

Birth of the human being: Historicising the concept of human in the study of reproduction

Master's thesis, History and Philosophy of Science

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Introduction. The history of the natural human being.	3
<i>Human categories as products of history</i>	5
<i>Reproduction: The human being as the embryo</i>	8
<i>Ideas and ontological categories in history</i>	9
<i>Tracking down the human being: time range, sources, and language</i>	11
<i>Argument: The downfall of Man and the birth of the human being</i>	13
Chapter I. Generating Man: Eighteenth-century theories of generation and the meaning of Man.	15
<i>Preformation theories: Males as the source of life</i>	17
<i>Preformation theories: Explaining how males are born</i>	21
<i>Epigenesis: All about men again</i>	25
<i>Man uncovered: The rational male</i>	30
<i>The generation of Man</i>	36
Chapter II. Man’s special status: How the rational soul united male individuals across the world.	38
<i>The power of the rational soul: Man above all animals</i>	39
<i>One and the same Man</i>	42
<i>The study of generation in favour of Man’s unity</i>	46
<i>Man versus Woman</i>	48
<i>Enter stadial progress: The rational soul erodes</i>	51
<i>Man as a product of development: The unity of Man fractures</i>	54
Chapter III. The indifferent stage and the birth of the human being.....	57
<i>Getting the embryo out of its blind spot: Reproduction in the nineteenth century</i>	58
<i>The “indifferent stage” of embryonic development</i>	62
<i>The meaning of sex in the nineteenth century</i>	68
<i>Change in definitions of Man: The birth of the human being</i>	71
<i>The indifferent embryo was the neutral human being</i>	74
Chapter IV. Animalisation versus progressive development: How the human being was born, and how Man came back.	76
<i>Man gets closer to animals: The weakening soul, evolution, and human history</i>	76
<i>The animal embryo: Studying embryos to find evolutionary ancestors</i>	82
<i>Arrested development: Males develop further than females</i>	85
<i>Arrested development: Non-Europeans lag behind</i>	89
<i>Measuring up to European Man</i>	92
Conclusion.....	94
List of figures.....	98
Bibliography.....	99

Introduction. The history of the natural human being.

“Se vogliamo che tutto rimanga com’è, bisogna che tutto cambi”.
[Everything must change for everything to remain the same].
Tomasi di Lampedusa, *Il Gattopardo*.

The “human being” or “human” is a natural frame of reference for people living on Earth. In most people’s minds, the world is populated by animals, plants, inanimate objects, and then by us, the human beings. Within the human species, there are different sexes, different skin colours and physical conformations, and different cultures with their own history and peculiarities. But take all those distinctions away from a person, and being human will remain. Most of us assume that underneath our differences lies our common human biology, a biological body that grants us membership in the species *Homo sapiens*. In this thesis, I aim to take this deceptive aura of naturalness away from the concept of human. I want to show how the very meaning of human being as we intend it today, a biologically neutral and universal individual, has a history. I claim that the neutral human in use today is much more recent than we usually suspect, only emerging towards the end of the nineteenth century.

Defining the “human being” or the “human species” is not just a scientific question of finding a collective identity for a group of biological individuals. Because defining humans means defining ourselves, cultural and political circumstances shape who is admitted in the human species. The Swedish naturalist Carl Linnaeus famously baptised people as *Homo sapiens* in the exhaustive tenth edition of his *Systemae Naturae* (1758). Linnaeus believed all *Homo sapiens* shared the criterion hinted by the “sapiens” part of their name: reason.¹ The human ability for rational thought, the crowning achievement of the human species, was what distinguished humans from other animals. But Linnaeus’ criterion of reason alerts to another dimension of his definition. In the eighteenth century, reason was understood as a natural male, not female, quality.² In fact, it was a matter of debate whether women were reasonable creatures or not. It is no coincidence that the Latin name of humans features the male “Homo” before

¹Londa Schiebinger, “Why Mammals Are Called Mammals: Gender Politics in Eighteenth-Century Natural History,” *The American Historical Review* 98, no. 2 (1993): 394.

²*Ibid.*

“sapiens”. If the human species was defined by reason, and reason in turn was a male quality, then who was Linnaeus really thinking of when coining the term *Homo sapiens*?

Hints of a preference for the male sex over the female sex in defining humans were not limited to Linnaeus’ scientific definition of the human species. Looking at eighteenth-century encyclopaedias, natural history treatises, and philosophical essays reveals that those sources did not have much use for the word “human”, preferring “Man”, which they defined, like Linnaeus, in terms of reason. According to the French *Encyclopédie* (1751-1772), the most beautiful definition of Man was that given by the ancient Greek philosophers: “l’Homme”, Man, was a “animal raisonnable”, a rational animal.³ Even when authors used the word “human”, it functioned as an adjective for “Man”. In his *Cyclopaedia* (1728), Ephraim Chambers defined “human” as “something that relates to man, or the nature of man”.⁴ “Mankind” was preferred over “humanity”, and the term “human being” was entirely absent. Sometime, somewhere, history saw a change from Man to the human being in use today. This apparently subtle and unimportant difference makes, in fact, all the difference.

I argue that, up until the last decades of the nineteenth century, this favouring of the term Man over human was an essential part of human definitions. Man did not fulfil the same function as the human being. When we talk of a biologically universal human, we do more than assume that different ethnic groups and populations are part of the same human category. Just as the “human” unites individuals with different physical conformations, it also unites male and female individuals. Instead, Man implicitly excluded females from its category. Scholarly definitions of the human species referred to the “reasonable” half of the world’s population, male men. The true representatives of the human species were understood to be men. The gendered definition of Man persisted until the end of the nineteenth century, when the concept of Man was shaken up by the growing understanding that Man was part and parcel of the natural world, a world that he shared with Woman. The human being was born as a result of Man’s downfall and of his union with Woman.

³Denis Diderot and Jean le Rond d’Alembert, eds., *Encyclopédie, ou Dictionnaire raisonné des sciences, des arts et des métiers*, vol. 8, 2nd ed. (Paris: 1766), 210.

⁴Ephraim Chambers, *Cyclopaedia or, An Universal Dictionary of Arts and Sciences* (London: 1728), 1:261.

Looking for the historical life of categories about individuals is not new among humanities scholars and social scientists, but applying this analysis to the human being is. The “individual”, the “person”, the “self”, or “identity” have all featured in many cultural and historical analyses.⁵ Anthropologists noted that what makes somebody a “person”, meaning an individual with a moral status that grants them particular rights, varies with culture. In some societies, the status of person is only acquired after specific acts have been performed, from drinking mother’s milk after birth,⁶ to holding offices of authority through a slow and painstaking career.⁷ Unlike for Westerners, then, personhood is not immediately granted to the biological individual. In these cases, as ethnographers Beth Conklin and Lynn Morgan have put it, the biological birth of a new human being is distinct from the social birth of the person.⁸

This last statement points to why many analyses have not put the term “human” under scrutiny. Saying that “social birth” does not correspond to “biological birth” suggests that social personhood finds its meaning by contrast to the notion of biological human being. In her definition of the Western concept of person, the anthropologist Jean La Fontaine asserted that the Western individual “gives jurial, moral and social significance to the mortal human being, the empirically observable entity”.⁹ According to her, the mortal human being exists before any social definitions of personhood; it is the “empirically observable entity”. If the human being is the skeleton on which social definitions of person are fleshed out, then “human” becomes a taken-for-granted notion, a pre-cultural, natural concept.

⁵See e.g. Marcel Mauss, “A category of the human mind: the notion of person; the notion of self,” in *The Category of the Person: Anthropology, Philosophy, History*, eds. Michael Carrithers, Steven Collins, and Steven Lukes (Cambridge: Cambridge University Press, 1985); Brian Morris, *Western Conceptions of the Individual* (New York: Berg, 1991); Charles Taylor, *Sources of the Self: The Making of the Modern Identity* (Cambridge: Cambridge University Press, 1989); Marilyn Strathern, *Property, Substance, and Effect: Anthropological Essays on Persons and Things* (London: Athlone Press, 1999).

⁶Beth A. Conklin and Lynn M. Morgan, “Babies, Bodies, and the Production of Personhood in North America and a Native Amazonian Society,” *Ethos* 24, no. 4 (1996): 657–94.

⁷Jean S. La Fontaine, “Person and individual: some anthropological reflections,” in *The category of the person: Anthropology, philosophy, history*, eds. Michael Carrithers, Steven Collins, and Steven Lukes (Cambridge: Cambridge University Press, 1985).

⁸Conklin and Morgan, “Babies, Bodies, and the Production of Personhood,” 677.

⁹La Fontaine, “Person and individual: some anthropological reflections”.

Most historians similarly tend to use the “human” as a ahistorical category, a concept available to anybody, at any time. This conviction persists even when historians deal explicitly with questions about humanity. In her *Renaissance Ethnography and the Invention of the Human* (2016), Surekha Davies has explained how Renaissance map-makers dealt with monstrous people found in distant parts of the world, and whether they considered them “human” or not.¹⁰ Similarly, David Abulafia in *The Discovery of Mankind* (2008) examined the encounters between early modern Europeans and people on the other side of the Atlantic.¹¹ Davies likened the Renaissance debates on the humanity of South American “giants” to current hominin fossil discoveries, stating that they both re-shaped the notion of human.¹² Likewise, Abulafia compared the question of whether American men and women were human to debates about the human status of Neanderthals.¹³ Davies’ and Abulafia’s analyses are rich in insights on past perceptions of “monsters”, degeneration, civility and barbarism. But they both missed that in early modern times, “human” in our sense of the word, as a neutral member of the human species, did not exist yet. When Davies wondered whether Patagonian “giants” were considered “rational humans”, the gendered axis of difference – the possibility that only male men were naturally “rational” – gets written out.¹⁴ Despite the title of her book, which mentions the “invention” of the human, Davies treated of this human as a stable concept in history.

Other historians have drawn out more explicitly the deceptive transparency of “human” and “man”. Man, for example, has long been viewed as the basic unit of humanist thought, the tradition of scholarship that places the individual at the centre of the world.¹⁵ But humanism relies on the idea that the individual is naturally autonomous, wilful and independent.¹⁶ As Joanna Bourke has argued in *What It Means To Be Human* (2011), this conception of man did not extend to women nor to non-European people; it only concerned European men.¹⁷ Bourke’s analysis fo-

¹⁰Surekha Davies, *Renaissance Ethnography and the Invention of the Human : New Worlds, Maps and Monsters*, Cambridge Social and Cultural Histories 24, (Cambridge: Cambridge University Press, 2016).

¹¹David Abulafia, *The Discovery of Mankind : Atlantic Encounters in the Age of Columbus* (New Haven, Conn.: Yale University Press, 2008).

¹²Tony Davies, *Renaissance Ethnography and the Invention of the Human*, 149.

¹³Abulafia, *The Discovery of Mankind*, 3.

¹⁴Davies, *Renaissance Ethnography and the Invention of the Human*, 151.

¹⁵Tony Davies, *Humanism*, 2nd ed., The New Critical Idiom, 2008: 2 (London: Routledge, 2008), Chapter 1. The invention of humanity.

¹⁶Joanna Bourke, *What It Means to Be Human : Reflections from 1791 to the Present* (London: Virago Press, 2011), 12 (of digital edition).

