GALDÓS THE PHARMACIST: DRUGS AND THE SAMANIEGO PHARMACY IN *FORTUNATA Y JACINTA*

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Throughout his long career as a writer, Galdós was passionately interested in medicine. The depiction of doctors, alienists, their co-workers, and their methods and remedies fills the pages of his novels. Because of the medical-therapeutic-pharmacological dimension, a sizable critical literature deals with this aspect of his knowledge and literary practice.[1] Where Galdós obtained particular facets of his medical insight is still open to conjecture, but it is known that he owned and consulted medical books and counted a number of Spain's most eminent physicians among his friends (Gordon 68-75; Ullman and Allison 17-24). These same sources indicate that Galdós routinely accompanied doctors on visits to patients, hospitals, pharmacies, and asylums. A little noticed sidelight of this medical content is the portrayal of the sciences of drug prescription and pharmaceutical preparation, with their application of chemistry to the countless maladies of mind and body. While many Galdós novels draw the physician in the act of prescribing drugs or regimens, only one, *Fortunata y Jacinta,* provides a detailed examination of the workings of the pharmacist.

Maximiliano Rubín studies pharmacy, experiments with drugs in search of a cure for his own mysterious psychosomatic illnesses, later works in a pharmacy, and is treated by other professionals with drugs taken from the same pharmacopoeia that he personally manipulates. Maxi's wife, Fortunata, also undergoes considerable drug therapy in connection with her delivery of a baby and the subsequent complications. Several other characters likewise receive medicines, and various prescribing physicians, pharmacists, and professors of pharmacy walk through or behind the pages of the novel. This pharmaceutical presence is concentrated in Part Four to such an extent that Pedro Ortiz Armengol, a knowledgeable guide to the historical and material details of the novel, has exclaimed about one section: «Estamos en plena orgía farmacéutica» (1050). Although pharmaceutical preparations are mentioned in Parts Two and Three of *Fortunata y Jacinta,* their concentrated and interactive relationship with the plot is restricted to Part Four. For this reason, the present study will deal only with this portion of the text.

It is likely that, in addition to his dealings with doctors, Galdós drew upon various sources for his understanding of pharmaceutical compounds and their therapeutic applications and of the practice of pharmacy. Berkowitz's catalogue of Galdós's library (40) lists two volumes from which, given their dates of publications and subject matter, Galdós could have drawn information about the preparation and properties of medicines incorporated into *Fortunata y Jacinta.* One is Part Two of an anonymous book that Berkowitz describes as a «Libro médico azul con índice de enfermedades y remedios,» a

materia medica published in London in 1884. The other is José Armanque y Tuset's *Estudios clínicos de neuropatología,* which appeared in Barcelona that same year. Apart from Galdós's library, there existed a host of more popular writings devoted to the afflictions and treatment of people from different walks of life. Balzac, for example, wrote a *Physiology of Marriage;* the French physician Jean Louis Alibert a *Physiology of Passions*; L. Conaillac a physiology of the bachelor and a physiology of the spinster (Ackerknecht 198). Galdós's close familiarity with and recourse to Balzac is pertinent in view of the major importance of medicine and pharmacy in the latter's novels. Balzac, like Galdós, had been a friend of many distinguished physicians who, under real or assumed names, became characters in his works. For example, three noteworthy physicians of the day appear in fictitious guise in the famous consultation scene in *La Peau de Chagrin* (Ackerknecht 198). Galdós partially duplicated this tactic in *La desheredada* by incorporating his own noted friends in the medical establishment (Gordon), and Krow-Lucal (10) has alleged that the medical aspects of this novel owe a great deal to Galdós's acquaintance with the entire *Comédie humaine.* Other French novelists whose impact on Galdós has been thoroughly documented—Flaubert, Zola, and Eugène Sue, the last of whom was a practicing physician for eight years (Ackerknecht 199)—had also made medical and pharmaceutical subjects a prominent feature of their fictions. Stephen Gilman has adduced sufficient parallels to show that the details of Maxi's impotency and Fortunata's frustration in *Fortunata y Jacinta* are in significant ways modeled on those of Víctor Quintanar and Ana Ozores in Alas's *La Regenta,* published shortly before Galdós's novel. It is not fanciful speculation to say that literary models of medicine and pharmaceutics played a considerable role in the depiction of behavior, symptoms, and treatment in *Fortunata y Jacinta.* The importance of literary source material notwithstanding, it seems more probable, to judge by the autor's lifelong habits and love affair with science, that, in order to build his pharmaceutical case histories, «Galdós manejó algún libro de Farmacia ... o, más probablemente, el asesoramiento de algún o algunos licenciados» (Ortiz Armengol 1044-45). Whatever the ultimate source or sources of the copious pharmaceutical details, it is certain that they have essential artistic functions in the text.

The following is an inclusive list of all the medicines that appear in Part Four of *Fortunata y Jacinta,* together with a description of their properties and physiological effects and of their therapeutic applications in the nineteenth century. In each entry these effects and functions are matched against the pathological symptoms, possible illnesses, therapeutic uses of the substance, and consequences of their administration in Part Four of the novel. Multiple appearances of a substance, similar substances and conditions, and related behavior are coordinated and cross-referenced. Finally, a number of tentative medical conclusions and literary implications are explored.

For the preparation of this study, I have not only consulted several vintage *materia médica* but have also benefited from the advice and suggestions of a number of experts.[2] I have adopted, in the vast majority of cases, the English pharmaceutical equivalents rendered by Agnes Moncy Gullón in her translation of Galdós's masterpiece. In a few instances, Gullón does not

distinguish between different chemical formulas popularly represented by the same nomenclature, and I have followed this practice, since it corresponds to Galdós's own disregard for preciseness in the matter. In other instances, where Gullón's literary task obliges her to choose between the English chemical name (e.g., sodium nitrate, phenol) and the English popular names (saltpeter, carbolic acid), I have listed both.

Drugs Mentioned in Part Four

ACONITE TINCTURE (*tintura de acónito*). Exceedingly poisonous cardiac sedative (Stedman 15) capable of producing extreme headaches. Ballester accuses Maxi of confusing this substance with various alcohols and alcoholates (i, 1; 414).[3] This interchange may suggest that some of Maxi's headaches are induced by the drugs he handles or ingests. As a tincture, this form of aconite can be absorbed through the skin.

