrowding and malnutrition but were also impressed by the way in which diseases tended to run in families, which led them to suggest a causal, inherited predisposition. In Galdós's time, it was widely accepted that the consequences of the physical and moral lives of parents would be passed on by heredity to their descendants, an idea associated with the theories of the French zoologist, Lamarck. This idea evolved into a wide-ranging theory of social ills in the work of the French *aliéniste* Benedict Morel (1809-1873) who propounded a theory of degeneration in 1857 to account for environment-related loss of primitive, biblical perfection.[14] At the hands of his disciple Valentín Magnan, who was influenced by Darwin's *On the Origin of Species of 1859*, the theory of degeneration acquired an evolutionary slant in which degeneration was attributed to regression to a supposedly more primitive and barbaric state (Huertas, "Magnan" 365).

Social and medical thinkers of Galdós's time brought this interpretive mind-set to the consideration of four great endemic diseases of modern city life, the so-called *enfermedades sociales degenerativos,* that appeared likely to undermine civilized society as they knew it (Hauser, "Siglo" 211-220). These conditions were tuberculosis, held to be largely familial and decimating all conditions within society; alcoholism, which became a fearsome social problem as a result of the recent development of industrial distillation and the widespread availability of cheap spirits (Hauser, "Siglo" 209-211); madness, attributed to heredity and the stresses of modern city life (Giné y Partagas, *Freno-patología* 217-237); and syphilis, attributed to the breakdown of morals and society associated with urban poverty and prostitution (García Viñas 153). The leading *higienista,* Hauser (1832-1925), in his surveys of the public health supported by improved population statistics, issued dire warnings. To him, these *enfermedades* seemed so universal and uncontrolled that they appeared to threaten Western society and even the human race itself.[15]

It is in this medical-scientific context that Galdós gave himself the task of portraying the middle class with all its strengths and weaknesses, but withal the class in whose energy, he believed early on, lay the future of Spanish society (Pérez Galdós, *Observaciones* 167). As a result, the created world of Galdós's novels could not avoid portrayals of these *enfermedades sociales degenerativas*[16] that menaced the world he depicted. In his zeal to entertain and to improve the society of his time, he held a mirror up to it so that it might contemplate the forces that threatened it.

Death from pulmonary tuberculosis is portrayed with documentary fidelity in the second half of *El doctor Centeno*, where the description of Alejandro Miquis's surroundings, his loss of contact with reality associated with poverty-inducing liberality, his fevered obsession with his epic drama and his energy-sapping relationship with *La Tal* almost seem to be assembled from a list of predisposing conditions compiled by contemporary writers on tuberculosis (Gutiérrez Jiménez 179-205; Moreno Fernández 5-11, 13-20). Galdós portrays the degenerative vice of alcoholism vividly in *Fortunata y Jacinta,* most memorably in Mauricia la Dura, where he associates her crippling,

mortal dependency with poverty, prostitution and a fearsome mental instability. Mauricia's addiction is all the more sensational for its being public and in a woman, as Fuentes Peris observes, in contrast with José Izquierdo's lower profile and implicitly more acceptable dependency (109). Of the representations of madness in Galdós's work, one might single out the famous episode in *La desheredada* of Tomás Rufete in the asylum of Leganés, a semi-documentary criticism of inhumane treatment of the insane that merited its inclusion in *El Diario Médico*, published by Tolosa Latour for its significance for the medical profession as well as the general public.

Given Galdós's commitment to narration of the life of the clase media, it seems inevitable that he would portray the fourth of these terrible *enfermedades*, despite the major taboo that the subject presented in his time.[17] I believe that there is strong evidence that he portrayed a recently defined form of congenital syphilis in Maximiliano Rubín and that he drew upon the medical advances of his day, either from his own reading or through the agency of his many medical friends, in order to assemble his fictional portrait. This medical background, of which Galdós must have been aware to write such a very detailed picture, appears to have received little attention to date.