¹⁷*Ibid.*, 12-13.

cuses on how discourse about who can or cannot be part of mankind or part of humanity impacts the rights and capacities attributed to particular people, such as women. Also focusing on shared rights, in *The Invention of Humanity* (2017), Siep Stuurman has investigated the historical roots of “common humanity” understood as “culturally significant similarity”, a similarity creating a belief in common equality.¹⁸ Both Bourke and Stuurman stress that common humanity is not to be taken for granted: it is a historical development.

The historical nature of conceptions of humanity is also the starting point of my thesis. But, unlike those historians, I ground my analysis at a different level of the human. Before questions about the rights of humans and nonhumans, before wondering about the emergence of equality between different people, and even before analysing the criteria used to distinguish humans from animals or from machines, I want to ask: how is it that we ended up with the neutral, sexless, and apparently biological concept of “human being”? To put it in the anthropological terminology; whereas historians such as Bourke and Stuurman are mainly interested in the human being as a social category and as a moral person, I focus on the human being as a biological concept, as the embodiment of biological neutrality. I want to show how social, scientific, and historical circumstances came together to create the concept of the human being as the “empirically observable entity”, the biologically neutral individual.

Justin Smith’s analysis of race in early modern philosophy is an example of the “level” of the human being I am interested in.¹⁹ Smith stated that the conception of human beings as “natural beings” is a product of history.²⁰ His research traces the origins and effects of human beings’ incorporation in the natural world. Smith argued that, whereas humanity had previously been united by a shared divine essence, the naturalisation of the human being made it possible to think about deep racial divisions within the human species.²¹ However, Smith still did not notice, or was not concerned, with making the difference between the earlier Man and the later human being. Yet, the two concepts did not refer to the same thing. In Smith’s argument that all human beings could share the same essence, the “human beings” should be replaced by “men”.

¹⁸Siep Stuurman, *The Invention of Humanity : Equality and Cultural Difference in World History*. (Cambridge, Massachusetts: Harvard University Press, 2017), 6.

¹⁹Justin E. H Smith, *Nature, Human Nature, and Human Difference : Race in Early Modern Philosophy*. (Princeton, N.J.: Princeton University Press, 2015).

²⁰*Ibid.*, 7-8.

²¹*Ibid.*, 17-19.

In that sense, although my analysis is concerned with the “deepest” level of the human, it is also “superficial”: I propose to take seriously the language terms, Man and human being, that accompany ideas about humanity. My thesis links the most obvious terms about humanity (the terms Man and human), to the most hidden, “natural” implications of those terms. The emergence of the term “human being” signalled a shift in the understanding of people on Earth, when both men and women were able to claim the status of human. But, as I will also argue, the possibility of a neutral human being did not automatically imply that different humans were viewed as equals.

Reproduction: The human being as the embryo

To uncover the history of the biological human being, I investigate the human’s coming into the world in studies of generation, or as it became later known, reproduction.²² Eve Keller wrote that the rhetoric of embryology, because it deals with human origins and because it posits a physiological basis for human identity, is a useful arena where to study the construction of identity.²³ Moreover, at the margins of life, during conception, gestation, and childbirth, definitions of individuals and persons are imminent, yet unstable, as the continuing debates on abortion show.²⁴ The imminence of ideas about identity makes reproduction a critical area to look for ideas, not just about personhood and identity, but about what makes somebody a biological human.

Another intriguing tie between generation and the human being comes from the resemblance between understandings of embryos and human definitions. The concept of “human”, as a neutral individual not distinguishable by sex or ethnicity, is not an empirical term. Nobody on Earth is entirely devoid of any sexual or ethnical characters. That is, excepted for one type of being: the young embryo (*Figure 1*). As an organism with no clear sex or skin colour, the embryo bears a strange correspondence with the human. By examining embryos, students of reproduction engaged, in one way or the other, with this neutral “human” state. In turn, paying attention to those scholars’ studies reveals changing ideas about the human. Although I aim to denaturalise the concept of

²²Nick Hopwood, “The Keywords ‘Generation’ and ‘Reproduction,’” in *Reproduction: Antiquity to the Present Day*, eds. Nick Hopwood, Rebecca Flemming, and Lauren Kassell (Cambridge: Cambridge University Press, 2018), 287–304.

²³Eve Keller, “Embryonic Individuals: The Rhetoric of Seventeenth-Century Embryology and the Construction of Early-Modern Identity,” *Eighteenth-Century Studies* 33, no. 3 (2000): 323.

²⁴Conklin and Morgan, “Babies, Bodies, and the Production of Personhood,” 657–658.

human being, I do not take the opposite position that social or cultural developments can entirely account for the birth of the human being. By linking the human being with the embryo, I acknowledge that “nature” can “prod and shake human belief systems, without, however, impelling them in a straightforward way”.²⁵ I view both ideas about the human and theories about reproduction as mixtures of “natural” and “cultural” factors.²⁶ My guiding question is how, and why, understandings of Man and human changed together with theories about reproduction and embryonic development.



Figure 1. The ambiguous embryo. Source: Wikimedia Commons.

Ideas and ontological categories in history

My focus on ideas about the human being and about with embryonic development contrasts with recent approaches of historians of science, who stress the study of science as an assemblage of material practices. Nick Hopwood has commented that histories of biology have stayed too long in the ethereal realm of ideas.²⁷ By telling the story of Ernst Haeckel’s embryological drawings, Hopwood showed how images of embryos succeeded or failed in becoming “icons of knowledge”, got accepted by embryologists or caused trouble by becoming the centre of scientific disputes.²⁸ Instead of looking at embryology through particular social and

²⁵Stefani Engelstein, *Anxious Anatomy: The Conception of the Human Form in Literary and Naturalist Discourse*, SUNY Series, Studies in the Long Nineteenth Century (Albany: SUNY Press, 2008), 8.

²⁶For this position see e.g. Bruno Latour and Catherine Porter, *We Have Never Been Modern* (New York: Harvester Wheatsheaf, 1993).

²⁷Nick Hopwood, *Haeckel's Embryos: images, evolution, and fraud* (University of Chicago Press, 2015), 10.

²⁸*Ibid.*, 3.

knowledge practices, my thesis is rather located in the field of the history of ideas or intellectual history.

As current historians are well-aware, writing the history of ideas comes with its own risks. Tracing the historical roots of ideas revolves around finding the meaning of past categories of thought in historical sources. But, as Quentin Skinner powerfully argued, studying what someone said can never be enough to understand what they meant.²⁹ Words can be used with different intentions. In order to uncover true meaning, the historian needs to take into account what writers were *doing*, what they were hoping to achieve by using a certain term.³⁰ Were they arguing in support of a political party, against a new law, or did they just want to anger their opponents? The social context of writers is crucial, but past intellectual historians all too often neglected this side. Although my thesis makes suggestions about how the social and political environment of scholars affected the meaning of human categories, I take a different angle of analysis than that suggested by Skinner. Rather than directly aiming to uncover the social context of those world-structuring categories, I focus on linking two sets of scientific-cultural ideas together: ideas about the human, and ideas about reproduction.

Seeking connections between seemingly independent ideas is a valuable way of writing history. In the first decades of the twentieth century, some sociologists and historians of science maintained that science mostly developed through “internal”, scientific factors.³¹ Today, it is tempting to take the opposite stance, and to view the “social” as an external cause for “scientific” or “intellectual” effects. But, as Andrew Pickering noted, to treat the social as a cause for scientific practice denies that the social and science are intertwined.³² Like Pickering, I prefer to suspend any hard lines between social context and scientific activity. Leaving aside questions about causality, I focus instead on drawing out intriguing correlations between changes in reproductive sciences and changes in understandings of human. As Lorraine Daston and Peter Galison have put it in their historical study of the category “objectivity”, our understanding can be broadened and

²⁹Quentin Skinner, *Visions of Politics* (Cambridge: Cambridge University Press, 2002), 79.

³⁰*Ibid.*

³¹Jan Golinski, *Making Natural Knowledge : Constructivism and the History of Science*, Cambridge History of Science (Cambridge: Cambridge University Press, 1998), 48.

³²Andrew Pickering, *The Mangle of Practice : Time, Agency, and Science* (Chicago: University of Chicago Press, 1995), 27.

deepened by exposing previously unsuspected links, like patterns that connect elements in a whole.³³

Studying historical changes in terms and concepts can be a useful complement to the social and materialist approach to scientific practices. Words are conceptual tools for describing the world. As such, they “reflect a society’s past experience of doing and thinking about things in certain ways”.³⁴ If language is not a neutral vector for expression, but is culturally and historically determined, then the study of past terms and their meanings can reveal assumptions and constraints in the thought of historical actors. I combine this approach to linguistic terms with what Ian Hacking called “historical ontology”, the study of how organising concepts come into being through specific historical processes.³⁵ Here, I am concerned with the biological human both as an organising concept and as a term in language. Hacking stated that historical ontology is about the “space of possibilities” for character formation, and warned against making “grand abstractions”.³⁶ Finding the history of the “human” seems to get dangerously close to those grand abstractions. Yet, the “human” is a crucial organising concept, which structures our vision of the world and of each other. Looking for when the human, as an ontological category, emerged in history, is a valuable undertaking. If historical ontology, as Hacking would have it, is about the ways in which possibilities for choice and for being arise in history,³⁷ I want to show how the category of Man structured the space of possibilities available to scholars, and how that space changed shape with the shift from Man to human.

Tracking down the human being: time range, sources, and language

In particular, I track the intertwined changes in theories of reproduction and notions of “human” from the eighteenth to the nineteenth centuries. I chose the eighteenth century as the starting point for my thesis because that century shows the power of the parent and predecessor of the human category: Man. The scholarly world, at that time, was made in the image of Man, as a rational and wilful being. The lowering of Man’s special status,

³³Lorraine Daston and Peter Galison, *Objectivity* (New York: Zone Books, 2010), 35.

³⁴Phil Withington, *Society in Early Modern England: The Vernacular Origins of Some Powerful Ideas* (Cambridge, U.K.: Polity, 2010), 6; Amanda Goodrich, “Understanding a Language of Aristocracy, 1700–1850,” *The Historical Journal* 56, no. 2 (2013): 369-70.

³⁵Ian Hacking, *Historical Ontology* (Cambridge, MA: Harvard University Press, 2002), 22.

³⁶*Ibid.*, 23.

³⁷*Ibid.*

throughout the late eighteenth and nineteenth centuries, culminated in the birth of the human being in the last decades of the nineteenth century, which also marks the end of the time range I consider.

The story I tell here is also limited to scholarly understandings of reproduction and of human categories, rather than in the more popular or practical understanding of the same topics. In the eighteenth century in particular, the boundaries between “popular” and “scientific” works were not easy to define.³⁸ In general, I am interested in the theories of reproduction that formed the genealogy of our scientific understanding of the process. One part of my corpus of sources consists in texts by authors who contributed to debates on reproduction in universities and learned societies. These sources take different forms: natural history treatises, essays on human evolution and specialised texts on embryology. The other part of my corpus includes those writers who explicitly grappled with the meaning of Man and human; those were the authors of encyclopaedias and dictionaries.

I find it important to mention that all these authors were men. Women scholars existed, but the study of reproduction (or the writing of encyclopaedias) seemed to be an especially male endeavour, perhaps in part because, in the Victorian era, ignorance of reproductive processes was viewed as a fine female trait.³⁹ Unsurprisingly, the vision of the world I describe through the category of Man was a male-centric vision of the world. To illustrate the ubiquity and influence of this category, the authors I have selected for my research are a mixture of well-known scholars and more obscure figures: from giants such as the Comte de Buffon, Georges Cuvier, and Charles Darwin, to little-known embryologist Alfred Velpeau, or discreet encyclopaedist Ephraim Chambers.

