

12 The Prenatal: Contingencies of Procreation and Transmission in the Nineteenth Century

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But alas! *continued he, shaking his head a second time, and wiping away a tear which was trickling down his cheeks*, My Tristram's misfortunes began nine months before ever he came into the world.

—Laurence Sterne¹

After many years, in which the seed has monopolised attention, a time has arrived in which our thoughts are directed to the soil.

—John William Ballantyne²

During the nineteenth century, at a time when ever-growing knowledge production about reproductive mechanisms was bringing forth biology, human sciences such as medicine, physiology, and psychology were making their own efforts to understand the coming into being of individual human beings.³ Conception and heredity, in particular, were the thematic context within which these discourses intersected or, more precisely, constituted a field of interest not defined by discipline. Medical, physiological, and psychological approaches to conception and heredity were thus closely intertwined with biological knowledge about reproduction.

Yet there was one significant difference. Emerging biology carried out a conceptual shift when it addressed the coming into being of individual organisms as the continuous “reproduction” of the species as opposed to a “generation” of offspring through a procreative act by parents.⁴ This move from “generation” to “reproduction” was fundamental and far-reaching; however, it was not totalizing. In French physiological writing, for instance, the term *génération* continued to designate the coming into being of human individuals throughout the nineteenth century—at the same time as the concept of “reproduction” was gaining ground through the organization of biological knowledge, and that of “generation” was itself acquiring a new meaning to conceptualize populations in terms of “well-defined social and cultural collectives of individuals.”⁵ Such terminological inconsistencies are not simply due to the slow workings of semantic change. Instead, as I will argue in this contribution, they indicate that the

scope of concerns with the coming into being of human individuals remained broader—and the field they delineated more heterogeneous—than the history of the biological concept of “reproduction” has suggested. Space remained for a continued view of conception and heredity as elements of acts and processes of procreation, not just as mechanisms of reproduction.

Taking this perspective seriously permits, firstly, a historical investigation that addresses both major conceptual transformations and continuities, which may be understood as revealing not conceptual stability but processes of maintenance that require explanation no less than transformations do. Secondly, addressing concepts of “procreation” brings together two—or three—domains of research that often remain separated in historical research: the history of knowledge about conception and the history of knowledge about the unborn, which is also the history of knowledge about pregnancy. It thus becomes possible to avoid compartmentalizing in advance what today seem to be separate issues and instead to research the very historical process that led up to this separation.

This chapter tries to elucidate how, throughout the nineteenth and up to the beginning of the twentieth century, the question of intergenerational transmission was linked not only to emerging biological knowledge about conception, but also to the traditional assumption that contingent circumstances of pregnancy generate distinct features in the offspring. While the latter idea—encapsulated in the notion that “like begets like”—had very fundamentally informed concepts of “heredity” before the advent of modern biology and its notion of “reproduction,” during the nineteenth century it remained pertinent in research on pathogenic transmission.⁶ At the same time, such research was framed by ever more intense discourses of “degeneration,” which shared with concepts of “reproduction” a concern with the collective dimension of procreative processes.⁷ In this context, concepts of transmission remained heterogeneous up to the beginning of the twentieth century, and gestation retained its relevance as a site of transmission. In order to grasp this double implication, I look at the history of modern heredity from the perspective of a history of modern concepts of the coming into being of human beings.

In a first step, I address discussions of artificial insemination in France, to show how a notion of the procreative event as an act whose circumstances matter was sustained despite a fundamental shift toward a novel understanding of procreation as biological reproduction. This continuity is due, I then argue, to a contemporary concern with transmission that went beyond the biological quest for a hereditary mechanism. The third section of this chapter examines how, on the basis of a novel physiological conception of gestation as a time of “influence,” the field of “prenatal pathology” emerged in the nineteenth century. On new conceptual grounds, this field was able to preserve the relevance of contingent circumstances of conception and gestation. Finally, I turn to speculations about the possible pathogenic effects of a pregnant woman’s mental

state, in order to further substantiate my argument that traditional concerns dovetailed with novel concepts in a way that kept open a broader view of transmission among medical experts concerned with the coming into being of new human beings.⁸

12.1 From Act to Substance: Interpreting the Procreative Event

In 1867, the doyen of French obstetrics and gynecology, Charles Pajot, spoke out on a novel medical practice. His verdict was not favorable. Artificial insemination, he argued, was just one of “the eccentricities that come to us from the New World, and it will have difficulty in definitively acclimatizing to French ground; the common sense of our medical community does not provide fertile terrain for such methods.”⁹ Pajot was mistaken, however. If he frowned upon “such methods,” a handful of French physicians had already, and comparatively early on, undertaken experiments in artificial insemination and were about to adopt the technique into their practice.¹⁰ Artificial insemination in nineteenth-century France provides a salient entry point to the question of how the procreative event was interpreted in medicine. When justifying their endeavors, French physicians using the technique applied a rhetorical strategy that reveals a conceptual transformation. This transformation is not adequately described as a substitution of the sexual by the technological (as is often done in the historiography of assisted reproduction). Certainly, such a substitution did take place, and it was not innocuous, but it remains on the surface of a more fundamental epistemological shift.