The Portrait of Maximiliano Rubín

The profile of Maximiliano begins with his mother, Maximiliana: "mujer desarreglada y escandalosa, que vivía con un lujo impropio de su clase, y dio mucho que hablar por sus devaneos y trapisondas […] una mujer bella y deseosa de agradar" (I 448).[18] It is clear that he means us to understand that she was sexually promiscuous, especially when he suggests indirectly that the Rubín brothers are so different from each other to suggest different fathers: "De esta heterogeneidad de las tres caras vino sin duda la maliciosa versión de que los tales eran hijos de diferentes padres" (I 449). The brothers all have severe headaches, "todos padecían de fuertes y molestísimas jaquecas" (I 449). Maxi was weakly as a child with a lymphatic constitution[19] and was born at seven months' gestation when he needed to be fed with a bottle and by a goat: "Maximiliano era raquítico, de naturaleza pobre y linfática, absolutamente privado de gracias personales. Como que había nacido de siete meses y luego se le criaron con biberón y con una cabra" (I 459-50). As a young adult, he has difficulty in retaining information and is a poor student: "El muchacho estudiaba y quería cumplir con su deber; pero no podía ir más allá de sus alcances" (I 456). He has a small, feeble body: "Era de cuerpo pequeño y no bien conformado, tan endeble que parecía que se lo iba a llevar el viento, la cabeza chata, el pelo lacio y ralo," (I 456) and is balding prematurely: "la cabeza de Maximiliano anunciaba que tendría calva antes de los treinta años." (I 456). The bridge of his nose is collapsed, his teeth are strikingly irregular, he suffers from bone pain and he has severe coryza:

> Tenía el hueso de la nariz hundido y chafado, como si fuera de sustancia blanda y hubiese recibido un golpe, resultando de esto no sólo fealdad sino obstrucciones de respiración nasal, que eran sin duda la causa de que tuviera siempre la boca abierta. Su dentadura había salido con tanta desigualdad que cada pieza estaba, como si dijéramos, donde le daba la gana. Y menos mal si aquellos condenados huesos no le molestaran nunca; ¡pero si tenía el pobrecito cada dolor de muelas que le hacía poner el grito más allá del Cielo! Padecía también de corizas y las empalmaba, de modo que resultaba un coriza crónico. (I 456)

Maxi medicates himself with every known form of potassium iodide: "se administraba el yoduro de potasio en todas las formas posibles," (I 456) and appears to suffer delayed development for, at the age of 25, has still no moustache suggesting a lack of facial hair: "tenía Maximiliano veinticinco y no representaba aún más de veinte. Carecía de bigote" (I 458). Maxi is mentally unstable and becomes obsessed with the possibility that he has an aneurysm of the aorta that ruptures: "Es la aorta...Yo tengo una aneurisma, y el mejor día, plaf,... revienta…" (II 220), and dreams: "se me rompía la bolsa del aneurisma, y todo el cuarto se llenaba de sangre, todo el cuarto, hasta el techo" (II 221). He contemplates murder-suicide: "¡Ay! Un revólver...—Sí para matarte y matarme…" (I 703), and is convinced that his family wants to poison him: "Este chocolate tiene arsénico" (II 279). Later he experiences a mania for logical analysis: "le sobrevino el furor de la lógica" (II 417), has delusions of religious grandeur: "Yo no soy más que el precursor de esta doctrina; el verdadero Mesías de ella vendrá después, vendrá pronto; ya está en camino. Quien todo se lo sabe me lo ha dicho a mí" (II 307), and has hallucinations in which he imagines the presence of a nocturnal intruder:

> Y anteayer había en esa misma alcoba la impresión, sí, la impresión de una persona que aquí estuvo. No lo puedo explicar; era como huellas dejadas en el aire, como un olor, como el molde de un cuerpo en el ambiente. No me equivoco; aquí entró alguien. Lucido, lucido papel estoy haciendo. ¡Dios mío! ¿De qué le vale a uno el poner su honor por encima de todas las cosas? (II 277)

He tries to murder the cook: "Rubín salió de su cuarto con un cuchillo en la mano detrás de Papitos, diciendo que la había de matar" (II 385).

In a later, lucid interval, he is able to summarize objectively the features of his psychosis:

> Primero tuve el delirio persecutorio, después el delirio de grandezas... Inventé religiones, me creí jefe de una secta que había de transformar el mundo. Padecí también furor de homicidio, y por poco mato a mi tía y a Papitos. Siguieron luego depresiones horribles, ganas de morirme, manía religiosa, ansias de anacoreta y el delirio de la abnegación y el desprendimiento... (II, 491)

Juan and Ballester surmise that Maxi may suffer from diffuse periencephalitis or meningoencephalitis: "el bromuro de sodio, que estaba dando tan buen resultado contra la peri-encefalitis difusa y contra la meningo-encefalitis" (II 399), with the related condition of softening of the brain: "El pobrecito está mal. Me ha dicho esta mañana Ballester que tiene algo de reblandecimiento cerebral" (II 259).