As the list above already suggests, I have chosen to focus only on authors writing in French and English. When studying theories of generation, limiting oneself to a specific language or national tradition seems artificial. In eighteenth and nineteenth-century Europe, scholars working on generation engaged with each other’s work across national and linguistic borders. Buffon cited the work of English, Dutch, German and Italian scholars, and he was in turn read in foreign countries such as Britain.⁴⁰

³⁸Mary Fissell and Roger Cooter, “Exploring Natural Knowledge: Science and the Popular,” in *The Cambridge History of Science*, ed. Roy Porter, The Cambridge History of Science (Cambridge: Cambridge University Press, 2003), 4:129–58.

³⁹Evelyn Ender, *Sexing the Mind: Nineteenth-Century Fictions of Hysteria* (Ithaca: Cornell University Press, 1995), 13–14.

⁴⁰Georges-Louis Leclerc, Comte de Buffon, *Histoire Naturelle, Générale et Particulière, avec la Description du Cabinet Du Roi*, vol.2, *Histoire générale des Ani-*

There is, however, a good reason to examine sources in French and English specifically.

In both languages, the word “man” or “homme” could and still can be used to refer both to males and to general human beings, suggesting a close relationship or even a conflation the two notions. By contrast, in German and other Germanic languages, the equivalents of “male man” and “human man” are more distinct. The German word “Mensch” corresponds to the general human being, whilst “Mann” strictly refers to the male sex. Unlike English and French, then, German shows little overlap between “Mann” and “Mensch”. The difference between English and French on one side, and German on the other, may indicate a difference in ways of thinking about the neutral human. Although a comparative study would be intriguing, I prefer to take an in-depth look at the writings of those scholars who shared a common linguistic understanding of “man”. My choice of a deep perspective means that, even if other European languages such as Italian also use “man” both as a gender-specific term and as a general term for humans, I limit this study to sources in two languages, English and French.

Argument: The downfall of Man and the birth of the human being

The story I want to tell is the following. For a long time, Man dominated over the rest of nature. Although Man has been taken as a mostly androgynous figure, in the eighteenth century, Man was a thoroughly masculine sovereign, who dictated, amongst other things, systems to explain reproduction. In Chapter One, I explain how eighteenth-century theories of generation were well-equipped for explaining the formation of new male embryos, from male bodies, but not so much for explaining that of female embryos. I connect this favouring of male generation to definitions of Man, which, through their focus on the masculine quality of reason, made male men the true representatives of the human species. The curious asymmetry in theories of generation becomes more intelligible when realising that scholars aimed to explain the generation of male Man, over that of Woman. I argue in Chapter Two that the category of Man could extend beyond European men to virtually any member of the male sex in other populations. Thanks to the power of his rational soul, Man was more different from Woman than individual men were from each

maux, *Histoire Naturelle de l'Homme* (Paris: Imprimerie Royale, 1749); James A. Secord, “Talking Origins,” in *Reproduction: Antiquity to the Present Day*, ed. Nick Hopwood, Rebecca Flemming, and Lauren Kassell (Cambridge: Cambridge University Press, 2018), 479-480.

other. The sovereign Man reigned over Woman and over the rest of Nature.

The ontological category of Man, however, came to change. In Chapter Three, I point to a new correspondence between theories of reproduction and ideas about Man. As more and more scholars tackled fecundation and embryonic development with increasingly fine-grained techniques, embryonic development started to be understood as starting from a state of neutrality, when the embryo was neither male nor female, or both at the same time. This “indifferent stage” paralleled a change in definitions of Man. Masculine Man was apparently dethroned, and substituted with the much humbler human being, who was not defined in terms of reason anymore. In the Chapter Four, I attempt to explain why this parallel change in the embryo and in Man occurred. Developments in nineteenth-century science, spearheaded by Darwin’s theory of evolution, affirmed Man’s place in the natural world. Embryological theories helped to lower Man to his new status, by showing that the embryos of animals and humans started from the same form. Fallen from his pedestal, Man landed among the rest of Nature’s inhabitants, including Woman. The new, much less assuming human being, was the product of their union.

Yet, the story is more circular than linear. The old Man came back. Even if all animals, including the human species with both its sexes, started in a common form, they did not stay at the same level. Man had previously enjoyed a special status because of his rational soul. Now, in the latter decades of the nineteenth century, Man obtained a privileged status through a long process of development, both in the womb and in evolutionary time. The growing embryo mirrored the history of the species. Starting from an animal form, the embryo progressed beyond the stage of Woman and of foreign people, until it reached the last stage of progress, that of European Man, endowed with reason. As he aged, the initially neutral son of Man, the human, ended up resembling his old Man very closely. Even though everything had changed, everything had really stayed the same.

Chapter I. Generating Man: Eighteenth-century theories of generation and the meaning of Man.

In this first chapter, I introduce the ontological category that came before the human being, Man, and I show the extent to which Man was bound up with understandings about reproduction and embryonic development. Specifically, I argue that eighteenth-century theories of generation make more sense when viewed through the category of Man. At the start of the eighteenth century, theories of generation multiplied and, in parallel, became the centre of heated discussion amongst European scholars. In part, the business of giving birth was becoming a male profession, as midwives were supplanted by male doctors.¹ More importantly for scholars and natural philosophers, studying processes such as conception promised to reveal the mechanisms behind the origin of the whole animal and even plant kingdom, as processes of generation were often understood to be shared between Nature's kingdoms.² A new kind of medical man entered the arena: a scholar who would devote his entire life to research and experiments, in order to pierce the "secrets" of generation.³

But the secrets remained in great part intact. At the start of his in his *Cyclopaedia's* (1728) entry on generation, British scholar Ephraim Chambers found it necessary to include a disclaimer: "The generation of animals is a process in the oeconomy of nature very difficult to be traced. The parts concurring hereto, are numerous, and their functions mostly discharged in the dark".⁴ Generation occurred in the hidden viscera of bodies. For eighteenth-century scholars, it was a complex and mysterious process.

As a consequence, scholars studying generation in the eighteenth century agreed on very few things. Some believed that embryos already existed pre-formed in either the female or the male body, the so-called "preformation" doctrine.⁵ Others, usually grouped under the banner of "epigenesis", thought that organisms started out from some unformed matter, and only acquired form as they developed.⁶ Current historians have warned that the schools of preformation and epigenesis had more

¹Lisa Forman Cody, "The Body in Birth and Death," in *A Cultural History of the Human Body*, vol. 4, in the Age of Enlightenment, ed. Carole Reeves (Oxford etc.: Berg, 2010), 73-74.

²John Farley, *Gametes & Spores : Ideas About Sexual Reproduction, 1750-1914* (Baltimore: Johns Hopkins University Press, 1982), Chapter 1, The Universality of Sex.

³Raymond Stephanson and Darren N Wagner, eds. *The Secrets of Generation : Reproduction in the Long Eighteenth Century* (Toronto: University of Toronto Press, 2015), 21.

⁴Ephraim Chambers, *Cyclopaedia or, An Universal Dictionary of Arts and Sciences* (London, 1728), 1:134.

⁵Jane Maienschein, *Embryos Under the Microscope : The Diverging Meanings of Life*, (Cambridge, Massachusetts: Harvard University Press, 2014), 29-30.

⁶*Ibid.*, 29.

ground in common than may be assumed.⁷ Some preformationists, for example, believed that only some fundamental parts of the embryos existed preformed, whilst epigeneticists sometimes relied on the idea of a “form” that remained stable through generations.⁸ Even with these nuances, the categories of preformation and epigenesis are useful to capture the eighteenth-century study of generation, since, as I will show, scholars belonging to different camps sternly opposed each other’s theories.

Here, I analyse the works of scholars who held different positions on the issue of generation, and different places in the European scholarly landscape. On the side of preformation, I discuss the writings of English encyclopaedist Ephraim Chambers, recognised Swiss expert on generation, Charles Bonnet, and English physician Erasmus Darwin, who rejected preformation but still conserved some of its elements. On the side of epigenesis, I have chosen the works of the Comte de Buffon, French aristocrat and natural philosopher, and important exponent of epigenesis,⁹ as well as those of Pierre Louis de Maupertuis, French philosopher and mathematician. During the course of the eighteenth century, epigenetic theories slowly supplanted preformation as the preferred approach to explain generation.

Given the wide range of opinions concerning generation, it is surprising that one aspect remained consistent across different systems: the role of the female sex in reproduction. I track how scholars thought the male semen played the active and life-triggering role in the generation of new living beings, whilst the female body played a passive, nutritive role. Generation systems were also more suited to explaining the formation of the male sex than the female sex. Both preformationists and epigeneticists favoured the formation of male embryos, from male bodies.

This peculiar character of eighteenth-century theories of generation is best understood in the context of an ontological category. Scholars of generation formulated their theories within a specific space of possibilities, structured by the concept of Man. Man made the marginality of the female sex into a logical feature of generation systems. Man was not a general category, as it is often interpreted. In the eighteenth century, the true representatives of Man were male, rather than female. When writing about generation, scholars were mostly concerned with explaining the generation of Man, meaning of male foetuses, not of Woman.

⁷Peter J. Bowler, “Theories of Generation and the History of Life,” in *The Secrets of Generation : Reproduction in the Long Eighteenth Century*, ed. Raymond Stephanson and Darren N Wagner (Toronto: University of Toronto Press, 2015); Maienschein, *Embryos Under the Microscope*, 30.

⁸*Ibid.*, 79-82.

⁹*Ibid.*, 79.

Preformation theories: Males as the source of life

Many French and British scholars in the eighteenth century subscribed to some form of the doctrine of preformation. In the variation that became most well-known, preformation theory stated that all organisms had been created by God at the beginning of times, and already existed, pre-formed, in the human body.¹⁰ Accounts of preformation usually divide preformationists into two camps: spermists and ovists.¹¹ The first believed that the pre-formed organisms were contained in tiny animals inhabiting the male semen, the spermatozoa. The second maintained that pre-formed individuals were waiting inside the female eggs. Yet, when it came to gender in generation, scholars in both camps tended to come to the same conclusions. Whether they were spermists or ovists, writing in French or English, accepted experts or lesser-known figures, authors gave the life-giving function to the male actor.

The early eighteenth century was the heyday of mechanical philosophy, according to which natural phenomena could be explained solely based on properties inherent to matter.¹² Although mechanical philosophy fit well with the analysis of physical phenomena, such as astronomical observations, it stood in an uneasy relationship to the living world. There were no simple links between matter and motion and organic processes such as digestion or generation. Charles Bonnet spent decades investigating generation in animals. In his *Considérations sur les corps organisés* [Considerations on organised bodies] (1762), Bonnet admitted that the best efforts to explain mechanically the formation of even one single organ reached no solution.¹³ Faced with this almost complete obscurity, Bonnet thought it was reasonable to imagine that organisms pre-existed somewhere in the bodies of their parents.¹⁴ God had created every organism at the beginning of time, and each organism was only waiting for the right time to be born. Because organisms were at first so tiny, it was not surprising that they could not be observed by anybody. Ephraim Chambers thought the same: an animal “is not the sudden Product of a Fluid [but] has all its little Members folded up according to their several Joints and Plicatures, which, are afterwards enlarged and distended”.¹⁵ Once their time had come, the development of organisms unfolded cleanly and mechanically, getting bigger and bigger until they

¹⁰Clara Pinto-Correia, *The Ovary of Eve : Egg and Sperm and Preformation*, (University of Chicago Press: 1998), 3.