Pajot’s 1867 remark referred to a manual of obstetrics and gynecology by the American James Marion Sims, which dealt—very cautiously—with artificial insemination. By the time Sims’s manual appeared, the French Academy of Science had already received four reports on experiments of this kind, dated 1847, 1853, 1861, and 1864.¹¹ Even earlier, in 1803, a small brochure had been published that announced its topic in an all-embracing title: “Application to the Human Species of Experiments Performed by Spallanzani upon Some Animals, Referring to the Artificial Fecundation of Germs, or, Results of an Experiment which Proves that One Can Make Children with the Concurrence [*concurrence*] of the Two Sexes but without Their Intimate Rapprochement [*approche*].” This text, published under the alias “Tourette” and attributed to the physician Michel-Augustin Thouret, initiated the documented history of artificial insemination in humans in France and records the first artificial insemination in humans that can be dated with certitude.¹² Thouret referred to a then famous experiment by the Italian priest and natural philosopher Lazzaro Spallanzani, who in 1780 had succeeded in inseminating a bitch using a syringe. Applying this technique to one of his patients, Thouret did not perform the experiment himself but gave instructions to the concerned husband. Although “purely mechanical,” Thouret argued, the procedure could still not be realized without certain “preliminary acts” (*actes préliminaires*), consisting in “voluptuous caresses” (*caresses voluptueuses*) that aroused “delirious sentiments”

(*le délire du sentiment*).¹³ Conception, according to Thouret—in line with a long-held belief—could not do without gestures and sensations of desire.

When, sixty years later, physicians had abandoned the idea that “voluptuous caresses” were necessary for conception, the syringe could be placed in the hands of the physician.¹⁴ From this moment on, reports on artificial insemination were presented before learned societies and doctoral committees and published in medical journals and monographs; soon artificial insemination found its way into obstetrical manuals and medical handbooks.¹⁵ However, since the technique brought a third party into an event involving the sexual, it evoked moral qualms even among those physicians who applied and promoted it. Their writings on the topic were therefore not restricted to technical aspects alone (when, how, etc.) but applied a quintessentially legitimizing discourse, justifying artificial insemination in the first instance as a therapeutic intervention for the benefit of sterile couples.¹⁶

Yet there was also another line of reasoning, epistemological rather than moral in quality. This likewise aimed to neutralize the disturbing fact of intervention into sexual matters, but it did not legitimize the physician’s interference in the procreative act in terms of any therapeutic function. Instead, the procreative event itself was reinterpreted in such a way that medical intervention became external to it. Procreation, it was argued, actually did not require any doing by human agents, even in the case of “natural” conception. As physician Pierre-Fabien Gigon reasoned in his doctoral thesis on artificial insemination: “Normal fecundation is the result of the material and intimate contact of ovum and viable sperm.”¹⁷ From this he concluded, referring to the physiologist Johannes Müller, that conception can dispense with the participation of any male person: “sperm is sufficient as long as it is introduced into the female body.”¹⁸ Gynecologist Joseph Gérard, probably the most ardent and controversial proponent of artificial insemination in France, argued in the same vein: “Two elements are indispensable when making a child: a cell of the mother, a spermatozoid of the father. The beginning of a human being is limited to this.”¹⁹ And physician Félix Dehaut defined conception as “bound to this encounter between the generative products of the two sexes.”²⁰ In order to neutralize a novel, and morally doubtful, medical intervention, these authors cited novel biological knowledge. The penetration of the ovum by the spermatozoid having been theoretically postulated in 1824, in the following decades microscopy successively identified this penetration, the nuclei of the germ cells, cell fusion, and eventually, in 1875–1876, the fusion of the nuclei.²¹ On such grounds, histologist Charles Robin—often cited by practicing physicians—concluded in 1878: “Fecundation, conception or incarnation is a physiological phenomenon whose primary agents are, from an anatomical point of view, the ovum on the one hand and the spermatozoids on the other.”²²

By referring to such biological knowledge, physicians realized a major conceptual transformation: something that from a biological point of view constituted

the mechanism of procreation became, in the medical discourse, the very procreative event itself. If what physiologists, histologists, and cytologists observed under the microscope *was* procreation, the “doing” of parents (or physicians, for that matter) revealed itself to be a mere accessory to the procreative event. Taken, thus, as a purely biological event, it was of no importance who set it in motion and by what means—whether a sexual act or a physician’s handling of a syringe. The procreative event, hitherto understood as an act involving a relationship between persons, was transformed into an interaction of substances; what used to be the doing of human subjects became a physiological phenomenon, what was once the “rapprochement” of a woman and a man became the “encounter” of bodily substances, and what were previously social actors became physiological agents, the ovum and spermatozoid.