ANTISPASMODIC (*antiespasmódico*). «Preventive or curative of convulsions or spasmodic affections»; «an agent that quiets spasm» (Stedman 93); «agents which prevent or allay spasm of voluntary or involuntary muscles in any portion of the organism» (Potter 23). The physician Quevedo takes an antispasmodic from the pharmacist Segismundo Ballester to administer to Fortunata during her labor (v, 2; 490). The drug is apparently successful, since the child is born without ill effects. Doña Guillermina seeks out Ballester in order to have him administer an antispasmodic to Fortunata to quiet her agitation after the violent struggle with Aurora Samaniego on the occasion of the latter's affair with Juanito (vi, 8, 10; 521, 526). Doña Guillermina's objective is to enable Fortunata to rest and to prevent her milk from drying up on account of nervous exhaustion. Fortunata sleeps poorly and the milk does eventually dry up, events which symbolize the dominance of psychological states over reason and societal order.

ARSENIC (*arsénico*). Administered as both an escharotic and a depilatory, its primary use was as an antispasmodic in the treatment of epilepsy and other nervous disorders. In small doses it promotes the appetite and digestion, but in toxic quantities it produces gastric disorder, anxiety, and nervous collapse. It is relatively easy to develop tolerance to arsenic by slowly increasing its dose (Potter 160-63). Haller notes (93) that in the nineteenth century arsenic was used to treat neuralgia, syphilis, dyspepsia, hypochondriasis, threatened abortion, postpartum hemorrhage, spermatorrhea, and functional impotency—conditions clearly associable with Maxi's sexual dysfunction and Fortunata's pregnancy. Maxi paranoically believes that his aunt, Doña Lupe, has put the substance in his chocolate, that she has obtained the drug from the pharmacist Ballester «porque también él está contra mí» (i, 2; 419). Doña Lupe has, in fact, secured the special chocolate, fortified with dialyzed iron (q.v.), from Ballester as an antidote to Maxi's anemic exhaustion, and in view of Ballester's thoughts about poisoning the drama critic Ponce with strychnine (q.v.), Maxi's suspicions of poisoned chocolate do spring from a particle of reality that his pathological mind has picked up and magnified. Arsenic was the most widely used drug in the *materia medica* of the nineteenth century (Haller 98), particularly because of its use in tonics to treat melancholia and anemia (Espinosa Iborra 25, 142). It would have been unusual for Maxi, as a pharmacist, not to have handled the substance many times daily and pondered its use as a treatment for his own condition.

ATROPINE (*atropina*). An alkaloid of belladonna commonly administered in solid form as a treatment for cerebral and spinal hyperemia, congestive headaches, encephalitis, meningitis, spermatorrhea, and involuntary seminal emissions (Potter 174; Ortiz Armengol 1044-45). Atropine is also a hallucinogen whose excessive use may lead to depression. It is one of the drugs contained on a list of poisons that Maxi has smuggled out of the Samaniego pharmacy in small packets and that he subsequently exhibits to Fortunata as he proposes their mutual suicide. By thus ending life, he reasons, they will succeed in escaping the «bestia» of the flesh which so consumes Fortunata in her passion for Juanito and which obsesses and humiliates Maxi in his inability either to inflame Fortunata or to perform sexually with her. Maxi's praise of a

drug commonly used to treat brain disorders and sexual malfunctions serves to reflect his hidden maladies. The drug's properties as a cure for headaches, when coupled to its use as a treatment for spermatorrhea, may signal in Maxi—who suffers from chronic migraine headaches—the presence of congenital syphilis (Ullman and Allison 11), the most commonly ascribed origin of schizophrenia in the nineteenth century.

BELLADONNA (*belladona*). Drug frequently employed to relieve pain and relax spasm (Potter 172-74). The major component of belladonna is atropine (q.v.). Ballester (vi, 1; 503) provides a belladonna salve and poultice to the drama critic Ponce, for use by his mother who suffers from rheumatism. The reference to belladonna may serve as a forerunner to the more important reference to atropine, discussed above, since the belladonna-atropine association juxtaposes the youthful romanticism of Ponce to the premature desperation and dysfunction of Maxi.

CAMPHOR (*alcanfor*). An antispasmodic (q.v.) which depresses the motor centers (Potter 171). It stimulates respiration and mental activity, even producing intoxication. It is capable of allaying pain. Often it increases the sexual appetite, but its continued use depresses the generative function (Potter 197). Excessive doses depress the heart, diminish reflex action of the spinal cord, and lead to coma and death. Ballester (i, 3; 422) orders Maxi to bring him the camphor, the saltpeter (q.v.), and the licorice powder (q.v.) in order to compound a prescription for a customer apparently in need of an antispasmodic. The association of Maxi with a drug that both increases and destroys sexual appetite is another reflection of his sexual dysfunction and frustrated desire. It additionally may suggest Maxi's unproductive use of drugs to restore impaired mental and physical functions (Ullman and Allison 11).

CARBOLIC ACID or PHENOL (*fénico*). Drug used to relieve itching and swelling, flatulence, dyspepsia, vomiting, and anthrax. Large doses depress the cerebrum and induce stupor (Potter 378-82). Maxi (i, 1; 415) has utilized two jars of carbolic acid as a set of bookends for the speculative-mystical volume he is reading, Flammarion's *La pluralidad de los mundos habitados.* As he resumes his reading, he notices a continued drowsiness, and the narrator describes him as having weak blood (i.e., anemia) and poor circulation. This description may ironically point to the implied author's ignorance of the possiblity that Maxi's contact with or ingestion of phenol, rather than simply anemia, could be the major cause of his stupor.

CASTOR OIL (*aceite de crotón*). Bitter, highly odorous, and nausea producing drug used as a laxative (Potter 415-17). Ballester (i, 9; 437) confects an egg yolk candy similar to those prepared by Olimpia Samaniego for her boyfriend, the drama critic Ponce. However, to punish the critic for sending him to a miserable and humiliating evening at the theater (Chamberlin, *Galdós and Beethoven* 92-93), Ballester fills the candy with castor oil (after reluctantly discarding the possibility of using strychnine [q.v.]). Circumstances ultimately do not permit the pharmacist to bring his joke to a successful conclusion, but the incident underlines the many near tragedies that drugs occasion throughout the novel.