¹¹Farley, *Gametes and Spores*, 16-20; Eve Keller, “Embryonic Individuals: The Rhetoric of Seventeenth-Century Embryology and the Construction of Early-Modern Identity”; Pinto-Correia, *The Ovary of Eve*, Chapter 1, All about Eve, Chapter 2, All about Adam.

¹²Pinto-Correia, *The Ovary of Eve*, 3.

¹³Charles Bonnet, *Considérations sur les Corps Organisés* (Amsterdam, 1762), 1:15.

¹⁴*Ibid.*

¹⁵Chambers, *Cyclopaedia*, 1:134.

became visible. The question was: where were those future organisms located?

For Ephraim Chambers, the male body contained future organisms. As the writer of an encyclopaedia, he dutifully reported that some theories saw the origin of the embryo in the seed of the male, whilst others that saw it in the egg of the female. But the “animalcules” that Anthony van Leeuwenhoek had first identified in the male seed (*Figure 2*) resembled the young embryo too much for it to just be a coincidence. “The Resemblance between the Rudiments of the Foetus in Ovo, both before and after Incubation, and the Animalcule, makes it very probable that they are one and the same”, wrote Chambers.¹⁶ The animalcule *was* the young foetus. Male bodies contained thousands of little preformed organisms, which, in turn, contained other future organisms, and so on until the end of times.

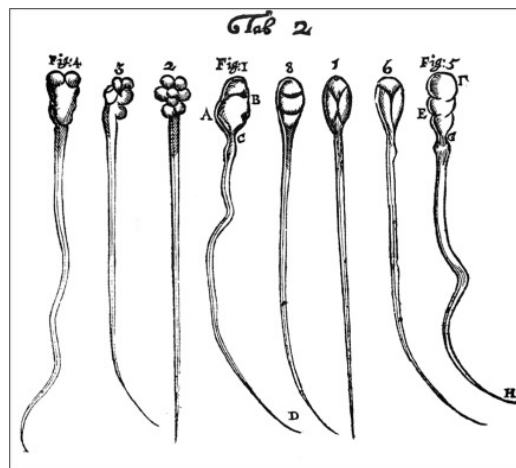


Figure 2. Anthony van Leeuwenhoek’s animalcules in different species (image submitted to the Royal Society in 1678). Source: *Journal of Obstetrics and Gynaecology Canada.*

Whilst males stored all future beings, females fulfilled a nutritive function in generation. During fecundation, the male animalcule or foetus got transferred from the male to the female body. The uterus was the “nidus”, nest, the “fertile soil”, or the “field”, as Chambers alternately called it, where the embryo grew, and received its much-needed nourishment.¹⁷ To be precise, the foetus did not properly “receive” nourishment; it had to take this nourishment from the female body by “spreading its roots” in the uterus, just like the seed of a plant spreads its roots in the ground. Chambers stressed that “an Animalcule cannot come for-

¹⁶*Ibid.*

¹⁷*Ibid.*, 135.

ward, if it do not fall into a proper nidus".¹⁸ Although necessary to generation, the role of the female body was rather passive; it was only a source of nutrition, an immobile field, for the growing animalcule or embryo.

Ovist scholars such as Charles Bonnet reached similar conclusions. Like Chambers, Bonnet spent as much time explaining the theories of those who disagreed with his view, as on his own theory and evidence. But overall, unlike Chambers, Bonnet agreed with the ovist theory. He discussed the experiments of Albrecht von Haller, a Swiss anatomist, who showed that chicks could not develop without an egg yolk. Since yolks existed even in eggs that were not fecundated, this observation led to the simple conclusion that the chicken exists in the egg before fecundation.¹⁹ Most eighteenth-century scholars shared Bonnet's opinion. The spermist system meant that pre-formed organisms in the male seed numbered millions, which implied too much waste of future souls.²⁰ Surely, God could not have been such a bad planner. Locating pre-formed organisms in the rarer female egg relieved anxieties about wastefulness.

Ovist systems such as Bonnet's seemed to reverse entirely the terms of spermist theories: the starring role shifted from the male animalcule, to the female egg. Yet, Bonnet actually had a very similar opinion to Chambers' on the passivity of the female in generation. Even if the female egg contained the preformed embryo, the male semen still played the active and life-giving role in generation.

As the eighteenth century unfolded, preformationists moved from the idea of totally preformed organisms, to thinking in terms of pre-existing fundamental parts.²¹ Bonnet thought that some essential parts of the future organism were already there, created by the omnipotent God, but that could not be the whole story. Taking an example from cross-species breeding, mules, Bonnet remarked that the mule resembled the female horse, but some of its parts, such as the long ears, were definitely closer to the male donkey. It followed that although the "germe", the pre-formed embryo in the female egg, contained the elementary particles of the future animal, the male seminal liquid influenced the germ's development.²²

That influence was crucial. According to Bonnet, the male liquid infused the germ with life, because females were not capable of triggering the development of the foetus. "Tel est ici l'ordre de la Nature que l'intérieur des femelles ne contient aucune liqueur, assez subtile ou assez active... pour y commencer le développement", "The order of Nature is

¹⁸*Ibid.*

¹⁹Bonnet, *Considérations*, 2:126.

²⁰Clara Pinto-Correia, *The Ovary of Eve*, 104.

²¹*Ibid.*, 8.

²² Bonnet, *Considérations*, 1:21, 2:243.

here such that the female interior does not contain any liquid, subtle or active enough... to start development”, Bonnet stated.²³ Instead, the source of this activity was the male seminal liquid. As Bonnet wrote about “la liqueur que le Mâle fournit”, “the liquid that the Male provides”:

Elle est le principe d'un développement qui ne commenceroit point sans elle... Elle agit donc fur les Organes de la Circulation du Germe, elle en pénètre le Cœur, elle l'anime & si elle l'anime et si elle s'y introduit, elle peut encore circuler dans toutes les Parties. Elle y répandra plus de chaleur & de vie; elle leur donnera plus de consistance.²⁴

[It is the principle of a development that could not start without it... It acts on the Organs of the Circulation of the Germ, penetrates its Heart, animates it, and if it animates it and inserts itself in it, it can circulate in all Parts. It will spread more heat and life, it will give them more consistance.]

Even though Bonnet saw female bodies as carrying the rudiments of the embryo, female bodies were in fact only containers for the embryo’s material form. The true principle of life came from the male semen.²⁵ Just like for Chambers, females tended to have a passive nurturing role in generation, whilst males provided the embryo with life. Even scholars on the margins of preformation theories expressed similar beliefs, such as Erasmus Darwin, English physician and natural philosopher. Erasmus Darwin is known for having “foreshadowed” the theory of evolution, in his work on the natural world and in a more direct sense, since he was Charles Darwin’s grandfather. In the late eighteenth century, when Erasmus Darwin was writing, scholars were detaching themselves from mechanical philosophy. In his *Zoonomia: or the laws of organic life* (1796), Darwin stated that the body was not a mere “hydraulic machine”, because it had an essential characteristic: animation.²⁶ In line with this principle, he rejected the idea that organisms existed “in miniature” in the body of the parent. But, in practice, Darwin’s theory of generation still shared several elements with earlier preformation theories.

Darwin speculated that the embryo started from a “simple living filament” in the blood of the parent, not too unlike Bonnet’s and Chambers’ initial “germe” or “rudiments of the foetus”.²⁷ Through nutrition,

²³*Ibid.*, 1:41.

²⁴*Ibid.*, 2:245.

²⁵Keller, “Embryonic Individuals: The Rhetoric of Seventeenth-Century Embryology and the Construction of Early-Modern Identity,” 339; Eve Keller, *Generating Bodies and Gendered Selves: The Rhetoric of Reproduction in Early Modern England* (Seattle: University of Washington Press, 2007), Chapter 5. Embryonic Individuals: Mechanism, Embryology, and Modern Man.

²⁶Erasmus Darwin, *Zoonomia: or the Laws of Organic Life*, vol 1 (New York: Swords, 1796), 1.

²⁷*Ibid.*, 362.

the filament slowly acquired new parts, which themselves excited the development of other parts, until it developed into a full foetus.²⁸ Darwin believed that this rudimental “filament” came from the male, not the female.²⁹ The female role in generation consisted solely in the nutrition of the embryo. According to him, this followed naturally from the realisation that females already nurtured the embryo for nine months, and therefore did not have enough strength to form the embryo:

If the female be supposed to form an equal part of the embryon, why would she form the whole of the apparatus for nutriment and for oxygenation? The male in many animals is larger, stronger, and digests more food than the female, and therefore should contribute as much or more towards the reproduction of the species; but if he contributes only half the embryon, and none of the apparatus for sustenance and oxygenation, the division is unequal; the strength of the male and his consumption of food are too great for the effect, compared with that of the female, which is contrary to the usual course of nature.³⁰

Females could not be expected to grow the foetus during nine months, and also contribute to its life. To the male the principle of the embryo’s life, to the female the caring and nourishing. Though the theoretical commitments and specific reasoning were different, all systems supported a dichotomy where females were passive containers and sources of nutrition for preformed embryos, and where males provided embryos with the essence of life. Although the female nurturing role was indispensable for growing future embryos, females had no active role in giving life to the embryo. Moreover, females were marginal not only for what concerned the action of generation, but also for the products of this process, new male and female organisms. Eighteenth-century scholars’ theories were better suited to explain the formation of the male, rather than the female sex.

Preformation theories: Explaining how males are born

As preformation theories became more allowing of organic development in the place of mechanical unfolding, sex formation became a more important issue. A scholar such as Chambers could easily ignore the question of sex. If organisms already existed entirely pre-formed and only increased in size, then it was reasonable to assume that their sex, too, was already decided by God. In fact, Chambers did not once bring up the topic of the embryo’s sex. For Bonnet and Darwin, with their mixed ideas about preformation, sex formation represented a more concrete question. Here, I show how the systems that those scholars devised to

²⁸*Ibid.*, 363-370.

²⁹*Ibid.*, 362.

³⁰*Ibid.*, 356.

explain sex formation could easily explain how male fetuses were created, but could not as easily account for the formation of females. This imbalance stemmed from the power that scholars attributed to the male semen, or male “seminal liquid”, as it was often called.

For Bonnet, the male semen animated the preformed embryo. In doing so, it kept a long-lasting influence on the future organism.³¹ The transformative power of semen affected “toute la vie de l’enfant”, “the entire life of the child”, bringing about previously invisible developments such as “la mue de la voix, crêtes, défenses, barbe...”, “voice change, crests, tusks, beard...”.³² Virtually all of those attributes are male attributes, which the male organism acquires when transitioning to adulthood. In Bonnet’s description, the male semen produced a specifically male effect on the embryo. This makes it easy to understand how male embryos could be generated. The formation of the female sex, with female traits, remained an open issue. Bonnet also noticed this problem:

Mais après qu’un germe femelle s’est développé, il se développe chez lui des parties qui n’existoient pas chez le mâle, des Ovaires, des Trompes, une Matrice, &c. Si la Liqueur séminale est nécessaire pour procurer les premiers développements de toutes les parties du Germe, comment peut-elle procurer celui de Parties que le Mâle n’a point...?³³

[But after a female germ develops, parts that do not exist in the male develop, such as Ovaries, Tubes, a Uterus, etc. If seminal liquid is necessary for procuring the first developments of all parts of the Germ, how can it produce the development of Parts that the Male does not possess?]