12.2 The “Transmission Problem”²³

However, the physicians who insisted on this revised notion of procreation did not simultaneously let go of its predecessor. While they declared it to be irrelevant how and by whom the procreative event was induced, they also raised a grave concern: was it possible that fecundation by syringe could impact on the vitality and the traits of the children thus conceived? The editor of a medical journal introduced the subject of artificial insemination with speculation on these lines: “It is probable, according to the law of heredity, that in human beings conceived by a kind of fleeting sentiment the sensorial system dominates the intellectual or reflexive system.” Hence, in the case of artificial insemination, “the contrary will happen” and “the products thus conceived will differ from those resulting from ordinary procreation.”²⁴ Félix Dehaut mused that it might be possible, by means of artificial insemination, “to conceive in a more perfect manner” since it was “widely known that the mental state of the parents in the procreative moment exerts a considerable influence on the product.” By orchestrating the procreative event, the physician would be able to choose “the circumstances most favorable” to a desired outcome.²⁵ In a more dystopic vein, journalist Georges Barral asked,

Will the purely mechanical operation of artificial insemination be able to provide morally capable subjects? There is no doubt as to the perfection of forms. If the germ is viable, a child thus conceived will possess all the morphological features of a non-degenerated race. However, as to his instincts, as to his intelligence, as to his sentimental aspirations, it could happen that his moral and intellectual organization will be thrown into disarray, and he will be turned into a maniac, a neuropathic, a lunatic.²⁶

Hence, with regard to the question of how artificial insemination might shape the features of the offspring, medical discourse in the nineteenth century preserved a

notion of the procreative event as an act—since it was believed that the quality of this act could determine the traits of the prospective child. In other words, “voluptuous caresses,” while not necessary to conception, were still perceived as possibly relevant to its outcome. The notion of procreation as an act performed by social actors is thus continued at the very same time as it is rebutted. This ambivalence reveals, on the one hand, that it was not possible in the context of the human sciences to distill a “biologized” concept of the procreative event out of rival interpretations. On the other, it testifies to the heterogeneity of ideas about the transmission of traits from parents to the offspring in this period. A notion of “hereditary transmission” that disconnected heredity from “the contingencies of conception, gestation, embryogenesis, birth and breastfeeding” was far from stable at the time.²⁷ Thus, the manifestation of the procreative act’s quality in the traits of the child could be assumed as a presumed “law of heredity” and had to be taken into account when considering the use of artificial insemination.

When he evoked the formative power of the procreative event, Georges Barral substantiated his worry not with individual examples but with a reflection on a whole group of children conceived in Paris during the Franco–Prussian War of 1870–1871 and the revolutionary events during the *Commune de Paris* in spring 1871:

It has been observed that the pathogenic effect of political or social upheaval on the physical and intellectual qualities of the human being in the making has always been very strong. The many developmental disorders observed among the children born in the late months of 1871 ... have bestowed upon them the name of *enfants du siège*, which became a synonym for wayward children of a disastrous destiny.²⁸

Barral referred to a phenomenon that preoccupied several physicians and psychiatrists in the 1880s, in particular Henri Legrand du Saulle and Charles Féré. Both shared with their contemporaries an intense interest in heredity and “degeneration.” Legrand du Saulle began his career as an assistant to Bénédict Augustin Morel, who had presented a systematization of degeneration theory in 1858, and succeeded an equally influential theoretician of heredity, Prosper Lucas, as director of the Bicêtre Hospital; Charles Féré, a disciple of Jean-Martin Charcot, soon became a prominent voice in contemporary discourses on hereditary disease.²⁹ It is within this context that both raised the question of whether the “mental traumatismes” (*traumatismes morales*) (Legrand du Saulle) or the “mental shocks” (*chocs morales*) (Féré) experienced by besieged Parisian women in 1870–1871 had detrimentally affected the development of the unborn children they were carrying at the time.³⁰ This speculation fed into the more fundamental question of what Féré called “the psychic influence” in pregnancy.³¹

This hypothesis picked up on a well-established interest in accounting for congenital anomalies in terms of disease transmission, which explains why Barral made use of the

enfants du siège as evidence for his argument that the circumstances of the procreative event had a “hereditary” relevance.³² In an almost paradigmatic way, the coming into being of these children presented pregnancy as a transmissive link, with transmission, moreover, appearing in its decidedly “modern” sense, as a mediator of generational times.³³ Through the assumed relation between the experiences of a pregnant woman and the features of her prospective child, a mother’s contingent present becomes her child’s determined future. In other words, by way of gestation, women bequeath their children the effects of their own experiences.

The concern for this phenomenon was situated, on the one hand, within contemporaneous fears of “degeneration,” that is, a spreading of disease across generations that was increasingly perceived as having taken on epidemic dimensions. On the other, it rested on the nineteenth-century idea of “heredo-intoxication,” which saw pathologies in the child as effects of physicochemical injury caused to the germ and developing organism by its environment or “milieu.”³⁴ To be sure, during the second part of the century such “accidental” causation of pathology was more and more sharply distinguished from “true heredity,” the regular reproduction of pathological parental traits in the offspring.³⁵ However, throughout the nineteenth century both belonged to a broad epistemic space called “heredity,” in that they both attributed the pathologies of the child to mechanisms operative in the procreative event.³⁶ Alongside the contemporaneous quest for a hereditary mechanism that could alone account for the transmission of traits, the interest in heredo-intoxication thus preserved the significance of pregnant women’s life conduct and experiences as agents of transmission.