A list of Maxi's features, or those attributed to him, would include the following: 1. promiscuous parent, 2. severe headaches, 3. lymphatic temperament, 4. severe prematurity, 5. direct suckling by a goat while an infant, 6. poor memory with difficulty in learning, 7. small, frail body, 8. thin abnormal hair, 9. premature baldness, 10. saddle nose, 11. very irregularly positioned teeth, 12. widespread bone pain, 13. severe, chronic coryza, 14. intensive self-medication with potassium iodide, 15. delayed sexual maturation. Features of Maxi's insanity include: 1. obsessive hypochondria, 2. homicidal and suicidal thoughts, 3. paranoia, 4. logical mania, 5. delusions of religious grandeur, 6. hallucination, 7. homicidal behaviour, 8. intermittent lucid intervals

with insight into his condition suggesting a remission or even a cure. The suggestions of family members and friends include the pathological brain conditions of 1. diffuse periencephalitis, 2. meningoencephalitis and 3. softening of the brain.

Galdós assembles such a highly specific combination of features that I conclude that it is not randomly assembled but that he drew, directly or indirectly, upon the detailed medical-scientific literature of his time. I believe that this complex of features indicates that Galdós had a particular disease in mind when he created his fictional portrait of Maxi since his clinical description is closely related to that made by the great English physician, Jonathan Hutchinson (1828-1913), who in 1858 described a form of congenital syphilis for the first time. Hutchinson was the most distinguished expert in venereal disease in England of his day and his brilliant insight explained a previously unrecognized form of congenital syphilis, one that presented in adult life.

Infection of mother and child with its consequences of repeated miscarriage and prematurity and death of the infected infant had been recognized since the outbreak of syphilis in Naples in the 1490s and its subsequent epidemic spread throughout the Western world. Those infants surviving into childhood often died despite treatment with a variety of medications, including those containing mercury. In the Nineteenth Century, crowding and poverty in rapidly growing cities were associated with a fearsome new wave of the disease that the physicians of the day were obliged to confront. In doing so, Hutchinson recognized signs and symptoms of advanced (*tertiary*) syphilis in a group of patients in adolescence and early adulthood, which prompted the question as to when the infection had been acquired during infancy, from an infected wet-nurse for instance, or from before birth.

Hutchinson made the key observation that the permanent dentition was consistently malformed indicating that tooth-formation had been disrupted at an early stage, that is, during intrauterine life. The form of tertiary syphilis that Hutchinson recognized was thus congenital with its sufferers surviving to present in adult life. Hutchinson describes short stature, skin that may appear thin and hair that is thin and dry. He places particular emphasis upon the irregularly placed and malformed permanent teeth, a specific abnormality that has been associated with his name in medicine ever since. He lists disease of the bones and joints while a sunken and flattened nose he describes as "a very marked condition in most cases and constitutes a very valuable sign" (265) and ends by asserting the prime importance of the tout ensemble, that "it is not by any one symptom that the diagnosis of hereditary syphilis can ever be supported but by the careful estimation of the entire group" (265). His observations were confirmed in France by the equally distinguished venereologist, Alfred Fournier (1832-1914), who supported and published them on the basis of his own clinical experience in 1886.[20] In addition, his clinical experience led him to be so suspicious of young men with severe, chronic headaches that he recommended that chronic, syphilitic meningitis should be considered as a likely cause and be treated accordingly, especially in the presence of a suspicious family history (*Tardive* 488).

Galdós's description, "había nacido de siete meses y luego se le criaron con biberón y con una cabra" takes us to the world of premature infant care that was topical in that it was just developing in France in the 1880s. Though the phenomenon of *faiblesse congénitale* was incompletely understood, the first improvised incubators with heated water tanks were introduced by Tarnier in 1881 and achieved significantly improved infant survival for the first time.[21] Previously the