The solution Bonnet offered to this question was rather short, occupying only the next two pages in a 300-pages long treatise. Bonnet brought in evidence from the world of insects. He observed that, among bees, some individuals did not have a sex and did not reproduce. These “neuters”, according to Bonnet, excluded the simple possibility that female liquids produced a female and that male liquids produced a male, because where would the molecules that make up neuters come from?³⁴ The answer lied, instead, in the potential of the male body to produce different sexes. He wrote: “les Organes de la Génération des Mâles ont été construits de Manière, qu’ils filtrent & préparent les Molécules relatives au développement des trois sortes d’Individus”, “the Male Organs of Generation have been built so that they filter and prepare Molecules for the development of three sorts of Individuals”: males, females, and neuters.³⁵ Those three types of individuals, he specified, had already been

³¹Bonnet, *Considérations*, 2:231.

³²*Ibid.*, 232.

³³*Ibid.*, 260-261.

³⁴*Ibid.*, 261-262.

³⁵*Ibid.*, 262.

drawn by some superior hand in the ovaries, but the male seminal liquid, as the principle of life, put them in the right state for development.³⁶ The male body actively provoked the development of the sexes. The female body had no role in that, aside from containing the rudiments of pre-formed individuals.

Still, Bonnet never explained how the male genital organs could manage to prepare the development of females and neuters, aside from the development of males. The answer was left up in the air. This vagueness is not surprising. Bonnet's system was built around the power of the male seminal liquids to infuse the future embryo with life. Females were an irregularity that did not immediately find a logical place in his system.

Erasmus Darwin chose a different strategy from Bonnet's to explain sex formation. For Darwin, the issue of sex was closely bound up with the question of the embryo's resemblance to the mother and the father. According to Darwin, even if the "living filament" came from the blood of the male, the nutritive particles provided by the mother influenced the embryo to grow a likeness to its female parent.³⁷ Resemblance with the father came from a different source: the male "imagination". By imagination, Darwin did not refer to the popular belief that what the mother saw and felt during her pregnancy could affect the foetus, for example by making birthmarks appear on the child's skin. Darwin judged that belief to be unfounded.³⁸ In its place, he proposed a physical mechanism for imagination. Just like feeling pain provokes the physical reaction of tears, Darwin remarked that the pleasurable sensations of sex, including the visual sensations, resulted in ejaculation.³⁹ Those sensations might have such an effect on the secretion of semen, that the "living filament", the embryo itself, would be affected:

The imagination of the male, at the time of copulation, or at the time of the secretion of the semen, may so affect this secretion by irritative or sensitive association... as to cause the production of similarity of form and of features, with the distinction of sex.⁴⁰

The potential of the male to produce "similarity of form and features" meant that, if the male visual senses focused on his own form at the moment of conception, the embryo would be male. If the male focused on the female, the embryo would be female.⁴¹ Again, the male body determined the sex of the embryo. Importantly, the male body especially produced other male embryos, because thinking about one's own form was the most natural thing to do:

³⁶*Ibid.*

³⁷Darwin, *Zoonomia*, 379.

³⁸*Ibid.*, 380.

³⁹*Ibid.*, 381-384.

⁴⁰*Ibid.*, 383.

⁴¹*Ibid.*, 384.

It may be objected to this theory, that a Man may be supposed to have in his mind the idea of the form and features of the female, rather than his own, and therefore there should be a greater number of female births. On the contrary, the general idea of our own form occurs to everyone almost perpetually, and is termed consciousness of our existence; and thus may effect, that the number of males surpasses that of females.⁴²

The natural disposition of sentient beings was to focus on one's own form, and therefore to produce other males. The production of females, instead, was a slippage of the mind to thinking about the form of the female. As a consequence, more males should be born than females. Both Bonnet's and Darwin's systems, at their core, relied on the potential of the male to give life to the embryo, and to shape it in its own image, including in its sex. Because of the centrality of the male body in generation, the female sex could not easily be accounted for. No matter their affiliation to the spermist or ovist camps, and independently of their specific reasoning, scholars converged on very similar solutions regarding the respective role of males and females in generation.

But preformationists did not have the monopoly over the study of generation in the eighteenth century. Some scholars rejected any kind of preformation altogether. George-Louis Leclerc, better known as the Comte de Buffon, spent the second volume of his grand *Histoire Naturelle* (1748) building an alternative system to preformation. As he made clear with his characteristic verve, preformation did not explain anything:

Lorsque nous demandons comment on peut concevoir que se fait la reproduction des êtres, & qu'on nous répond que dans le premier être cette reproduction étoit toute faite, c'est non-seulement avouer qu'on ignore comment elle se fait, mais encore renoncer à la volonté de le concevoir. On demande comment un être produit son semblable, on répond c'est qu'il étoit tout produit; peut-on recevoir cette solution!⁴³

[When we ask how the reproduction of living beings could work, and when we answer that, in the first living being, this reproduction was already made, that is not only admitting that we do not know how it works, but also renouncing to the possibility of conceiving it. We ask how a being can produce another one; we answer that it has already been produced; can we accept this solution!]

Buffon's position is usually associated to the term "epigenesis", and his ideas harkened back to the ancient Aristotelian system to explain generation; embryos came into existence when the mother's and the fa-

⁴²*Ibid.*

⁴³Buffon, Comte de, Georges-Louis Leclerc, *Histoire Naturelle, Générale et Particulière, avec la Description du Cabinet Du Roi*, vol.2 *Histoire générale des Animaux, Histoire Naturelle de l'Homme* (Paris: Imprimerie Royale, 1749), 28.

ther's fluids came together.⁴⁴ The question is now how epigenetic theorists such as Buffon saw the place of the female sex in generation.

Epigenesis: All about men again

Buffon's explanation of generation was part of his larger theory on the natural world, which had the ambitious aim of explaining all major phenomena in living bodies, including nutrition, growth, and reproduction. Buffon argued that all natural beings were formed of smaller particles, which he called "molécules organiques", organic molecules.⁴⁵ These molecules were found everywhere in the world, in animal and vegetal bodies, and also in the food that sustained organisms. Nutrition was simply the assimilation of organic molecules, and those same molecules, sent to different parts of the body, caused growth and development.⁴⁶ When growth stopped, molecules accumulated in "reservoirs" in different parts of the body, the testicles in males, and "seminal vesicles" in females, which roughly corresponded to female eggs.⁴⁷ Once in those reservoirs, organic molecules would wait until copulation. Then, male and female molecules could mix together to form a new being, either male or female.

Les liqueurs séminales des deux sexes se mêlent; et lorsque dans le mélange qui s'en fait il se trouve plus de molécules organiques du mâle que de la femelle, il en résulte un mâle, au contraire s'il y a plus de particules organiques de la femelle que du mâle, il se forme une petite femelle...⁴⁸

[The seminal liquids of the two sexes mix, and when there are more male organic molecules than female molecules, there results a male, on the contrary if there are more female organic molecules than male, a small female is formed]

To present sensibilities, Buffon's theory strikes as a wonderfully balanced, if rather strange system. Back in the eighteenth century, most generation scholars treated Buffon's views as too detached from empirical reality to be useful. Erasmus Darwin called Buffon's system a "fanciful theory", and Bonnet also found problems with it.⁴⁹ Despite these criticisms, however, Buffon's work was the talk of learned salons across Europe.⁵⁰

Moreover, Buffon's speculations were not always opposed to preformationists' arguments. In particular, some underlying assumptions

⁴⁴Maienschein, *Embryos under the Microscope*, 28.

⁴⁵*Ibid.*, 49.

⁴⁶*Ibid.*, 48.

⁴⁷*Ibid.*, 57.

⁴⁸*Ibid.*, 58-59.

⁴⁹Darwin, *Zoonomia*, 362; Bonnet, *Considérations*, 1:99.

⁵⁰Secord, "Talking Origins," 378-80.

about the role of women in generation stayed the same. Although Buffon's theory gave an active role to both males and females, Buffon was quick in qualifying that claim:

Comme les femmes font plus petites et plus faibles que les hommes, qu'elles font d'un tempérament plus délicat et qu'elles mangent beaucoup moins, il est assez naturel d'imaginer que le superflu de la nourriture n'est pas aussi abondant dans les femmes que dans les hommes... dès-lors elles auront moins de liqueur séminale, cette liqueur fera aussi plus faible et aura moins de substance que celle de l'homme; et puisque la liqueur séminale des femelles contient moins de parties organiques que celle des mâles, ne doit-il pas résulter du mélange des deux liqueurs un plus grand nombre de mâles que de femelles!⁵¹

[Because women are smaller and weaker than men, have a more delicate temperament and eat a lot less, it is natural to imagine that superfluous nourishment is not as abundant in females as it is in men... so they will have less seminal liquid, the liquid will also be weaker and have less substance than that of men, and because female seminal liquid contains less particles than that of males, should the mixing of the two liquids not result in a greater number of males than females!]

The weakness of women, their more delicate temperament, and smaller appetite, meant that their seminal liquid was weaker compared to that of men. As a result, Buffon noted, fewer females must be generated than males. And, he added, this was exactly what happened, across all species:

Il naît environ un seizième d'enfans mâles de plus que de femelles, & on verra dans la suite que la même cause produit le même effet dans toutes les espèces d'animaux sur lesquelles on a su faire cette observation.⁵²

[About one sixteenth of male children is born more than female children, and we will see in the following that the same cause produces the same effect in all animal species on which this observation has been made].

All the scholars of generation discussed so far, Chambers, Bonnet, Darwin, and Buffon, justified their theories by attempting to make them coherent with empirical facts: for example, that females ate less or were weaker than males, or that pregnant females nourished the foetus. Yet, apparently "factual" evidence can be lead to multiple interpretations. The systems that those scholars devised were only one solution among many alternatives for solving the puzzle of generation.

Buffon, for example, stated that females were physically weaker and ate less than males. Less surplus nourishment meant that their semi-

⁵¹Buffon, *Histoire Naturelle*, 72.

⁵²*Ibid.*, 73.

nal liquids could not be as strong. But the second statement does not necessarily follow from the first. If females are indeed weaker than males, and therefore need less nourishment, this also indicates that females can meet their nutritional needs more easily. In principle, females could ingest less food than males, and still have surplus organic molecules to convert into seminal liquid. Nothing would automatically make female seminal liquids less “strong” than male liquids.

Or take what Erasmus Darwin wrote about “equal” male and female tasks in generation. Darwin stated that the female burden of generation lied in the foetus’s nourishment, so females could not be expected to give life to the embryo, an equally burdening task. Yet, producing and secreting semen does not require as much effort as carrying a foetus and giving birth. The risk involved in those activities is also not comparable; in the eighteenth century, pregnancy could easily involve a threat to life; secreting semen never did. Even considering the evidence that scholars mentioned in favour of their theories, there were no logically compelling reasons for the particular systems they came up with.

The same realisation applies to explanations of sex formation. Bonnet stated that the male body could trigger the development of different sexes. But nothing indicated that only the male sperm should have this role. Even accepting that the male genitals were responsible for the formation of males (and perhaps also of neuters), there was no reason why female fluids should *not* transmit female sexual characters to the embryo. Explanations of generation involved choosing between different alternatives. But, at the time, not all alternatives were equally preferable or even visible.