While recent work has drawn attention to this history of heredity beyond genetics, the conceptual foundations of non-“hereditary” approaches to transmission need to be explored further—not only in order to trace their own features, but also to understand how the idea of heredo-intoxication contributed to bringing forth an increasingly distinctive research field of “the prenatal” at the turn of the century. This was a time when the epistemic space of heredity was gradually narrowing as the foundations of genetics took shape and, in life sciences, transmission was reduced to the workings of a hereditary mechanism.³⁷ Despite never attaining a disciplinary identity, this research field aggregated at the intersection of various human scientific disciplines (especially medicine, physiology, and psychology) where, at the end of the nineteenth and the beginning of the twentieth century, the notion of the “prenatal” or the “antenatal” began to take hold in the context of a wide range of research on development.³⁸ That notion has a complex genealogy, having emerged from an array of traditional and newer interests and performing a multiplicity of conceptual operations.³⁹ At its core lay a novel conceptualization of the unborn and gestation that had arisen during the nineteenth century and also provided a coherent framework for research on pathogenic transmission in pregnancy.⁴⁰

12.3 Influence: Fetal Physiology and Prenatal Pathology

In 1883, the German physiologist William Thierry Preyer published a book on *The Special Physiology of the Embryo* in which he introduced himself as the founder of a new discipline, entitled “physiological embryology,” “biochemical and physiological embryognosis,” or “history of functional development.”⁴¹ Preyer’s book had an immediate impact all over Europe in handbooks and manuals of physiology and medicine that had hitherto concerned themselves only rather unsystematically with the physiology of embryos and fetuses (blood circulation, metabolism, nutrition, etc.).⁴² In fact, however, Preyer was less the founder of a new discipline than the organizer of an existing body of research on what I propose to call the “physiological particularization of the unborn.” These endeavors can be traced back to the eighteenth century, when doubts arose as to whether the pregnant woman and the unborn child constituted the kind of organic unity that had previously been assumed. The Hippocratic idea that the fetus respire through its mother’s mouth was rejected, and soon it was proven that the pregnant woman and the unborn child did not share a common blood circulation.⁴³

This physiological differentiation of the unborn from the maternal corresponded to a dissociation taking place in contemporary anatomical representations, where the unborn was depicted as a more and more isolated entity. As Barbara Duden has shown, most representations of unborn children in this period “do not even have an umbilical cord, a memory to a maternal relationship. They appear out of context, without relationship to a woman, to flesh, to a placenta, to origin.”⁴⁴ Both ways of separating the unborn off from the maternal body—*anatomical and physiological*—were realized within the context of the contemporary emergence of the notion of the “organism” itself, denoting the “individual” in natural philosophy and a “structure–function complex” in research on the living.⁴⁵ However, while anatomy and physiology both turned away from the idea of a corporeal unity, physiology went on to reassemble what were now perceived as two separate “organisms.” In contrast to the morphological features of the unborn, its functional features could not be understood without accounting for the maternal body as a provider of vital elements (oxygen, nutrition, etc.), that is, without accounting for the individual organism’s “milieu.” The physiological approach to the unborn thus placed the two separate organisms in relation to each other, in terms of “communication”⁴⁶ or “exchange.”⁴⁷

Hence, there was intense interest in the placenta, which was now conceived of as an “intermediary organ.”⁴⁸ It simultaneously separated and linked the two organisms and thus epitomized the distinct physiological perspective on the unborn that was emerging in the nineteenth century. This conceptualization was articulated by the obstetrician Adolphe Pinard in 1878:

There is no direct communication between the maternal and the fetal blood, as was assumed in the past. Completely independent from the anatomical perspective, the two vascular systems ... are, from a physiological point of view, intimately correlated [*en correlation intime*] due to the thinness of the panels that separate them, and allow a constant and multiple exchange.⁴⁹

At the heart of what defined the child to come, then, lay a tension between self-containment and dependence. As Karl Burdach's handbook of physiology put it,

Both are individuals aspiring to a peculiar existence [*ein eigenthümliches Daseyn*] or trying to maintain such an existence, but both also constitute a community [*ein gemeinschaftliches Ganzes*], they interact and are dependent on one another [*stehen in Wechselwirkung und sind von einander abhängig*].⁵⁰

Against the backdrop of such relational notions of the unborn, pregnancy came to be thought of as a time of "influence." It is this concept that informed a series of teratological experiments performed by Charles Féré as he embarked on his attempt to understand pathogenic transmission. Harking back to the work of Étienne and Isidore Geoffroy Saint-Hilaire and, especially, Camille Dareste, Féré was not the first to engage in such an endeavor but is of particular interest here due to the systematic conclusions he drew from it.⁵¹ By introducing substances like nicotine, morphine, microbes, or infected blood into hen's eggs and pregnant rabbits, Féré observed the teratogenic and pathogenic effects that toxic substances and infections exerted when they found their way into the embryonic or fetal organism. Hoping to integrate teratology into general pathology, Féré successfully linked the question of malformation to that of congenital diseases, for his research was able to show that the same substances which produced morphological anomalies when effected in an early developmental state caused functional anomalies—such as infertility, morbidity, or debility—when effected in a later developmental phase. A whole range of disorders (sterility, malformations, abortion, stillbirth, retarded development, etc.) was rendered homogenous by attribution to the same mode of origination, namely, an injury to embryonic or fetal development whose effect depended on the time of its occurrence. "Like monstrosity," Féré argued, "morbid predisposition is the result of troubled evolution."⁵² In this way, "before birth" became the overarching category of analysis.⁵³