CYANIDE OF MERCURY (*cianuro de mercurio*). Solid, odorless compound of mercury (q.v.) —like the more frequently mentioned iodide of mercury (q.v.)—which, when ingested, produces a deadly acid in the stomach. This is one of the poisons that Maxi smuggles home in small packets and proposes to use with Fortunata as a means to commit suicide and thus gain mutual deliverance from the pleasures and humiliations of the «flesh.» (See *atropine,* above, and various other substances, below.)

DIACHYLON (*diaquilón*). Derivative of lead (Wood 418-19), often administered as a plaster to treat eczema and other cutaneous disorders (Potter 397), Ballester (i, 1; 415) orders Maxi to sell «diez céntimos de diaquilón» to a woman who has patiently been awaiting service for a quarter of an hour. Placed in a context with other drugs used to treat both syphilis and disorders of the skin, the mention of this substance may contribute toward an extended code that alludes to Maxi's hidden disorder. The presence of lead compounds in the pharmacy where Maxi works may additionally provide a possible material cause for his cerebral degeneration, in accordance with the major explanation of insanity in the nineteenth century (Gordon 67).

DIGITALIS (*digitalina*). Primarily a cardiac and vascular stimulant (in excess it produces cardioglycocide, death through the arrest of heart action) but also a diuretic, an emetic, and purportedly an anaphrodisiac. Its use almost automatically causes headache, and even in moderate doses it induces hallucinations, delirium, and languor (Potter 262-63). In the nineteenth century the drug was used to treat delirium tremens, headaches, acute mania, feeble erections, and spermatorrhea (Potter 266; Espinosa Iborra 25). This is one of the poisons on the lengthy list smuggled out of the pharmacy by Maxi with the hope of persuading Fortunata to commit suicide with him. (See atropine and cyanide of mercury.) Maxi sadistically recommends digitalis over some of his other poisons for the reason that it produces death through a most painful type of asphyxiation (i, 10; 439), but the primary importance of its use in this context appears to be its reflection of Maxi's impotence, possible venereal disease, alternating languor and excessive energy, and hallucinations involving the afterlife, life on other planets, and the «spiritual» procreation of children. In ii, 1 (446) (here termed *digital*), the drug is prescribed for Moreno-Isla by his doctor, Moreno Rubio, in order to relieve his obsessions with fatherhood, resultant insomnia (thus the chapter title: «Insomnia»), and very real cardiac and circulatory disorders. In the present instance the drug has no effect, as the patient goes without sleep for ten nights. As Moreno Rubio had also prescribed that his cousin abstain from sex or affairs of the heart, excitations which the old man's constitution—mirroring Maxi's—can no longer tolerate, it can be theorized that Galdós is depicting in both Moreno-Isla and Maxi a conviction that the procreative instinct is often more powerful than the instinct for survival. Without sex, without the fantasies of love and a type of eternity through surrender and extension, the human organism feels threatened by a more immediate form of death than the one that ultimately occurs. Moreno's death shortly afterwards is as much due to his inability to escape the misery of the mundane as to his physical old age.

ERGOT OF RYE (*cornezuelo de centeno*). Powerful vasoconstrictor, cardiac sedative, and motor excitant. Large doses depress the heart and vasomotor center of the brain. In women it causes powerful contractions of the parturient uterus, and its primary use is the promotion of contractions in labor. It is also used to control many forms of hemorrhage (Potter 271-73; Haller 161-63). In v, 2 (490) the obstetrician Quevedo takes from the pharmacist Ballester a preparation of ergot of rye for administration to Fortunata, who is in labor, presumably to promote contractions and to halt bleeding. If Ullman and Allison (11) are correct and Maxi did self-administer drugs during his tenures as pharmacy student and pharmacist, the ingestion of a motor excitant would be consistent with certain hyperactive phases of Maxi's behavior (Ribbans 102-06).

ERGOTINE (*ergotina*). Drug used for the same purposes as ergot of rye (Potter 271). The substance is administered to Fortunata along with perchloride of iron (q.v.) and an antispasmodic (q.v.) by Quevedo (vi, 10; 526) in an attempt to calm Fortunata, who is prostrate in bed with her milk drying up after the debilitating fight with Aurora Samaniego. Yet Fortunata still has enough strength to insist that Maxi shoot Aurora and her lover, Juanito Santa Cruz, with the revolver for which she has given him money. The incident shows how even the administration of a powerful tranquilizer cannot immediately dominate Fortunata's sense of outrage and passion for revenge. Later, however (vi, 14; 539), Guillermina succeeds in getting the moribund Fortunata to drink more of this «eficaz medicamento,» which finally calms her after she undergoes the strain of dictating her unorthodox will to Estupiñá. The extra draught so disorders her mind that she is unable to make a coherent confession before dying. Taken together, the two incidents trace Fortunata's final resignation to life and death after her victory over Juanito, her superiority over Jacinta, and the welfare of the legitimate *Pitusín* have been assured.

EXTRACT OF WORMWOOD (*extracto de ajenjos*). Substance formerly used for treatment of dyspepsia. In large doses it produces tremor, stupor, and epileptiform convulsions (Potter 58-59). Ballester (i, 1; 415) prescribes this substance (along with hydrogenated iron pills [q.v.] and a laxative) for Maxi in an attempt to calm his overloaded nervous system on a hot day, a condition that is causing Maxi to compound prescriptions improperly. This incident, coupled to others that involve Maxi's improper labelling of bottles, confusion of substances, and dreaming while on the job, puts into doubt the correctness of all the prescriptions compounded in the Samaniego pharmacy. This situation, in turn, raises questions about the true causes of Fortunata's fatal illness, Maxi's mental degeneration, and Moreno-Isla's death.