There were, of course, exceptions. The French philosopher Pierre Louis Moreau de Maupertuis diverged from many of his contemporaries. Maupertuis was an all-around scholar, who wrote on philosophy, mathematics, physics, languages, and finally, the living world. He published his *Vénus Physique* (1745) only a few years before Buffon’s *Histoire Naturelle*, and, like Buffon, he did not hold preformation in much sympathy. He could not choose between the spermist and ovist systems, he said, because:

L'un & l'autre de ces deux systèmes me paroissent... détruits par la ressemblance de l'enfant y tantôt au père, tantôt à la mère... de ce que l'enfant ressemble à l'un & à l'autre, je crois qu'on peut conclure que l'un & l'autre ont eu également part à sa formation.⁵³

[Both of those systems seem to me to be destroyed by the child’s resemblance sometimes to the mother, sometimes to the father... since the child resembles

⁵³Maupertuis, baron de, Pierre Louis Moreau, “Vénus physique,” in *Oeuvres de Maupertuis*, vol. 2 (Lyon: Bruyset, 1745), 81.

both of them, I believe we can conclude that both have taken part in its formation.]

Children sometimes looked more like their mother, sometimes more like their father. For Maupertuis, this simple fact meant that both parents contributed equally to generation. Unlike Buffon, he did not make any claims about the relative force of the male or female contribution to generation.

Maupertuis' opinion shows that gendered assumptions did not always find their way in eighteenth-century generation systems. Different cultural and intellectual currents exist at the same time, either alongside each other, or in confrontation.⁵⁴ Yet, Maupertuis' ideas were not very well-received among his colleagues, in part because his descriptions of reproduction's pleasures were considered too alluring to be appropriate to a scholarly mindset. Bonnet dismissed Maupertuis by saying that his work was "plus propre à exciter les sensations que les perceptions", "more fit for stimulating sensations than perceptions".⁵⁵ The fact that Maupertuis' ideas were generally not accepted suggests that there were limits on what it was possible to argue.

More than just debunking gendered assumptions in generation systems, however, I am interested in the constraints that shaped those systems. If, as Hacking stated, historical ontology is about the possibilities for choice that arise in history, then those scholars had a limited space of possibilities before themselves. Hacking's concept echoes Foucault's notion of the "episteme": the unconscious structure which defines the conditions of possibility for knowledge.⁵⁶ The episteme or space of possibilities for the eighteenth-century study of generation was limited by scholars' underlying cultural beliefs and by current preoccupations, more precisely by the values and traits attributed to males and females.

The importance of the male in generation, for example, had ancient, religious undertones. As Erasmus Darwin noted: "This idea of the reproduction of animals from a single living filament of their fathers, appears to have been shadowed or allegorised in the curious account, in sacred writ, of the formation of Eve from a rib of Adam".⁵⁷ The fundamental role of the male sex in generation, as well as the question of how a different sex could be formed from the rib (or the filament, or the seminal fluid) of a male individual, went back to the most fundamental of all Christian stories. As Eva Pinto-Correia put it in her study of pre-

⁵⁴Annabel Brett, "What is intellectual history now?" in *What Is History Now?*, ed. David Cannadine (Basingstoke: Palgrave Macmillan, 2002), 122.

⁵⁵Bonnet, *Considérations*, 1:142.

⁵⁶Michel Foucault, *Les Mots et les Choses* (New York: Vintage, 1994), 183.

⁵⁷Erasmus Darwin, *Zoonomia*, 360.

formation theories: “When the oldest myth meets the newest discovery, no postulate is too daring”.⁵⁸

In terms of scholars’ current preoccupations, Eve Keller has remarked that, even if mechanistic theories such as preformation formed a temporary solution to the problem of generation, they did not leave scholars entirely at ease.⁵⁹ The likening of human embryonic development to the unfolding of a mechanical process stirred anxieties about human identity, or to be precise, masculine identity. That the female was essentially a passive machine was not seen as problem, but that male subjects risked losing their willpower by approaching the status of a machine was harder to swallow. To prove that male men were not mere machines, scholars stressed the identity, autonomy, and willpower of the male seed.⁶⁰

Still, exceptions such as Maupertuis remind us that, despite the influence of past cultural associations and of current anxieties, students of generation were not mere puppets of the episteme. Prioritising structure or power forgets that people are complex subjects, who have the capacity to think and reflect from inside a given historical and cultural consciousness.⁶¹ Those scholars’ insistence on the power of the male sperm may have been unconscious, but it was convenient for them that they did not have to become conscious about it. Their claims that processes of reproduction reflected the weaker nature and nourishing role of females could have very concrete consequences for how women’s role was conceived of in society.

In the eighteenth century, upper-class men campaigned for the abolition of wet-nursing and the return to a “natural” way of feeding children from their mothers’ breast.⁶² According to scholars such as Buffon or Linnaeus, wet-nursing was dangerous for infant survival.⁶³ But this campaign was also connected to a moral argument about returning women to their place of loving and caring mothers, responsible for children’s nourishment.⁶⁴ Buffon stressed that only maternal tenderness could satisfy all the needs of an infant.⁶⁵ Arguments that the female role in generation was to provide nourishment for the foetus, helped to make that point. The shared belief that males were future organisms’ sources of life, whilst females provided nourishment, justified what eighteenth-century scholars wished to see around them: a division of labour based on female care for children, and male labour or intellectual pursuits. His-

⁵⁸Pinto-Correia, *The Ovary of Eve*, 122.

⁵⁹Keller, “Embryonic Individuals,” 339-40.

⁶⁰*Ibid.*, 343-41.

⁶¹Sherry B. Ortner, “Subjectivity and cultural critique,” *Anthropological Theory* 5, no. 1 (2005): 31-52.

⁶²Schiebinger, “Why Mammals Are Called Mammals”, 404-409.

⁶³*Ibid.*, 404-406; Buffon, *Histoire Naturelle*, 460-475.

⁶⁴Schiebinger, “Why Mammals Are Called Mammals,” 408.

⁶⁵Buffon, *Histoire Naturelle*, 460.

torians have remarked how, throughout the early modern period, and especially as the eighteenth century drew to a close, women became more closely identified with their generative function, as well as with the domestic sphere.⁶⁶ Although the extent to which women's lives actually changed during that time is a matter of discussion,⁶⁷ theories of generation do reflect at least male scholars' desire for women to fit into particular roles.

Man uncovered: The rational male

Aside from particular cultural limits on the space of possibilities, and aside from scholars' own political motivations, I argue that a wider thought category also had a strong role in shaping those scholars' theories of generation. This category operated through an apparently anodyne language feature: the use of the term "Man". Man was exactly the opposite of an anodyne word. It was an organising, world-structuring concept. Although Man appears as a general descriptive term for the human race, Man was not a neutral concept. It referred primarily to male men, the true representatives of Man. Uncovering the meaning of Man allows for a better understanding of why scholars' theories of generation privileged the production of new males, from male bodies.

The word "man" or "homme" was pervasive in the writings of eighteenth-century scholars. A word frequency search on the second volume of Buffon's *Histoire Naturelle* returns 237 instances of the word "homme/s", featuring in expressions such as "génération de l'homme", generation of Man, or standing by itself as "l'homme" or "les hommes", opposed to animals.⁶⁸ By contrast, the word "humain", with its variations, only appears a total of 56 times, mostly used in "corps humain", human body, and in "genre humain", "human race".⁶⁹ The expression "être humain", "human being" was entirely absent. Besides its frequent use, the very meaning of Man was often ambiguous.

Sometimes, Man seemed to stand for the general human being. Even today, Man is still used as a synonym for the human species. After having described how generation worked in animals and in humans, Buffon moved to a section titled "Histoire Naturelle de l'Homme", "Natural History of Man":

⁶⁶Karen Harvey, "The century of sex? Gender, bodies, and sexuality in the long eighteenth century," *The Historical Journal* 45, no. 4 (2002): 904; Eve Keller, *Generating Bodies and Gendered Selves: The Rhetoric of Reproduction in Early Modern England* (Seattle: University of Washington Press, 2007), 9-10; Dror Wahrman, *The Making of the Modern Self: Identity and Culture in Eighteenth-Century England* (Yale University Press, 2004), 12-13.

⁶⁷Harvey, "The century of sex," 907-908.

⁶⁸Searching for "homme" returns 48 results, "l'homme" 109 results, and "hommes" 80 results.

⁶⁹Searching for "humain" returns 34 results, "humaine" 20 results, "humains" 1 result, "humaines" 1 result, "l'humain" 0 results.

Nous avons amené l'homme jusqu'au moment de sa naissance, reprenons-le où nous l'avons laissé, parcourons les différents âges de sa vie, & conduisons-le à cet instant où il doit se séparer de son corps, le rendre à la masse commune de la matière à laquelle il appartient.⁷⁰

[We have brought man until the moment of his birth, let us take him from where we left him, go through the different ages of his life, and bring him to that instant where he has to separate from his body, and give him back to the common matter to which he belongs]

Here, Buffon seemed to refer to “Homme”, or Man, in the sense of the general human being. In fact, in the rest of the section, Buffon went through the different stages of human life: childhood, puberty, adulthood, and old age, describing how both men and women changed through life. At other times, Buffon referred to “homme” specifically as the male sex, for example when, describing the different characteristics of the sexes, he wrote that “l'homme a la force & la majesté, les grâces & la beauté sont l'apanage de l'autre sexe”, “man has force and majesty, grace and beauty belong to the other sex”.⁷¹

But, the two meanings of “homme” often became conflated. Just after stating that Man possessed force and majesty, and woman grace and beauty, Buffon wrote:

Tout annonce dans tous deux les maîtres de la terre, tout marque dans l'homme, même à l'extérieur, sa supériorité sur tous les êtres vivans; il se soutient droit & élevé, son attitude est celle du commandement, sa tête regarde le ciel & présente une face auguste sur laquelle est imprimé le caractère de sa dignité; l'image de l'âme y est peinte par la physionomie, l'excellence de sa nature perce à travers les organes matériels & anime d'un feu divin les traits de son visage; son port majestueux, sa démarche ferme & hardie annoncent sa noblesse & son rang.⁷²

[Everything indicates in both of them the masters of the earth, everything indicates in man, even externally, his superiority over all living beings; he carries himself straight and tall, his attitude is that of commandment, his head looks at the sky and presents a noble face on which is printed the character of his dignity, the image of the soul is painted by the physiognomy, the excellence of his nature comes through the material organs and animates the traits of his face with a divine fire; his majestic attitude, his firm and bold gait announce his nobility and rank]

Buffon started by stating that “tous deux”, both Man and Woman, are masters of the Earth. Yet, as he went on to describe Man,

⁷⁰Buffon, *Histoire Naturelle*, 2:444.

⁷¹*Ibid.*, 518.

⁷²*Ibid.*

Buffon mentioned qualities such as leadership, nobility, dignity, excellence, majesty, firmness, boldness. Those attributes are much closer to Buffon's previous description of the male Man, based on force and majesty, rather than his description of Woman, associated to grace and beauty. In other words, Buffon made clear why male Man should be considered as the "master of the earth", but did not explain why Woman should possess the same title. Moreover, this description of Man appeared in a section titled "De l'Age Viril", "Of the Virile Age", in which Buffon addressed human adulthood. Yet, the attribute of virility belongs to male Man, not to Woman. Although Buffon seemingly started with the intention of describing the whole human species, he effectively described only the male half of it.