Féré himself did not represent his work as a contribution to research on the "prenatal"; in fact, he did not use the word, but spoke instead of research on "morbid heredity" caused by "accidents" during conception and gestation as a mode of pathogenic, or "degenerative," transmission that he sought to distinguish from "heredity" or "true heredity."⁵⁴ However, his work was instantly and enthusiastically welcomed by the Scottish obstetrician and gynecologist John William Ballantyne, who hailed it as an exemplary contribution to the "novel medical subdiscipline" he hoped to launch with his *Manual of Antenatal Pathology and Hygiene*.⁵⁵ Féré's work was located in a clearly

French context, with regard both to its concern with heredo-intoxication and to its links with fears of depopulation and “degeneration.”⁵⁶ Nonetheless, it was highly salient in disciplinary terms and thus beyond French borders because of the way it theoretically and experimentally interlaced the study of congenital anomalies and pathologies not only with the physiological concept of “influence,” but also with the notion of “development” that had come to prominence in embryology around 1800 and consolidated toward the end of the nineteenth century by framing psychologies of the child as “developmental psychology.”⁵⁷ As “development” shaped research on gestational accidents in a more and more consistent and systematic manner—as it did in Féré’s experiments—the temporal notion of the “prenatal” became more and more evident, prevailing over the rival, spatial notion of the “intra-uterine” and thus providing the confluence of research fields (mentioned above) with a label that was both conceptually saturated and productive.⁵⁸ In this context, contingent circumstances of conception and pregnancy that had transmissive effects could be thought of as “prenatal influences.”

12.4 Hesiod Was Right: Continuing Maternal Impression

Physiology being intimately linked to psychological questions, research on “prenatal pathology” included an interest in the influence of emotions that preoccupied Charles Féré and Henri Legrand du Saulle in the case of the *enfants du siège*. Since they assumed that psychical processes corresponded to physiological processes, it appeared plausible that the physiological relation of exchange and communication between the pregnant woman and the child to come had a psychological analogue. Emotional states of the mother that, Féré and many others surmised, translated into nutritive disturbances and vascular contractions could affect the unborn child.⁵⁹

However, while fetal physiology and prenatal pathology furnished the hypothesis of “psychic influence” with new conceptual foundations, the hypothesis itself was not novel. On the contrary, it can be regarded as the transformed version of an ancient idea, known as the theory of “maternal impression” or “maternal imagination,” or in German *Versehenslehre*.⁶⁰ According to this, visual impressions and mental images that accompanied a strong affect (desire, shock, horror) molded a child’s physical appearance, producing resemblances, birthmarks, or malformations.⁶¹ Charles Féré was well aware of this tradition when he speculated on “psychic influence”:

The influence of the parents’ psychic states at the moment of conception ... attracted attention long before medicine concerned itself with the phenomenon. Hesiod recommended not to copulate when returning from a burial lest melancholic children were engendered. Erasmus of Rotterdam commented on his madness by saying: “I am not the product of a dull marital love.” Tristram Shandy attributes his quirks to a question raised by his mother in a very untimely moment.⁶²

Such references to fiction and popular knowledge, rather than medical literature, testify to the fact that since the eighteenth century the theory of maternal impression had been subjected to devastating critique. However, it would be a mistake to conclude from this that the idea disappeared from learned discourse in the nineteenth century. What was certainly rejected was the idea that visual impressions and ideas shaped the child to come by reproducing themselves in his or her features—when, for instance, the horrifying sight of a crab gave rise to clawlike hands in a child. Such ideas belonged to an epistemology of analogy that could not satisfy the demands of empirical science.⁶³ On the other hand, the more general (and in fact more ancient) notion that a pregnant woman's mental states could mold traits in the offspring did not disappear but reacquired plausibility on new grounds. For example, in 1818 the *Dictionnaire des Sciences Médicales* dismissed the reproductive force of maternal vision and imagination yet argued that “moral affects,” “animated emotions,” and “storms of passion” could absolutely compromise development.⁶⁴

Hence, emotion was no longer considered to be the medium by which an image exerted its formative power but became that very power itself—a power that could plausibly be assumed since the emotional, as a psychic occurrence, could be searched for corresponding physiological processes. With this shift, the mental state of a pregnant woman ceased to be a creative force capable of producing monstrosities and, indeed, resemblances. Instead it became a matter for concern—concern about pathogenic factors that would act on a future child. Finally, as to the effect itself, interest shifted from morphology to functional pathologies or anomalies of development, or, as Féré called them, “functional stigmata” like the ones he deplored in the *enfants du siège*: “retarded motion ... , retarded language evolution, ... anomalies of motion, tics, ... morbid emotionality.”⁶⁵