GELSEMIUM (*gelsemina*). A motor and respiratory depressant that works on the spinal cord and respiratory centers of the brain. In moderate doses it causes languor, enfeebled musculatory action, and impaired sensibility (Potter 288-89). Gelsemium was commonly indicated in treatment of exalted nerve function, mania with great motor excitement, insomnia, delirium tremens, sick headache, and paranoia—almost all of which Maxi exhibits at one time or another. This substance, in fact, forms part of Maxi's long list of poisons which he proposes to take with Fortunata in order to escape the «bestia» of the flesh (see also above): «Pero lo bueno está aquí, míralo; el verdadero *ojo de boticario*, la bendición de Dios. Esto sí que mata, y pronto. ¿Ves este polvo gris? Es la *gelsemina*, la maravilla de la toxicación. La bestia se estremece sólo de verla, porque sabe que con esto no hay bromas. Muerte instantánea» (i, 10; 439). Maxi's high degree of enthusiasm for the drug may derive not merely from its quickness and throughness as a poison but also from his possible knowledge that it treats practically every one of his own major symptoms.

HASHISH (*hatchisschina or hatchiss*). Antipasmodic and analgesic, cerebrospinal stimulant, and powerful aphrodisiac that increases both intellectual and motor activity. In large doses it causes a pleasant form of intoxication in which the particular traits of the individual are exaggerated. In such states the ideas tend to flow so rapidly that all sense of time is lost. The substance has been used to treat migraine, delirium tremens, functional impotence, gonorrhea, and mania. Ballester (i, 8; 434) tells Fortunata and Doña Lupe that he is going to administer hashish to Maxi in order to determine if it will relieve his manic depressive spells, which consist of tirades of mystical nonsense and plans for suicide. Fortunata complains to Ballester (i, 11; 441) that none of the medicines that he has prescribed and prepared for Maxi's derangements seem to be producing any improvement. So bad has her husband's condition become that she and Doña Lupe are planning to have him committed to an asylum; but before they do, Fortunata begs Ballester to make up the hashish that had been mentioned some days earlier. Later (iii, 1; 462) Fortunata criticizes Ballester for failing to provide her with the hashish with which to alleviate Maxi's gloominess, and Ballester then hands the box of hashish pills over to her, jocularly urging her to take one to relieve her own frustration as well. There is no direct evidence that Fortunata follows his advice, but shortly afterward she exhibits violent motor activity by physically attacking Aurora Samaniego, Juanito's current lover. Fortunata (iii, 3; 469) queries Doña Lupe if she has given Maxi any of the prescribed hashish pills. Doña Lupe answers that she gave him two about eight hours apart, as directed, and that Maxi, while now in a much better mood, is still spewing forth mystical nonsense. Maxi's mystical transports and insane attempts to communicate the content of these feelings to Fortunata intensify, and in the midst of his religious soarings he has a vision that Fortunata is pregnant with the «hijo del Pensamiento Puro» (iii, 4; 471). Fortunata blames the pills and says that Maxi should not be given any more. It is apparent that the administration of hashish and hydrotherapy have little effect on Maxi's overall pathology (Ribbans 104); however, it also seems that his depression, confusion, and mental sluggishness are greatly relieved by the drug. While taking the medication, he correctly intuits Fortunata's pregnancy. In the subsequent three chapters and in the absence of evidence that Doña Lupe has ceased to administer the drug, Maxi reasons with exaggerated rapidity and lucidity, making many around him doubt that he is insane at all (except for his «too earnest» insistence on logical processes), and also correctly deduces that Fortunata is not only still alive but is giving birth to a child in an apartment on the Cava de San Miguel. While much of Maxi's improved behavior is doubtless attributable to the absence of Fortunata and her mirroring of his obsessive impotence, other aspects, including the disappearance of his depression and the quickness and ease of his thoughts and oratory, could stem from the hashish. As a well-known aphrodisiac and treatment for functional impotence and venereal disease, its appearance in Maxi's life reflects his underlying problems, and it is not surprising that, along with the many different preparations containing iron, hashish should be the most frequently mentioned substance in Part Four of the novel.

HEMLOCK or CONIUM (*cicutina*). Alkaloid whose ingestion produces motor paralysis and, in large doses, paralysis of the respiratory muscles. Its major application has been in the treatment of individuals characterized by excessive motor activity. Hemlock is another of the poisons on Maxi's list (i, 10; 439) for his communal suicide with Fortunata. He recommends the poison as a venerable soporific, in view of its use by Socrates. Yet, despite its ability to produce death amidst the sweetest of dreams, Maxi fears that the «beast» of his flesh may overpower

him to an uncommon degree while he is in one of its delectable transports. This, he reasons, is unacceptable for one who would devise a religion of «pure spirit.»

IODIDE OF MERCURY (*protoyoduro de mercurio* and *yoduro de mercurio*). Preparation used for the treatment of syphilis (Potter 316). Ballester (i, 3; 422) asks Maxi to help him with a prescription involving iodide of mercury for a patient with gonorrhea. In one of his states of agitation, Maxi pours in an excess quantity of the drug, which elicits a comment from Ballester to the effect that so much mercury will only make the patient's discharge of poisonous fluids even worse. Perhaps as a reaction to his own suspected condition, Maxi becomes nervous when handling a preparation linked to the origins of his mental decline. Maxi places iodide of mercury on the list of poisons for his and Fortunata's suicide.