This slippage was not a coincidence. Definitions of Man in encyclopaedias of the time show a similar blurring between the general, neutral human and the male Man. In the first place, as Buffon's text suggests, the word "human" or "human being", as a noun referring to a general member of the human species, did not exist. Today's definition for human being in the Oxford dictionary starts with: "a man, woman or child of the species *Homo sapiens*".⁷³ By contrast, the entry for "human" in Chambers' *Cyclopaedia* referred to Man: human was "something that relates to Man, or the nature of Man".⁷⁴ "Human" was only an adjective for Man. Chambers gave more detail on what he meant by Man under the heading Human Nature: "all men together that possess the same spiritual, reasonable soul".⁷⁵ Man, for Chambers, possessed a soul infused with spirit and reason.

The same definition of Man based on the soul and on reason appeared in other encyclopaedias, including in Diderot and D'Alembert gigantic *Encyclopédie, ou dictionnaire raisonné des sciences, des arts et des métiers* (1751-1766). The entry for "Homme" was divided in several sections: Natural History, Anatomy, Morals, Politics. But before getting into details, the author of the entry gave a general definition of "Homme":

Etre sentant, réfléchissant, pensant, qui se promène librement sur la surface de la terre, à la tête de tous les autres animaux, qui vit en société, qui a inventé les sciences et les arts, qui a une bonté et une méchanceté qui lui est propre, qui s'est donné des maîtres, qui s'est fait des lois... Il est composé de deux substances, l'une qu'on appelle âme... l'autre connue sous le nom de corps.⁷⁶

[Feeling, reflecting, thinking being, who walks freely on the earth's surface, who is at the head of all other animals, who lives in society, who has invented the

⁷³Oxford Languages, last accessed September 20, 2021, <https://www.google.com/search?q=human+being+definition&aq=hum&aqs=chrome.0.69i59l2j0i67j69i57j0i67j69i60l3.727j0j7&sourceid=chrome&ie=UTF-8>

⁷⁴Chambers, *Cyclopaedia*, 1:261.

⁷⁵*Ibid.* Note that Chambers' *Cyclopaedia* did not have an entry for "Man".

⁷⁶Diderot and d'Alembert, *Encyclopédie*, 8:261.

sciences and the arts, who has his own good and evil, who has given himself masters, who has made laws... He is composed of two substances, one called soul... the other known by the name of body.]

This understanding of Man shows similarities both to Chambers' and Buffon's descriptions: it mentions that Man has a soul, and that he is a leader on Earth. The only element that is lacking, compared to Chambers' entry, is that this definition does not directly refer to reason, only to reflection and thought. This omission was redressed by a long footnote by one of the editors of the *Encyclopédie*. According to this editor, the definition of Man based on reflection and thought risked to be confusing to the reader, exactly because it did not mention reason:

Je ne veux que garantir le lecteur d'un piège, qui quoique tendu sans dessein, n'en est pas moins dangereux. Les principaux attributs de l'Homme, ceux qui le caractérisent le mieux, & qui le distinguent essentiellement de tous les êtres... semblent avoir été trop négligés dans cette définition. En effet on n'y fait point mention de la Raison. On dit que l'homme est un être sentant, réfléchissant, pensant, mais on ne dit point que c'est un animal doué de raison, raisonnable.⁷⁷

[I only want to warn the reader of a trap, which although not set intentionally, is no less dangerous. The main attributes of Man, those that characterise him better, and that distinguish him essentially from all other beings... have been too neglected in this definition. In fact it does not mention Reason. It says that Man is a feeling, reflecting, thinking being, but it does not say that it is an animal gifted with reason, reasonable].

Yet, the editor continued, reason was the dominant faculty in Man:

Il n'y a cependant point d'homme qui ne reconnaisse en soi la faculté de raisonner comme la principale, comme celle qui règle les autres qui lui sont subordonnées... C'est donc la plus belle faculté de notre âme, et la plus belle définition de l'Homme est donc celle qu'en ont donnée en peu de mots les anciens philosophes: l'Homme est un animal raisonnable.⁷⁸

[There is no man who does not recognise in himself the faculty of reason as the principal, as the one which regulates the others which are subordinate to it... It is therefore the most beautiful faculty of our soul, and the most beautiful definition of Man is that given in a few words by the ancient philosophers: Man is a rational animal].

Man was defined by a central quality of the soul, reason, which granted him superiority over the rest of creation. But reason was not a neutral quality. In eighteenth century scholarly texts, such as the *Ency-*

⁷⁷*Ibid.*

⁷⁸*Ibid.*

clopédie, reason was especially attributed to men. The author of the entry on Woman stated “La nature a mis d’un coté la force et la majesté, le courage & la raison; de l’autre, les grâces & la beauté, la finesse et le sentiment”, “Nature has put on one side force and majesty, courage and reason, on the other grace and beauty, delicacy and sentiment”.⁷⁹ Reason naturally belonged to men, not to women.

Whether women also possessed reason was a matter of debate. In the *Cyclopaedia*’s entry on Woman, Chambers recounted the opinions of learned men on the question of whether the female sex was reasonable, and whether it belonged in Man. For example: “An Anonymous Author, about the Close of the XVIth Century, published a little Latin Dissertation to prove that Women are not Men; that is, are not reasonable Creatures”.⁸⁰ Chambers noted that this anonymous author might have asked this ironically. Still, the question of whether women were reasonable creatures, and in general the question of female abilities, seemed to remain unsolved: “Tis a Point much controverted, how far, Learning and Study become the Sex”, Chambers stated in the same entry.⁸¹ The reasonable status of women was not a complete impossibility, but it was also not certain. Defining Man through reason created the slippage between Man as a general term for all the human race, and Man as male. If Man was defined based on reason, and if reason was primarily a masculine quality, Man referred principally to male individuals, rather than female ones.

Naturally, this does not imply that scholars were not aware of the existence of women on Earth. Encyclopaedias described female anatomy, female bodily processes such as menstruation, and female pleasure in the act of generation.⁸² In some rare instances, authors such as Buffon and the contributors to the *Encyclopédie* even referred to women as the “moitié du genre humain”, half of the human race.⁸³ When talking about the juridical meaning of the word Woman, the author of the entry on Woman also stated that “Toutes les femmes et les filles sont parfois comprises sous le terme d’hommes”, “All women and girls are sometimes included under the term of men”.⁸⁴ The author, however, used “hommes” in the plural, not as the singular, essential “homme” used elsewhere. And the author hastened to add that “La condition des femmes en général est néanmoins différente”, “the condition of women in general is nevertheless different”.⁸⁵ The point is not that scholars ig-

⁷⁹*Ibid.*, 399.

⁸⁰Chambers, *Cyclopaedia*, 2:376.

⁸¹*Ibid.*, 377.

⁸²*Ibid.*, 1:135; Denis Diderot and Jean le Rond d’Alembert, eds, *Encyclopédie, ou Dictionnaire raisonné des sciences, des arts et des métiers*, vol. 7, 2nd ed. (Lucques: Giuntini, 1760), 492-493.

⁸³Diderot and d’Alembert, *Encyclopédie*, 7:398.

⁸⁴*Ibid.*, 401.

⁸⁵*Ibid.*

nored the presence of women, but rather that the true representatives of Man, that creature with a special status among the earth's inhabitants, were male rather than female.

The entry on "Homme" in the *Encyclopédie* never explicitly acknowledged that Man comprised two sexes, male and female. The author of the entry described anatomical and moral differences between men and women, but at no point did he state something in the lines of "the reasonable creature we call Man is divided in two sexes, male and female". The very definition of "Woman" given by the *Encyclopédie* and *Cyclopaedia* is telling; woman was the "Female of Man", or the "femelle de l'Homme".⁸⁶ Woman was *of* Man, meaning that woman belonged to male Man, but was not quite part of him. By way of contrast, the current definition of woman in the Oxford dictionary reads: "an adult female human being".⁸⁷ Unlike for the "human being", female individuals were not obviously captured by the notion of "Man".

The scientific name of the human species, *Homo sapiens*, betrays the same preference for members of the male sex. Historian Londa Schiebinger has argued that when Carl Linnaeus gave the name *sapiens* to the human species, he was effectively stating that a male quality, reason, separated people from the rest of the animal kingdom. Linnaeus based instead the class of mammals on a female attribute: the lactating breast. Men, endowed with the special quality of reason, marked the difference between Man and the rest of the world's beings. Women, representing the material, reproductive body, united the human species with other mammals.⁸⁸

The reason/body dualism points to what feminist historians such as Carolyn Merchant have long identified: that, historically, men have been associated to immaterial qualities such as reason or the soul.⁸⁹ Starting from Aristotle's writings, and continuing with Harvey's experiments on generation, the semen has been viewed as the soul-giving element, which could grant reason to the embryo.⁹⁰ In fact, most scholars at the time did not believe that the semen came in material contact with the female egg, but that it fertilised it from a distance.⁹¹ The same connection between Man and intangible characters persisted in the eighteenth cen-

⁸⁶Chambers, *Cyclopaedia*, 2:376.

⁸⁷*Oxford Languages*, last accessed September 20, 2021, <https://www.google.com/search?q=woman+definition&toq=woman+definition&aqs=chrome.69i59j0i512l2j46i512j0i512j46i512l2j0i10i512j0i512l2.1983j1j7&sourceid=chrome&ie=UTF-8>

⁸⁸Schiebinger, "Why Mammals Are Called Mammals," 394.

⁸⁹Carolyn Merchant, *The Death of Nature : Women, Ecology, and the Scientific Revolution* (San Francisco, Calif.: Harper and Row, 1980), Chapter 6. Production, Reproduction, and the Female.

⁹⁰Maryanne Horowitz, "The Science of Embryology before the Discovery of the Ovum," in *Connecting Spheres: Women in the Western World, 1500 to the Present*, eds. Marilyn J. Boxer and Jean H. Quataert (York: Oxford University Press, 1987) 86-94; Merchant, *The Death of Nature*, 156-161.

⁹¹Pinto-Correia, *The Ovary of Eve*, Chapter 3, "One does not see the wind".

tury. For Bonnet, the male sperm animated the preformed embryo. For Darwin, the force of the male imagination provoked changes in the embryo, including in its sex. In the reason/body dualism, women most properly represented the body.

The very concept of Man, defined through the immaterial quality of reason, referred to males over females. It is less strange, then, that Buffon described Man only with qualities that belonged to the male, rather than the female, sex. Man was implicitly male. In the eighteenth century, the notion of the “human being”, a neutral member of the human species, undifferentiated by sex, had not yet been born. Man dominated the scene, as a rational male, who stood for the whole of humanity.

The generation of Man

How does the male character of Man relate to eighteenth-century theories of generation? In this chapter, I described how scholars tended to give the passive role to the female in generation, whilst males furnished the active principle of life. I also noted how the systems that scholars came up with to explain sex formation could better account for the formation of the male sex than the female sex. Those gendered features of generation systems can be explained by the fact that when scholars explored the generation of Man, they chiefly saw their enterprise as aiming to explain the generation of *male* Man. Females were the instruments through which new men were born, but not the end of generation like men were.