This transformed notion of maternal impression can be found in numerous medical and physiological texts throughout the nineteenth century. Eventually, in 1895, French biologist Yves Delage observed, in the framework of reflections on the inheritance of acquired characteristics, “that it is not proven that very violent emotions ... cannot exert influence upon the product of conception.”⁶⁶ Far from disappearing during the nineteenth century, the theory of maternal impression underwent a transformation that made possible Féré's hypothesis of psychic influence and found its paradigmatic expression in the *enfants du siège*. From the 1880s onward, those unlucky children toured the human sciences, constituting a sort of key to a transformed notion of mental influence. They were frequently invoked in the course of speculations about the causes of anomalies in children other than accidents, illness, or education. As one psychologist and educationist put it, very much in terms of the “prenatal,” one had “to go beyond birth, to the period of gestation, back to a pregnant woman's emotions.”⁶⁷ And John William Ballantyne—not only concerned with the founding of antenatal medicine but also profoundly knowledgeable on the history of the doctrine of maternal

impression—referred to the *enfants du siège* when he argued that “prolonged or strongly marked mental states of the mother may affect the development of the foetus in her uterus.”⁶⁸

In the first decades of the twentieth century, the discourse on psychic influence ramified. On the one hand, it branched into what would later be called “prenatal psychology,” mingling dissident psychoanalysis with developmental psychology.⁶⁹ In this strand, psychic influence was approached as an interaction between a pregnant woman’s psychic life and the nascent psychic life of the unborn. Elaborations of this idea fed into a concept of the fetus as capable of sensations and experience. This constituted another aspect of the prenatal, imagining the time spent in the uterus as “the first page of the book that must be deciphered by the psychologist without haste or despair.”⁷⁰ On the other hand, in the first half of the twentieth century the hypothesis of psychic influence became an object of medical and psychological research that, with the detection of hormones and the advent of endocrinology, had at hand the physiological correlative of emotions and was thus able to investigate the matter experimentally.⁷¹ This context gave rise to research on the impact of “stress hormones” on a prospective child’s health and features, eventually prompting the embryologist and historian of science and medicine Jane M. Oppenheimer to remark, in 1968, that the theory of maternal impression might actually not be “the vulgar error” it was commonly assumed to be.⁷² Indeed, the influence of a pregnant woman’s emotional (and physical) states on the child to come has since—in the shape of the “fetal origins” or “fetal matrix” hypothesis—become a new frontier of cutting-edge science.⁷³ Moreover, the current rise of epigenetics fully restores the hereditary relevance of the contingencies of pregnancy: research seems to show, for instance, that “early stress” (i.e., stress experienced in the womb) causes disease not only in the individual experiencing the stressful intrauterine situation but also in its descendants.⁷⁴

The sudden acceptance and remarkable boom of such research can be explained by the demise of genetic determinism.⁷⁵ Its astonishingly rapid and almost complete translation into popular science, however, may be linked to what is currently identified as the “state of anticipation” as a “defining quality of our moment.”⁷⁶ In the setting of the fetal origins hypothesis, pregnancy becomes a moment where the future, claimed to be determined by the present, in turn determines that very present. It may thus be a further example of a “regime” that “gives speculation the authority to act in the present.”⁷⁷

12.5 Conclusion

A diversity of human scientific discourses on procreation in the nineteenth century shared an underlying concern for transmission as something that could secure

continuity yet was also vulnerable to distortion. This concern manifested itself in the unease around the passing on of traits raised by the novel technique of artificial insemination—or, more generally, around a revised notion of the procreative event. It was also expressed in the conceptualization of pregnancy in the temporal terms of the prenatal, which made a woman's contingent present into her child's determined future, and was again revealed when the unborn was thought of as a possible realization of assured continuity or pathological discontinuity.

As I hinted in my comments on degeneration theories, it is important to note that the fear of distorted transmission did not, at this time, primarily attach to individual accidents, but rather to social phenomena that were believed to be spreading among particular social groups or even the whole of society (syphilis, alcoholism, war trauma, etc.). This becomes evident in a crucial aspect of the discussion on the *enfants du siège* that I could only touch on here: the fact that the children were of interest not merely as individual children or as a statistical entity validating a theoretical speculation. Rather, they were talked of as a “generation” that had inherited the experience of its mothers, an experience conceived of as a “generational trauma.”⁷⁸ It is no coincidence that the *enfants du siège* became the object not only of medical discourse but also of a debate that, in the midst of the contested and fragile Third Republic, evolved around the memory of France's defeat and the revolutionary uprising of Parisians.

Transmission by way of the contingencies of conception and pregnancy was, then, quintessentially linked to the issue of social continuity (of the “race,” the nation, etc.). As we know, that question was perceived in temporal terms since continuity meant continuous evolution and disrupted continuity meant degeneration. In this setting, “generation” (of a new human being) became, in the biological imaginary and beyond, “reproduction” (of the species). Yet, anchored in the concept of the prenatal, contingencies of conception and pregnancy held their ground against an exclusive quest for detectable and governable hereditary laws.