IRON (HYDROGENATED or DIALYZED) (*hierro reducido por hidrógeno* or *hierro dializado*). Compounds of iron were used for treatment of anemia, epilepsy, and syphilitic chancroid (Potter 282-83). Nineteenth-century Spanish psychiatry frequently used iron to treat the weakness and anemia caused by psychic stress (Espinosa Iborra 142). Ballester (i, 1; 415) gives Maxi hydrogenated iron pills and extract of wormwood (q.v.) in order to relieve his mental disorder on a hot day. Doña Lupe advises Maxi to get rich by developing a panacea which may be sold on the mass market. Maxi answers that on the previous day he had considered the possibility and usefulness of adding dialyzed iron to all sorts of medicines. Ultimately, however, says Maxi, the ethics of pharmacy rule out the offering of panaceas (i, 1; 416). Doña Lupe suggests that, in order to counteract Maxi's mysticism, he be given some of the «chocolate con hierro dializado» that Ballester had supplied them for this purpose (i, 2; 429). Ironically, after smelling the chocolate, Maxi accuses Doña Lupe, Fortunata, and Ballester of trying to poison them with arsenic (q.v.). Ortiz Armengol (1045) notes that there are some two dozen references to chocolate in *Fortunata y Jacinta*. In late nineteenth-century Spain numerous attempts were made at marketing so-called «medicinal chocolates»; in fact, a particular Madrid pharmacy on the Calle Carretas ran advertisements for a chocolate with iron supplements, the very substance prepared by Ballester and administered to Maxi by Doña Lupe. In commenting further on Ballester's preparation, Ortiz Armengol terms it «un 'producto' más del mercado, una preparación bienintencionada del buen Ballester o un eco en el recuerdo de Doña Lupe, al acordarse de la idea de su sobrino acerca de la 'panacea'. En todo caso el término publicitario de 'dializado' parece indicar un reconstituyente obtenido a base de separar por diálisis las materias coloides de las cristaloides disueltas en un mismo líquido (!)... / Con probabilidad el término está utilizado por el novelista con partes iguales de humor y de sátira de una terminología publicitaria y pseudocientífica» (1048). Maxi's paranoia upon smelling the chocolate not only has some justification in fact (see paragraphs devoted to arsenic and strychnine) but recalls another character in the novel, Ido del Sagrario, who suffers a pellagra-induced psychosis whenever he consumes or even smells meat. Ballester (i, 3; 420) warns Maxi to put the properly colored labels on the syrups and drugs fortified with iron (see, also, extract of wormwood). The exaggerated emphasis on iron emphasizes Maxi's debilitated, and possibly syphilitic, condition and underlines the ambience of ignorance and quackery that pervaded medicine, psychiatry, and pharmacy well into the final decades of the nineteenth century. Since iron is a well-known antidote for arsenic (Potter 146), Maxi's paranoia at exposure to iron serves to reflect the twisted, pathological aspect of his not unfounded fear of being poisoned.

JALAP (*jalapa*). An «active cathartic, producing copious and watery stools..., also sometimes nausea» (Potter 324). Nineteenth-century Spanish psychiatry employed the substance as a purgative, with the idea of distracting the patient from habitual thoughts. Because of the drug's violent nature, its results were often deadly rather than therapeutic (Espinosa Iborra 25). Ballester's assistant, Padilla (i, 9; 437), conjectures about the funny scene that would follow if this substance were added to the trick candy that Ballester wants to feed to the drama critic Ponce (see, also, arsenic and strychnine).

LAUDANUM or MORPHINE HYDROCHLORIDE (*láudano* or *clorhidrato de morfina*). A preparation of opium used as a sedative and antidepressant (Wood 1135), analgesic, and antispasmodic (Potter 359-64). Its depressive effects are well known, but a little-known side effect of the drug is impotence. In the nineteenth century the drug was employed in the

treatment of pain, sleeplessness, melancholia, mania, and nervous prostration (Potter 359-64; Espinosa Iborra 142), all of which Maxi suffers. Maxi dreams that he drank a flask of morphine hydrochloride and that in the ensuing fictional stupor an angel announced to him that Fortunata was pregnant «por obra del Pensamiento Puro» (i, 1; 417). After telling this fantastic story, Maxi falls into a deep sleep, as if he had drunk «todo el láudano de la farmacia.» This dream within a dream recalls an episode in Part Three of the novel where Maxi is given a huge dose of laudanum to recover from the acute depression caused by his inability to consummate his marriage with Fortunata (Ullman and Allison 14). Only in dreams, and drug-induced dreams at that, can Maxi overcome his great obsession, impotence, a possibility seconded by the drug's drastic and highly ironic side effect of impotency.

LICORICE POWDER (*polvo de regaliz*). A demulcent used to mask the bitter taste of other drugs. Licorice powder is also a mild laxative and throat emollient, as it increases the flow of mucus and saliva. While specifically mentioned in i, 3 (422), when Ballester orders Maxi to bring him the licorice powder, saltpeter (q.v.), and camphor (q.v.) for the preparation of a prescription, the substance may be alluded to earlier (i, 1; 414) when Ballester urges Maxi to take a laxative to help alleviate his sluggishness and mental confusion on a hot day.

MERCURY (*mercurio*). A specific in the treatment of syphilis, and a useful substance for the treatment of gonorrhea, hepatic cirrhosis, diphtheria, cholera, and pneumonia (Potter 303-06). Among the mercury compounds that Maxi suggests for his suicide plot are iodide of mercury (q.v.) and cyanide of mercury (q.v.). The frequent references to mercury seem to support the hypothesis (Ullman and Allison 11) that Maxi's dementia was, in part, caused by congenital neurosyphilis or some other venereal disease.

PERCHLORIDE OF IRON (*percloruro de hierro*). An iron salt having no therapeutic functions not better served by other solutions of iron (Wood 1397). The primary use of all iron compounds is the treatment of anemia. However, iron compounds were sometimes used in the treatment of epilepsy and syphilitic chancroid (Potter 282-83). Ballester (vi, 10; 525) hands this substance—along with an antispasmodic (q.v.) and ergotine (q.v.)—to the maid while Fortunata lies in lethargy on her sickbed after the attack on Aurora Samaniego. Ballester prescribes the medicine as a treatment for Fortunata's anemia and generalized weakness following the birth of the *Pitusín,* the nervous exhaustion over Juanito's affair with Aurora, and the violent struggle between the two lovers. Mention of the compound also may serve to keep the notion of hidden syphilis alive.

PHOSPHORUS (*fósforo*). Element that serves to stimulate the brain and genital organs. Its therapeutic uses include the treatment of chronic nervous exhaustion, cerebral softening, neuralgia, cerebral anemia, and bilious sick headache (Potter 384-86; Espinosa Iborra 25), all of which can be seen as possible afflictions of Maxi Rubín. Maxi (i, 10; 439) includes it on his list of poisons with which to contemplate committing suicide with Fortunata. He correctly observes that phosphorus kills by poisoning the blood but fails to add the detail that its poisoning action constitutes an actual explosion in which the substance combines violently with the oxygen in the blood. This is the same effect that Ballester originally had hoped to achieve in his planned poisoning of Ponce with strychnine (q.v.). The presence of phosphorus on the list of poisons serves primarily to echo the suggestion of Maxi's genital dysfunction, possible syphilis, and cerebral deterioration. It is one of the few drugs mentioned in the novel which, under normal conditions, could have deadly effects by merely being placed in contact with the skin rather than by being ingested.