survival rates of severely premature infants had been minimal, partly due to problems with feeding. The pasteurization process developed to prevent spoilage of wine and beer in 1862 had yet to be applied to milk and, in addition, dilution and adulteration of cow's milk was all but universal in big cities. The mortality of even full-term infants fed spoiled milk from unwashed bottles in a foundlings' hospital like that of *La Inclusa* could reach 85%, leading to the warning that "tolerar el biberón es absolver el infanticidio" (Tolosa Latour, 88, 71). In a Paris hospital for abandoned children, the leading pediatrician, Joseph Marie Jules Parrot (1829-1883) encountered scores of infants with congenital syphilis. To keep them alive, wet nurses traditionally suckled these orphans but, even if they were initially healthy themselves, they frequently infected many other infants as a result of suckling a single infected new-born. Falling back on another traditional measure, Parrot found that suckling infants directly by a donkey or a goat was a safer method of getting sustaining milk into these infants (852), taking advantage of the species barrier that meant that the suckling animals could not contract the infection. Similar practice in Spain is documented by Tolosa Latour (69).

It should be realized that Galdós, writing in 1886, was projecting events back to the fictive period of Maxi's infancy (1849) while informed by the medical context prevailing in 1886/7, and in so doing employs a double time frame. If Maxi were truly to have been born at seven months gestation in 1849, his prospects for survival would have been slim indeed. Schnepf has elaborated on the occurrence of a similar double time frame in a different context in *La desheredada*.[22]

Features of delayed congenital syphilis that Galdós's describes in Maxi-prematurity, chronic coryza and bone pain-are also listed by Georges Homolle (867, 880) though, unlike Hutchinson, he was not himself responsible for the original observations. His description is significant, however, like those of Fournier and Parrot, for its being available to Galdós and his medical friends at the time that *Fortunata y Jacinta* was being composed.

Maxi's obsession with potassium iodide "en todas las formas posibles" is a very striking feature of Galdós's description, whose significance appears to have been missed up to the present. The only indication for potassium iodide listed in the *Farmacopea Oficial Española* of 1884 is, "de uso especial en el tratamiento de los fenómenos terciarios de la sífilis" (414).[23] Its more general use in the treatment of syphilis is also listed in volume II of the Burroughs Wellcome *Libro médico azul* that Galdós had in his library (323). The inclusion of this very specific medication strongly suggests that Galdós is telling his knowledgeable readers the cause of Maxi's problems, and he implies that not only does Maxi have a form of syphilis but that he is aware of his condition and is doing all he can to treat it. The use of potassium iodide in the treatment of syphilitic patients had been popularized in 1835 by William Wallace, a Dublin dermatologist-venereologist (11) and the practice may have become known in Spain through texts such as that of Payan, translated from the French in 1847.

Consistent with Maxi's awareness of his condition, Galdós makes him hypochondriacally obsessed with a complication of his disease, abnormal swelling of the aorta (aneurysm) and its not uncommon complication, rupture, which was always fatal. The association of aneurysmal dilatation of the thoracic aorta with tertiary syphilis was fully documented for the first time by the British Army pathologist Francis Welch in 1876 on the basis of a series of autopsies on soldiers in the prime of life.[24] Writing only ten years after this paper, Galdós indicates that Maxi knows of this

serious complication of his debilitating disease and its potential for a fatal outcome. From the story of the novel, we may assume that Maxi has read about aortic aneurysm in one of the "librotes de Medicina" in the Samaniego/ Ballester pharmacy that Fortunata criticises him for reading (II 220).

Maxi's hypochondriacal obsession and his intermittently tenuous grasp on reality lead one to wonder what relation there might be between Maxi's delayed congenital syphilis and his progressive insanity. In Galdós's time, a link was already suspected between syphilis and *parálisis general de los alienados*, a condition that was recognized in asylums throughout the Western world following its description by Bayle in 1822 (Ackerknecht 51; Quétel 160).[25] Fournier in France already suspected a link between the two conditions on the basis of his clinical experience and published his reflections in *La syphilis du cerveau* in 1879. At the same time in Spain a connection between *parálisis general* and syphilis was being considered by specialists with clinical experience of the disease like Seguin and Vera (438, 458; 33, 37). General paralysis occurs in patients with the advanced (or tertiary) form of syphilis, often many years after an initial infection in adult life, but can also affect those suffering from the delayed, congenital form of the disease. A very full description of the psychiatric features of general paralysis is given by the leading Spanish alienist of Galdós's day, the Catalán Juan Giné y Partagas (1836-1903): paranoia, hallucinations, megalomania, religious delusions, mania, depression, violence and a remittent course with temporary lucid intervals that may give hope of a cure (*Freno-patología* 529-546).