Notes

1. Sterne 1760, 8.
2. Ballantyne 1905, 14.
3. On the constitutive role of “reproduction” in the emergence of biology, see Jacob 1970.
4. Müller-Wille and Rheinberger 2012, especially chap. 2. See also Jordanova 1995.
5. Parnes 2007, 317; see also Parnes, Vedder, and Willer 2008 and Lettow 2014.
6. On theories of heredity before the modern epoch, see Lesky 1950.
7. Literature on “degeneration” abounds. With regard to the argument in this chapter, see especially Pinell 2001; Carol 1995.

8. This contribution draws on research previously presented in two German publications, on the history of artificial insemination (Arni 2008) and the history of the prenatal (Arni 2012). While making use of my research there, in this chapter I present a systematic link between the two fields and situate it in the history of heredity.

9. Pajot 1867, 217–218. Unless otherwise stated, all translations are my own.

10. On the history of artificial insemination in nineteenth-century France, see Griset 1995; Stora 1976; David 1987. Occasionally, it is evoked in historiographies of procreation, especially in studies concerned with the *longue durée* (Gonzalès 1996, 278–282; da Silva 1991; Gélis 1988, 262–265; Darmon 1981, 138–141; Rostand 1948, 11–35). Experimentation with artificial insemination in France is also mentioned in some histories of assisted reproduction (Semke 1996; Poynter 1968).

11. David 1987.

12. Fischer 1991, 158.

13. Thouret 1803, 13–15.

14. See, e.g., Dehaut 1865, 47.

15. A review of relevant sources can be found in Arni 2008, which deals in more detail with the subject of this section and its implications for concepts of paternity.

16. On the associated medicalization of “infertility,” see Benninghaus 2005.

17. Gigon 1871, 10.

18. Gigon 1871, 16–17.

19. Gérard 1885, 314.

20. Dehaut 1865, 6.

21. Jacob 1970; Farley 1992; Vienne 2009.

22. Robin 1878, 318.

23. I borrow the term from Churchill 1987.

24. Editorial note in Gigon 1867, 293.

25. Dehaut 1865, 41–42.

26. Barral 1884, xxiii. This issue remains, incidentally, a subject of research today (e.g., Middelburg et al. 2008).

27. Müller-Wille and Rheinberger 2007, 3.

28. Barral 1884, xxi.

29. On Féré, see Carbonel 2006; Courtin 2007.

30. Legrand du Saulle 1884; Féré 1884. "Trauma" was one of three pathogenic factors proposed by Legrand du Saulle and Féré, the other two being alcoholism in either parent and maternal malnutrition. For more detail on the *enfants du siège*, see Arni, forthcoming.
31. Féré 1884, 245.
32. On the field of disease transmission, see Gaudillière and Löwy 2001.
33. On the way that transmission became the link between "generations" in the nineteenth century, see Parnes 2007.
34. Mendelsohn 2001. This interest has a particularly French touch in that it persistently stresses the "milieu." For a similar overlap of "development" and "heredity" in the United States, see Maienschein 1987, and on the intense concern with alcohol as a heredo-intoxicative factor, Armstrong 2003, 23–67.
35. Mendelsohn 2001, 40.
36. On heredity as an "epistemic space" in the nineteenth century, see Müller-Wille and Rheinberger 2007. On the persistence of "dual approaches to transmission" at the beginning of the twentieth century, the still unstable boundaries between vertical heredity and horizontal infection, and the slow acceptance of Mendelian genetics in clinical settings, see Gaudillière and Löwy 2001, 7–9, and Gaudillière and Löwy, this volume.
37. Müller-Wille and Rheinberger 2005, 7; López Beltrán 2007, 105–106; Churchill 1987.
38. In the sources, the terms prenatal and antenatal are used alternatively as synonyms.
39. No comprehensive history of the "prenatal" yet exists. First steps, focusing on prenatal pathology, were undertaken in Salim Al-Gailani's (2010, 2013) work on John William Ballantyne and Paule Herschkorn-Barnu's (1996) on Adolphe Pinard. A very important contribution has been made by Andrew Mendelsohn, who argues for the French context that in nineteenth-century research on the transmission of disease "not heredity, but reproduction and 'prenatal pathology,' encompassing morbid heredity, germinal pathology, and pathology of the blastula, embryo, and fetus, was the overarching conceptual field" (Mendelsohn 2001, 42–43). With a focus on the context of degeneration theory, see Pinell 2001. Research is also under way on the twentieth century: Gluckmann, Hanson, and Buklijas 2011; Buklijas 2014. In what follows, I sketch out some features of the emergence of the prenatal, presenting preliminary results of my current book project.
40. This context—the emerging domain of the "prenatal" across disciplines—rather than neo-Lamarckism is what explains the florescence of research on heredo-intoxication in France between 1890 and 1920. For this very useful distinction between the concept of heredo-intoxication and neo-Lamarckism, see Mendelsohn 2001.
41. Preyer, 1883, 1–3.
42. Preyer, well-known as a founding figure of developmental psychology, is currently—and not coincidentally—also attracting renewed attention as a "true father of fetal studies" (Piontelli 2010, 2).