POTASSIUM BROMIDE (*bromuro potásico*). A powerful depressant of the nervous system as well as a hypnotic whose excessive use produces degeneration of the cortical cells and depression of the muscular system. It also paralyzes the heart, depresses sexual appetite and potency, produces somnolence, hallucinations, melancholia, and sometimes suicidal tendencies (Potter 181-82). All of the above symptoms are clearly present in Maxi, and in the context of the story it is plausible that Maxi may have ingested the drug. Potassium bromide ultimately may produce anemia of the brain, spinal cord, and sexual organs. In some subjects it generates maniacal excitement; however, its primary use is as a sedative for purposes of lowering excitement and inducing sleep. In nineteenth-century Spain it commonly was prescribed in attempts to interrupt hysterical psychosis, chronic hallucination, and certain forms of paralysis

(Espinosa Iborra 25, 142). Prolonged use of morphine (see laudanum and morphine hydrochloride) renders an organism extremely susceptible to the actions of potassium bromide. During a dream in which he was filling packets with potassium bromide (i, 1; 417), Maxi felt a strange thirst, ran to the pharmacy supply of morphine hydrochloride, drank it, and experienced the vision within a vision where an angel announced the pregnancy of Fortunata. It is possible that Maxi tasted some of the potassium bromide while filling «lo menos cien papeletas» with the substance and that the drug's interaction with the morphine already in his system produced the vision of the angel with its bizarre message. It will be recalled that the presence of supernatural phenomena in Galdós is almost always accompanied by a possible, but usually unconfirmed, rational explanation.

POTASSIUM IODIDE (*yoduro potásico*). Preparation used to alleviate melancholia (Espinosa Iborra 25) and, in combination with iodide of mercury (q.v.), to treat syphilis (Potter 316). Ballester (i, 3; 420) warns the confused and inattentive Maxi not to place the wrong labels on the potassium iodide and the dialyzed iron. Since Maxi supposedly has already taken the chocolate and dialyzed iron preparation compounded for him by Ballester from bottles of substances possibly mislabeled by Maxi, it is conceivable that he has ingested the wrong substance, an action that could explain why the chocolate fails to counteract his morbidity. On the positive side, the improper mixture could serve to treat a case of congenital syphilis.

REFINED LACTO-PHOSPHATE OF LIME (*lactifosfato de cal perfeccionado*). Potter (385) states that phosphate of lime (not refined and without the lacto prefix) has been used in the treatment of malnutrition, anemia, and softening of the bones. Lacto-phosphate of lime, on the other hand (Potter 578), has been used to treat anemia in nursing mothers. In the novel (i, 1; 416) refined lacto-phosphate of lime appears as an ingredient in a panacea which, according to the enthusiastic Doña Lupe, has made a pharmacist less scrupulous than Maxi and Ballester into a wealthy man. Since most *materia medica* recognize phosphate of lime and lacto-phosphate of lime but not refined lacto-phosphate of lime, we may assume that Galdós intended the name as a parody of the many useless preparations offered to the public under names that were deceptively similar to others recognized by international pharmacopoeias, bogus preparations that connoted a breakthrough improvement on the original, sanctioned substances.

SALTPETER or SODIUM NITRATE (*nitro dulce*). Diuretic and diaphoretic (Stedman's 1129), formerly used in treatment of dysentery (Wood 1583) and, like other diuretics, productive of temporary impotency. In the novel (i, 3; 422), Ballester orders Maxi to bring him the saltpeter, the camphor (q.v.), and the licorice powder (q. v.) for the compounding of a prescription. Together, the mention of two sexual depressants and a laxative may suggest the sluggish responsiveness (Chamberlin, «Poor Maxi's Windmill») of Maxi's genital apparatus.

SCAMMONY (*escamonea*). A drastic cathartic (Potter 434-35). Ballester's assistant, Padilla, talks about the advisability of putting scammony, not strychnine (q.v.), as Ballester had provocatively joked, into the piece of candy that Ballester had doctored up to play a trick on the drama critic, Ponce. Ballester, however, has chosen to use castor oil (q.v.), a milder laxative, which offers the advantage of possessing a terribly bitter taste (i, 9; 437).

SODIUM BROMIDE (*bromuro de sodio*). Used as a sedative to the nervous system, as a soporific, as a suppressant of the genital apparatus, and to counteract cerebral excitement (Potter 179-83). In various forms of insanity the bromides have been used «often to the detriment of the patient, causing a degree of mental dullness which simulates dementia, lowering nutrition and checking recovery» (Potter 182). In Part Four of the novel sodium bromide is mentioned three times. Maxi's brother, Juan Pablo, disturbed by Maxi's paranoia and hostility upon learning that Fortunata has abandoned him, suggests that his brother be given sodium bromide and hydrotherapy, which is reputed to be successful in dealing with diseases such as periencephalitis and meningitis (iii, 8; 478). All winter (v, 1; 486) Ballester has shower and sodium bromide treatments administered to Maxi, and the patient becomes so incredibly perceptive, calm, and logical for a time that, except for acute observers like Fortunata and Doña Lupe, he is taken for being completely sane. During this period, his strange admixture

of maniacal fixations and clear reasoning become the focal point for the narration and ultimately give rise to the title of chapter v, «La razón de la sinrazón.» After Fortunata's death and funeral—with Maxi totally insane on account of this recent tragedy, the interruption of his hope-inducing treatments, and the extreme excitement caused by Fortunata's earlier promise to love him eternally if he killed Aurora and Juanito—Ballester announces to Maxi that they must return to their earlier successes in treating him with sodium bromide and showers. The novel concludes with Maxi being spirited to the insane asylum of Leganés, the treatments not only having failed but having reduced Maxi to a submissive victim of his family and therapists. Galdós knew that hydrotherapy was cruel and ineffectual (Gordon 69-70; Ribbans 104). It is also probable that his many medical contacts (Gordon; Ullman and Allison 18-24) had taught him about the prolonged use of sodium bromide, which subdued the nervous system and genital apparatus to the point of creating the symptoms of greater mental and physical decline.