This list suggests how comprehensively Galdós modelled his portrayal of Maxi upon the features of the disease such as those described by Giné y Partagas. In addition we might list the obsessively logical reasoning listed in 1880 by Tolosa's colleague, Vera, who in the same work, lists diffuse interstitial periencephalitis, diffuse interstitial encephalitis and softening of the brain as features associated with *parálisis general* (56, 75, 78, 60). The latter, cerebral softening, that Galdós has Ballester suggest as a possible diagnosis, is also listed as a feature of *parálisis general* in contemporary texts such as those of Giné y Partagas, (*Freno-patología* 539) and Fournier, (*Cerveau* 68-69).

Conclusions

It appears clear from the specific details of the description of Maxi that Galdós had undertaken thorough preliminary research into delayed congenital syphilis. It is difficult to ascribe to anything other than this condition his description of 15 features then associated with the disease, 8 psychotic features that *alienistas* described as typical of general paralysis and 3 anatomical-pathological terms associated with cerebral syphilis in the contemporary medical literature. Exactly where or from whom Galdós obtained the information remains unknown, though some details are in the books of his own library. The information he provides, however, would have been familiar to Tolosa Latour and to Tolosa's colleagues and must have been available to Galdós for the asking.

There are many dimensions to the fictional character of Maximiliano and it might be asked why Galdós would want to include such a very specific clinical picture in what, in the opinion of many, is his greatest novel. It is likely that his passion for medicine and his fascination for mental disturbance would have been united as he portrayed progressive insanity in his tragically malformed character, with its underlying theme of struggle for normality in the face of an

implacably progressive, congenital disease. There can be little doubt that Maxi's illness accords with the Naturalist poetics of the novel as it deals with a darker side of human sexuality with an almost documentary realism. I believe that an additional motive, as Galdós held up a mirror to the liberal middle class readers whose lives he sought to portray, was that they might be drawn to contemplate society's tragedies and to achieve something better with a new awareness of one of the great social vices of their time.

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NOTES

[1] Examples include: Pérez Bautista, Harriet Turner, L.C. Álvaro, and Á. Martín del Burgo, Rodríguez Acosta, and Gordon.

[2] Reviews of Galdós's knowledge of pharmacy in his novels include those of Franz, Smith, and Vozmediano Hidalgo.

[3] "La ciencia más comentada por Galdós en estas cartas [to *La Prensa* of Buenos Aires] es la medicina," (Shoemaker, 23).

[4] A chronological list of the pioneers of microbiology and their discoveries can be found online in Campbell's *The Germ Theory Calendar.*

[5] Marañón writes of Galdós's "suerte de devoción suya, como ante un poder superior, que para él lo eran mis conocimientos médicos" (171). A contrasting view of Spanish physicians working outside Madrid is provided by the French-American Eduardo Seguin. In contrast with the *alienistas* of Madrid and Barcelona, Seguin found many provincial asylum physicians unable to read foreign medical literature in languages other than Spanish, unsympathetic to the practice of non-restraint practised elsewhere, and unable to identify general paralysis of the insane amongst their patients, even though the condition had been described 60 years beforehand and was frequently recognized in the capital cities. Such a contrast suggests that Galdós's experience of the medical profession may have been of a cosmopolitan elite and that his portrayal of doctors in his novels was correspondingly biased.

[6] Berkowitz (*Liberal Crusader* 112) comments, "[…] he left to posterity few notes relating to his work. This almost total lack of such documents certainly deprives the student of valuable if not indispensable sources."

[7] Alas observes, "un curioso de toda clase de conocimientos, capaz de penetrar en lo más hondo de muchos de ellos, si le importa y se lo propone." (22).

[8] Ruth Schmidt records many letters that include medicine-related topics (31, 34, 35, 160, 167, 177).

[9] For Enrique Diego-Madrazo see Benito Madariaga de la Campa, (115-121), and Gómez Arroyo. For Alejandro San Martín see Fresquet Febrer and Herrera Rodríguez.

[10] Berkowitz (*biblioteca* 12) refers to books and letters that disappeared from the library and also lists books that do not appear in the catalog of de la Nuez.

[11] The historian, Tuñón de Lara (26), praises the documentary authenticity of this chapter of Galdós's novel.

[12] "Las guardillas y las casas de vecindad" provides a vivid first-hand description, while the review of Huertas vivir, explores the consequences of the extreme crowding of Madrid's underclasses.