43. On this rebuttal of the maternal–fetal unity, see Filippini 2002; Watzke 2004; Enke 2000; Bennholdt-Thomsen and Guzzoni 1990.
44. Duden 1999, 23. This anatomical dissociation has been extensively researched by scholars of embryology and the unborn, e.g., Hopwood 2000, 2005, 2007; Duden 2002; Newman 1996. Fetal physiology, in contrast, has so far been largely neglected. It is important to note that shifts like the one examined here never unequivocally translated into a more popular medical discourse. On the cultural coexistence of various pregnancy models see, e.g., Hanson 2004.
45. Cheung 2010, 156, 178.
46. Prévost 1825, 499.
47. Duval 1892, 712.
48. Murat 1820, 517; see also Delore 1886.
49. Pinard 1878, 521.
50. Burdach 1837, 105–106. Historical insights into fetal physiology and its ambivalent conception of fetal autonomy and dependency might enable us to understand the present-day paradox whereby gestation is downgraded in the context of surrogacy yet upgraded in the context of the fetal origins hypothesis and its concern with prenatal influence.
51. According to Féré, Camille Dareste was a benevolent observer of his work, paying him regular visits in his laboratory and giving reliably good advice (Féré 1899, 360).
52. Féré 1894a, 446.
53. Féré published a series of articles on these experiments in the *Comptes rendus des séances de la société de biologie et de ses filiales*. A summary can be found in Féré 1895 and 1899. Féré's choice of noxa (morphine, nicotine, syphilis, etc.) is indicative that his experiments were motivated by concerns about “social hygiene.”
54. Féré 1899, 367; Féré 1894a.
55. Ballantyne 1904, 1905. On Ballantyne, see Al-Gailani 2009, 2010; Reiss 1999; Alistair 2008.
56. On fears of “degeneration” and depopulation as a context for research on disease transmission, see Pinell 2001; Carol 1995.
57. On the overarching concept of “development,” see Canguilhem et al. (1962) 2003; on “development” in embryology, see Hopwood 2000; on developmental psychology, see among others Ottavi 2001.
58. The notion of the “prenatal” came up occasionally before the publication of Ballantyne's manual, but it was only after the turn of the century that the notion took hold. In the 1890s, Adolphe Pinard, another pivotal figure in the history of the “prenatal,” had called for prenatal consultation and care in terms of a “puériculture intra-utérine” (Pinard 1891, 1895). On Pinard and the concept of *puériculture*, which harks back to a little-noted suggestion by the pediatrician Alfred Caron of 1865, see Rollet 2001, 189–190; Herschkorn-Barnu 1996, 82; Carol 1995, 38–51;

Schneider 1986. Eugène Apert, following up on Féré's work and concerns after the turn of the century, spoke of "hérédité morbide" (Apert 1919; on Apert: Pinell 2001). Eventually, in 1924, Henri Vignes chose "pathologie anténatal" as a label to summarize the debate (Vignes 1924). On the state of the field at the beginning of the twentieth century, see Gaudillière and Löwy, this volume. On the temporal aspect inherent to the notion, see Arni 2015.

59. Féré 1894b, 252.

60. The German term *Versehen* refers, on the one hand, to making a mistake and, on the other, in a very literal way, to a sort of "mis-looking," especially in the case of pregnant women.

61. Limited to the moment of conception, some versions of the theory also considered the father's mental state to be such a formative power. On "maternal imagination" see, among others, Dasen 2009; de Renzi 2007; Smith 2006; Huet 1993; Bennholdt-Thomsen and Guzzoni 1990; Gélis 1984, 119–124; Fischer-Homberger 1979.

62. Féré 1894b, 20–21.

63. On the workings of an epistemology of analogy in thinking about procreation, see Rollet and Morel 2000, 22–33.

64. Jourdan 1818, 78–79.

65. Féré 1896, 187. This shift corresponded to the move from monstrosity to the abnormal studied by Foucault 1999. On this transformation, see Arni 2012; on its preparation in the eighteenth century, Helduser 2014.

66. Delage himself did not believe in the possibility but apparently shied away from dismissing it altogether (Delage 1895, 228).

67. Compayré 1913, 351.

68. Ballantyne 1904, 127.

69. Among others, Rank 1924.

70. Perez 1882, 135. On the intense cultural discourse and imaginary that unfolded around this representation of the unborn in the twentieth century, see Dubow 2011.

71. E.g., Sontag 1941.

72. Oppenheimer 1968, 147.

73. See, e.g., Wadhwa et al. 2009; Gluckman and Hanson 2005.

74. Jablonka and Lamb 2011, 144–145. See also, on the context of such research, Lux and Richter 2014.

75. Jablonka and Lamb 2011; Müller-Wille and Rheinberger 2009.

76. Adams, Murphy, and Clarke 2009. As an example of the pop-science branch of the fetal origins hypothesis, see Paul 2010.

77. Adams, Murphy, and Clarke 2009, 249.

78. See also Arni, forthcoming.

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