STRYCHNINE (*estricnina*). The primary effects of strychnine, administered in small doses, are to deepen and quicken respiration, increase action of the heart, enlarge the field of vision, sharpen sight and hearing, and render the sense of touch more acute. It increases sexual excitability and promotes erections. Administered in large doses, it induces convulsions and causes death by asphyxiation. Medically, it has been used to counteract anemia and general debility, palpitation in hysterical subjects, nervous impairment of sight, melancholia, and localized paralysis (Potter 35-54; Espinosa Iborra 25). Given these effects of the drug and its presence in Part Four of the novel, its possible connection to Maxi's greater awareness, confidence, and sense of manhood in chapters iii, iv, and v—that is, when Fortunata is absent, having her baby—cannot be totally overlooked. In i, 9 (437), Ballester jokes that he and Maxi have just filled a candy with strychnine to poison the theatrical critic, Ponce. The pharmaceutical assistant, Padilla, remarks that it might be more appropriate to play a joke with scammony (q.v.) than to risk a homicide on account of some bitter feelings. Ultimately, Ballester confesses to having filled the candy with castor oil (q.v.). This atmosphere of poison and parodic poison that surrounds not only Maxi's work in the Samaniego pharmacy but, especially, his boss in that pharmacy, doubtless contributes to Maxi's conviction that Ballester is trying to poison him with chocolate laced with arsenic (q.v.). Strychnine is also one of the poisons that Maxi smuggles out of the pharmacy in small packets for his suicide pact with Fortunata. Perhaps recalling the ugliness of the details discussed during the preparation of Ballester's recent prank, Maxi recommends that he and Fortunata not avail themselves of this particular poison, since it produces death by violent convulsions.

VALERIAN (*valeriana*). An antispasmodic that depresses the motor centers of the brain and stimulates the muscular fibres of the intestines to expel gases. Ballester catches the befuddled Maxi adding valerian to a prescription by mistake. Galdós apparently intends this as a subtle comic touch, since the drug is an antiflatulent and roundly justifies Ballester's comment: «Si seguimos así, lo mejor sería que doña Casta [Samaniego] cerrase el establecimiento (i, 1; 414).

Conclusions

1) With few exceptions, Maxi could not have come under the influence of the drugs in the Samaniego pharmacy by simply handling them or breathing their vapors. Most of the substances are salts and alkaloids and cannot be absorbed through the skin unless prepared as tinctures, a step that appears only once in the text. The few substances mentioned that emit a characteristic odor (camphor, cyanide of mercury) are not capable of exciting, depressing, intoxicating, or anesthetizing a subject through the breathing of their vapors. Therefore, if Maxi is affected by a drug, it is because he has ingested it. This is a reasonable conclusion for several additional reasons. First, the reader already had observed Maxi administering to himself drugs like potassium iodide in

part 2 of the novel, that is, when his pharmacy studies had barely begun. Second, pharmacy and the dispensing of drugs were still disorderly affairs throughout Europe, including Spain, during the nineteenth century. Few pharmaceutical laws existed before the 1870s, and many of these, according to contemporary chroniclers, were «a dead letter» (Kremers 197). It was only toward the end of the century that pharmaceutical laws began to be enacted to «regulate the practice of pharmacy and the sale of poisons and to prevent the adulteration of drugs and medicines» (199). In nineteenth-century Europe the preparation of a pharmacist generally consisted of many years of apprenticeship rather than a rigorous scientific curriculum pursued at an institution of higher learning (213). The more enlightened countries, such as Britain, Germany, and France, were already taking steps to turn this trend around. In Spain, the vogue of the apprenticeship pharmacist, or *boticario*, was gradually giving way to the academically trained practitioner, or *farmacéutico*, turned out by institutions such as the Colegio de Farmacia San Fernando (López Piñero, *Medicina y sociedad* 268-70). Although Spanish laws early in the century had begun to institute rigorous degree requirements for the licensing of pharmacists, these laws were frequently overturned, and the older practices were allowed to creep back in (Folch Jou 108-09). Maximiliano Rubín represents this incomplete transition to the modern era, and when we come upon him in part 2, chapter i of *Fortunata y Jacinta*, he is already attending daily classes in professional pharmacy. Simultaneously, however, he is doing apprenticeship work at the pharmacy of the family friend, Samaniego, who has agreed to pass the business on to him when he satisfactorily learns the science and the trade. The year is 1869, a scant fourteen years after the invention of the hypodermic syringe made addiction by morphine compounds a serious social problem and the precise point in time when Eduard Levinstein and his associates in Berlin were issuing the first modern understanding of the addiction phenomenon.[4] For a long period Maxi's painfully slow education is divided between taking professional classes part-time and helping Samaniego with prescriptions and errands at the pharmacy. However, by part 3, chapter 5 (the year 1874), Maxi's scientific education is largely complete, and he is spending the majority of his day at the pharmacy, supposedly solidifying his hold on compounding and dispensing procedures. In such an environment of part-time classes, semi-supervised apprenticeship, few laws, and lax control of substances, it would have been not only easy but natural for an unsteady soul like Maxi to medicate or experiment on himself.

2) A listing of the drugs that Maxi, Ballester, and Padilla handle in part 4, together with a list of the maladies or symptoms they are intended to treat, would constitute a pharmacopoeia designed to address most of the symptoms and illnesses seemingly exhibited by Maxi. These include venereal disease, impotency, feeble erections, spermatorrhea, low sex drive, impaired sensibility, epilepsy, spasms, headaches, hallucinations, paranoia, depression, sleeplessness, and many other conditions. This list of drugs and the conditions for which their use is indicated may be a valuable guide to the specifics of Maxi's medical and psychiatric condition. Many of the substances serve to treat or play jokes on characters other than Maxi; but this apparent impediment to reading the drugs as a guide to Maxi's illnesses disappears once we

accept the axiom that the total listing of drugs in Maxi's laboratory contains a code erected to suggest Maxi's secret ailments, including matters that Galdós judged better left to the reader's private detection: impotency, drug dependency, venereal disease, and the like. The drugs present (at least most of them) appear to both circumscribe and continually reflect specific areas of pathology that, upon careful observation, are found to be present in the minutiae of Maxi's behavior.

Drugs are an important part of Maxi's daily surroundings, and this systematized and interactive portion of his circumstance continually reflects the ordered disorder of Maxi's inner self. By deciphering the code that underlies the listing of the Samaniego pharmacy's drugs, the reader can participate in the time-honored literary process of realism, which allows the reader to plumb the presumed hidden depths of a given character that go unseen by other characters caught up in their own areas of concern.