[13] Hauser was a disciple of Pettenkofer and a firm believer in the disease-producing qualities of certain soils, which he expounded in 1885 ("Casa y suelo"). Given the limited distribution of sewers and the widespread use of outdoor latrines and *pozos negros* in Madrid, the soil must have been highly contaminated so that confusion was understandable. Hauser was not alone in adhering to older theories of infection after the water-borne transmission of enteric diseases was established, and he continued to describe it in his *magnum opus (Madrid)* in 1902.

[14] Morel's encompassing theory of social ills as forms of degeneration was never as influential in Spain as it was in France, though it did influence the thinking of Esquerdo and his disciples. The term *degeneración* appears in the defence of the criminally insane priest Cayetano Galeote by Luís Simarro and José María Escuder in 1886 (Varela and Alvarez-Uría 100-107), a sensational event that was covered by Galdós as a journalist who wrote, "no queda duda [...] de que Galeote es un ser degenerado. Su demencia es hereditaria,..." (*crimen* 87).

[15] Hauser describes syphilis as, "una enfermedad social propia de nuestro siglo, constituyendo uno de los agentes debilitantes y degenerativos de la raza humana." (*siglo* 214) A vivid statement of the degenerationist thinking of the time is found in Escuder where madness, crime, tuberculosis, scrofula and syphilis are included under the rubric of "diátesis [que] degradan la especie humana, la aniquilan, corrompen y pervierten;…" (197).

[16] For a discussion of the theme of degeneration in some of Galdós's novels see Stannard.

[17] The taboo against mentioning the word 'syphilis' is well illustrated in *El Niño* by Galdós's medical mentor, Tolosa Latour who, while advising women on marriage and motherhood, makes unequivocal references to syphilis without ever once mentioning its name, "cuyo nombre no queremos pronunciar" (30). Galdós's own reticence in writing about sexual matters is well illustrated by his critique of *La Regenta* written to Alas in 1885 in which he writes, "…como este [el acto de la reproducción] no aparece sino en ciertas y determinadas ocasiones […] el libro debe, a mi juicio, ofrecer una veladura semejante," ("Carta" 229-230).

[18] The citations of *Fortunata y Jacinta* are from the two-volume Cátedra edition edited by Francisco Caudet.

[19] naturaleza [...] linfática: a concept of morbid predisposition that goes back to Classical times. The hygienist Pedro Monlau describes it as: "carnes blandas y abotagadas; piel fina, descoloradas, sin velo [...] cabellos lisos [...] pulso lento, blando, fácil de deprimir [...] movimientos tardíos, lentos y penosos; sueño largo y profundo" (542).

[20] Fournier, (Cerveau), based on a series of articles published under the same title in *La France Médicale* in 1883. It should be emphasized that Hutchinson, Fourier and their contemporaries had no laboratory tests to confirm their findings and had to work entirely on the basis of clinical history and examination since the organism responsible for syphilis was not described until 1905 and a diagnostic test not developed until 1906.

[21] Auvard reports an annual mortality of infants under 2000 grams in two maternity units in Paris of 65-66%, a rate comparable to the mortality of all infants, both premature and at term, seen in foundling's hospitals in Madrid. After introduction of the *couveuse* (incubator) at the hospital of *Maternité*, the mortality was almost halved (38%) (1025-26).

[22] Schnepf emphasizes that the modern reader must be aware not only of the chronology of the narrative, but also of conditions obtaining at the time when the text was composed, as they are sometimes quite different. Maxi's fictive survival from severe prematurity in 1849 is a good example of this.

[23] Giné y Partagas (venéreas 490) vividly expresses the accepted wisdom of his day when he opines, "Por la cefalea y otros dolores de la misma índole se ha dicho, con razón, que *el ioduro de potasio es el ópio* (sic) *de los sifilíticos*" (author's italics).

[24] Welch describes aneurysms of the ascending (first part) of the aorta in the chest. Aneurysms can also involve the aorta in the abdomen, but they usually occur later in life as a result of different causes. The symptoms of Maxi's imagined aneurysm occur in the arm and chest which, together with his relative youth, suggest that Galdós was relying upon the picture of ascending aortic disease, one that is strongly associated with syphilis.

[25] In his poll of Spanish *alienistas* in 1882/3, Seguin records that a consensus had observed a striking increase in general paralysis of the insane in the previous 15 years (458).

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