3) It is apparent that Maxi frequently handles (and possibly ingests) drugs whose principal recognized uses include the treatment of inadequate sexual desire and impotency, conditions apparently related to the failure and ultimate «disolución» of the Rubín marriage. As a trained pharmacist, Maxi certainly knows the properties of these medications; but he either may not know or may choose to disregard the fact that the repeated or excessive use of these same drugs actually increases languor, insensitivity, and sexual dysfunction.

A study of the drugs present in part 4 of the novel provides no conclusive solution to the hotly debated question as to whether Galdós meant to specify that Maxi was totally or partially impotent, impotent before marriage, or incapable of sex only when his liaison with Fortunata had been blessed with societal and religious approval.[5] However, so many of the drugs that he handles constitute nineteenth-century treatment for venereal disease that one is tempted to speculate that the history of Maxi's dysfunction involves a slow deterioration.

4) In addition to drugs whose ingestion or overuse causes impotency or sexual dysfunction, other medicines handled by Maxi produce undesirable side effects of a different order: mania, hallucinations, delirium, impaired sensibility, paranoia, depression, excitability, hyperactivity, languor, stupor, anemia, and headache. Since Maxi appears to exhibit all of these symptoms, an accurate reading of the novel cannot preclude the possibility that he ingested many of these substances (which, as we have seen, are accepted treatments for certain of his symptoms and suspected ills) and that these substances in turn produced either more of the same symptoms or new conditions. Such a hypothesis explains the perception that in many situations in the novel it is impossible to determine whether a symptom indicates use of a drug or the use of a drug calls forth the presence of a symptom. Such play with causes and effects is a typical Galdosian technique.

5) Maxi both compounds prescriptions incorrectly and mislabels bottles that store substances used in the preparation of prescriptions by all three chemists at the Samaniego pharmacy. The logical outcome of this situation is that, in the drug-intensive treatment of Fortunata's difficult labor and Maxi's stubborn dementia, Ballester, Quevedo, and others unknowingly may

have dispensed prejudicial substances. Circumstantial evidence suggests that Fortunata's decline may derive from drug reactions and interactions as well as from her postpartum exhaustion and struggle with Aurora. If Maxi ingested drugs in an attempt to treat his sexual dysfunction and chronic dementia, he not only may have overused certain substances and applied counterproductive measures but also may have ingested ingredients of whose identities he was unaware.

6) While there is no textual confirmation that Fortunata ever followed Ballester's advice to personally use some of the hashish that he had prescribed for Maxi, there is the indirect evidence of her increased excitement and physical activity in the attack on Aurora Samaniego. This surge can be seen to parallel Maxi's greater excitability under the influence of the same drug, whose principal effect on him is an intensification of his tendency to spew forth mystical nonsense. Just as Maxi correctly intuits Fortunata's pregnancy as a result of the clairvoyancy he gains from this drug, Fortunata during this same period is able to intuit Jacinto's affair with another woman and to suspect the true character of the other woman even before the detectivesque Maxi concretely apprises her that the *Delfín*'s new lover is none other than her friend Aurora.

7) Given the number of poisons kept and handled in the Samaniego pharmacy, and given both the constant mention of poison in Maxi's surroundings and the plans of his temperamental supervisor, Ballester, to do away with the annoying personality of Ponce by recourse to poison, it is not illogical to presume that Maxi has a basis for fearing his own poisoning at the hands of his mercurial boss.

8) In the face of strong psychological stimuli, medicines designed to relieve psychosomatic symptoms (spasms, sleeplessness, headache) for the benefit of the individual and society are often ineffective and postpone confrontation with the underlying problems. Espinosa Iborra (25-26) has shown that the drugs used in nineteenth-century Spanish psychiatry rarely altered underlying causes but rather played dangerously with symptoms. This pharmaceutical impotence is seen in the cases of three subjects—Maxi, Fortunata, and Moreno-Isla—who illustrate the mind's and the will's resistance to matter and medicine as promoters of behavior. Together with the demonstrated capacity of medical substances to create as well as to control pathology, the drugs adduced in the final section of the novel show that Galdós's enthusiasm for medicine did not blind him to the fact that progress in medical science, as in other areas, brings with it a whole new set of problems.

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NOTES

[1] See González Arauzo; Willey; Granjel; López Piñero; Gordon; Ullman and Allison; Ribbans; Chamberlin («Poor Maxi's Windmill»); Krow-Lucal.

[2] These include Dr. Glenn Sonnedecker, former director of the American Institute of the History of Pharmacy, School of Pharmacy, University of Wisconsin-Madison; Dr. James Ying-Peh Tong, Professor of Chemistry and founder of the program in forensic chemistry at Ohio University; Dr. Ronald Sawyer, Assistant Professor of Medical History at SUNY-Binghamton; and Mr. Fred Ellis, registered pharmacist.

[3] Numbers refer to chapter and section of Part Four and to the page in the *Obras completas*.

[4] The importance of these dates was suggested to me by Dr. Glenn Sonnedecker.

[5] Gullón (*Galdós* 14) simply declares that Maxi is impotent, a judgment that he does not modify in *Técnicas* (150-51). Ortiz Armengol (1054) also terms Maxi impotent. Montesinos (257) does not accept Maxi's complete impotence and believes him capable of sexual performance both before meeting Fortunata and during the period he lived with her before marriage. Ullman and Allison (12) basically accept Montesinos's position and find Maxi sexually functional before marriage but psychosomatically impotent after he marries Fortunata. Gilman (160), agreeing with Ullman and Allison, considers Maxi a counterpart to *La Regenta's* Víctor Quintanar in his marital impotence and recalls that Quintanar (and presumably Maxi as well) had enjoyed sex during earlier times. Chamberlin («Poor Maxi's Windmill» 432) agrees that Maxi was impotent after marriage, but his discussion of water symbolism implies that nothing, neither emotions nor organism, appeared overtly dysfunctional during courtship. Ribbans (39, 93-94) seems to believe, on the basis of textual evidence, that it is impossible to decide whether Maxi was absolutely impotent or had a period of sexual functionality.

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