When scholars mentioned the generation of Man, the word often slipped from its general to its masculine meaning. Writing about infant mortality, Buffon lamented the “perte d’une infinité d’hommes qui font la richesse de l’Etat”, the “loss of an infinity of men who make the wealth of the State”.⁹² Infant mortality affects both sexes, but in Buffon’s thinking, the “men” who constituted the wealth of the State were likely male, rather than female. Or take what Erasmus Darwin wrote about the growth of the foetus: “In the more advanced state of the foetus, it evidently possesses volition... afterwards the power of volition contributes to change or alter many parts of the body during its growth to *manhood*”.⁹³ Volition, the power of will, made the embryo grow, not to adulthood, but specifically to manhood. Even the term of “human” had a similar meaning to masculine Man. Writing about human instincts, Erasmus Darwin stated: “The *human creature* has greatly more accurate and distinct sense of vision than that of any other animal. Whence, as *he* advances to maturity, *he* gradually acquires a sense of female beauty”.⁹⁴

⁹²Buffon, *Histoire Naturelle*, 475.

⁹³Darwin, *Zoonomia*, 368. My emphasis.

⁹⁴*Ibid.*, 103. My emphasis.

Darwin started with reference to a supposedly general “human creature”, but immediately switched to a masculine “he” who was attracted to females. Scholars of generation mostly concerned themselves with new men coming into the world.

Moreover, Man’s immaterial, life-giving role in generation directly contrasted with the role of females as material containers that provided the embryo with nourishment. After describing the embryo’s development, Erasmus Darwin turned to the changes that animals underwent when reaching maturity: “the production of the butterfly with painted wings from the crawling caterpillar; or of the respiring frog from the subnatant tadpole; from the feminine boy to the bearded man, and from the infant girl to the lactescent woman”.⁹⁵ The boy went from looking feminine to a mature man with a beard, whereas the girl developed into a woman who produced milk. Outside its context, Darwin’s remark sounds strange: producing milk is not something that happens to women as they reach maturity, only when they are pregnant. But for eighteenth-century scholars, the growth of the female sex tended towards generation.

If the human species was better defined by its male half, endowed with reason, it is also natural that those systems were geared towards explaining the formation of males, and that they stressed that more males were born than females. Scholars wanted to explain the generation of reasonable men. There could be no neutral generation of humans or human beings, as we would intend those terms today. In the following chapter, I turn to the implications of masculine Man another axis of difference aside from sex: human ethnic differences.

⁹⁵*Ibid.*, 368.

Chapter II. Man's special status: How the rational soul united male individuals across the world.

The category of male Man allows to make sense of scholars' gendered theories of generation. But male Man did not only have consequences for male and female roles in reproduction; it reached further than that. In this chapter, I explore the implications of male Man for eighteenth-century views of human population difference, or, using the vocabulary of the time, of human "races" or "varieties". The category of Man separated men from women and from the rest of the animal world. And yet, Man, based on the rational soul, had the potential to unite men of very different origins and appearances.

In his study of race in early modern philosophy, Justin Smith has argued that until about the eighteenth century, all human beings were united by a shared essence, the rational soul.¹ Here, I endorse Smith's argument about the uniting potential of the rational soul. As long as all men shared an essence, there could be no strict differences between them. But I want to stress the "men" in that sentence. Unlike Smith, who treats the rational soul as an attribute that could unite all human beings, I argue that the rational soul united male men specifically, in line with the gendered category of Man.

The study of reproduction is one area where the importance of the rational soul becomes especially evident. In a field that required constant filling in with material from animals, scholars stressed the difference between men and animals by insisting on the rational soul. Man's rational soul established his absolute difference from the rest of the natural world, and, in the same movement, granted men of different origins the possibility to share Man's superior status, no matter their provenience or physical appearance. The study of generation also supported the superficiality of racial categories. In turn, considering human varieties had repercussions for the study of generation. The existence of many different physical conformations in the world weakened the idea that all people existed preformed from the beginning of times. Questions about human varieties, and the study of reproduction, influenced each other.

Yet, changes were already underway, which would relegate non-European men to a lower status, and pave the way for the strict ideas about race that would come forward in the nineteenth century. Starting from late eighteenth-century Scotland, some scholars left aside ideas of a shared rational soul. In its place, they introduced a model of human difference where men acquired reason and civilisation through a long proc-

¹Smith, *Nature, Human Nature, and Human Difference*, 17-19.

ess of improvement.² On the new scale of progress, “Savages” and other distant populations ranked far below European people. The unity of Man would not be a given for much longer.

The power of the rational soul: Man above all animals

The quality that distinguished Man from Woman, reason, elevated Man above all other living beings. Reason came together with Man’s special soul, a soul of divine origin. Chambers stated that all men shared “a reasonable soul”, and the *Encyclopédie’s* editors defined reason as “la plus belle faculté de notre âme”, “the most beautiful faculty of our soul”.³ This special, rational soul automatically separated Man from the rest of the animal kingdom. After describing his system of generation, Buffon offered a lengthy reflection on why it was important to consider the soul:

Pourquoi vouloir retrancher de l’Histoire Naturelle de l’homme, l’histoire de la partie la plus noble de son être! pourquoi l’avilir mal-à-propos & vouloir nous forcer à ne le voir que comme un animal, tandis qu’il est en effet d’une nature très-différente, très-distinguée & si supérieure à celle des bêtes, qu’il faudroit être aussi peu éclairé qu’elles le font, pour pouvoir les confondre!⁴

[Why want to exclude from the Natural History of man, the history of the most important part of his being! Why want to vilify him and want to force us to see him only as an animal, when he is in fact of a nature very different, very distinguished and so superior to that of beasts, that one should be as little bright as them, to confuse them!]

Buffon described how man had the power of speech, which was unknown to “brutes”. For Buffon, even if some animals possessed the mechanical capacity to speak, they could never truly possess language, because they lacked the “puissance intellectuelle”, the intellectual power to do so.⁵ Without thought, animals only perpetuated the behaviour of their species, without any novelty or independence. Ultimately, the source of that profound intellectual difference was reason, which God had bestowed on men but not on beasts.

²Silvia Sebastiani, “‘Race’, Women and Progress in the Scottish Enlightenment,” in *Women, gender and enlightenment*, eds. Sarah Knott and Barbara Taylor (London: Palgrave Macmillan, 2005), 75-96; Silvia Sebastiani, *The Scottish Enlightenment : Race, Gender, and the Limits of Progress*, Palgrave Studies in Cultural and Intellectual History (New York: Palgrave Macmillan, 2013), 48.

³Diderot and d’Alembert, *Encyclopédie*, 8:261.

⁴Buffon, *Histoire Naturelle*, 436-437.

⁵*Ibid.*, 440.

En voilà plus qu'il n'en faut pour nous démontrer l'excellence de notre nature, la distance immense que la bonté du Créateur a mise entre l'homme et la bête; l'homme est un être raisonnable, l'animal est un être sans raison! Si comme il n'y a point de milieu entre le positif et le négatif, comme il n'y a point d'êtres intermédiaires entre l'être raisonnable et l'être sans raison, il est évident que l'homme est d'une nature entièrement différente de celle de l'animal.⁶

[Here is more than we need to demonstrate the excellence of our nature, the immense distance that the goodwill of the Creator put between man and beast; man is a reasonable being, the animal is a being without reason! Seen as there is no middle between the positive and the negative, seen as there is no intermediary between the reasonable and the unreasonable being, it is evident that man is of an entirely different nature from the animal]

Man was immensely above the level of beasts, because Man possessed an “immaterial”, “spiritual” soul, endowed with reason. Instead, if animals had any soul at all, it would be a material soul, very different from Man's.⁷ Buffon's distinction between rational and irrational creatures left little space for middle grounds. Either one was an “être pensant”, a thinking being, or a “mechanical” being, an animal.⁸ The most important consequence of this binary was that, even as they physically shared many similarities, Man was on an entirely different plane from animals.

For scholars of generation, it was especially important to stress this difference, since the study of generation highlighted the many physical similarities between Man and animals. It was true that some species, including some worms and the much discussed water polyp, had a completely different reproductive system from men and women. To the amazement of eighteenth-century educated circles, those animals seemed to be able to grow copies of themselves from their individual bodies.⁹ Except for those strange cases, however, animals with a more complex organisation reproduced in much the same way. The *Encyclopédie's* entry on generation reported that “ce qui peut être dit for ce sujet par rapport à l'espèce humaine, convient presque entièrement à toutes les autres espèces d'animaux, pour la reproduction desquels il est nécessaire que se fasse le concours de deux individus”, “what can be said on this subject about the human species, corresponds almost to all other animal species, that need the cooperation of two individuals to reproduce”.¹⁰ The stress on this similarity reflected the belief that much of the living world shared the same generative processes.¹¹

⁶*Ibid.*, 443.

⁷*Ibid.*, 442.

⁸*Ibid.*, 443.

⁹Secord, “Talking Origins,” 376.

¹⁰Diderot and d'Alembert, *Encyclopédie*, 492.

¹¹Farley, *Gametes & Spores*, Chapter 1, The Universality of Sex.

The parallels between Man and the rest of the animal world also had a practical motivation. Experimenters often used observations made on small animals such as the chick or the frog, and extended them to other sexually reproducing animals, including to Man. Procuring animal bodies for study was much easier than finding human bodies,¹² especially since studying generative processes often required experimenting with animals that were either still alive, or had just been killed. The English physician William Harvey, for example, had obtained special permission from the King to kill and dissect does from his garden, just after they had mated with the stag.¹³ Studying animals was a necessary proxy to approach the generation of Man and of the rest of the animal kingdom.

This inevitable closeness between Man and animal did not please everyone. Linnaeus received severe criticisms on his natural classification system, which placed Man in a family shared with many other animals, *Quadrupedia* (then renamed *Mammalia*), and in the order *Anthropomorpha*, shared with monkeys, apes, and sloths.¹⁴ Fellow naturalists accused him of vilifying Man, of reducing him to a beast, of denying Man's divine status.¹⁵ Despite these critical voices, however, his system may not have represented such a break from Christian ideas. The rational soul could still come to the rescue. Staffan Müller-Wille has drawn attention to some of Linnaeus's writings, where he stated that men enjoy a "blessed immaterial soul".¹⁶ Man remained part of the divine order, even as Linnaeus believed Man was almost indistinguishable from his "cousins", the primates.¹⁷

On the whole, eighteenth-century generation scholars did not seem to have an overly big problem with the resemblance of Man to a material animal. Buffon expressed a similar judgment to Linnaeus' on this issue. Because of the similarity of Man's body to other animals, "on est forcé de le mettre dans la classe des animaux", "we are forced to place him in the class of animals".¹⁸ Yet, no matter the similarities shared by human and animal bodies, the soul and reason meant that on the divine plane, they were the furthest they could be from each other. The division between soul and body was sometimes used as a justification for treating the body in a material sense only: "Je laisse à des esprits plus sublimes à vous dire, s'ils peuvent, ce que c'est que votre âme... Je tâcherai seulement de vous faire connoître l'origine de votre corps", "I leave to

¹²Andrew Cunningham, *The Anatomist Anatomis'd: An Experimental Discipline in Enlightenment Europe* (Farnham: Ashgate, 2010), 315.

¹³Maupertuis, Baron de, Pierre Louis Moreau, "Vénus physique," in *Œuvres de Maupertuis*, vol. 2. (Lyon: Bruyset, 1745), 36-37.

¹⁴Gunnar Broberg, "Homo sapiens: Linnaeus's Classification of Man," in *Linnaeus: The Man and His Work*, ed. Tore Frangsmyr (California: Berkeley, 1983), 171-172.

¹⁵*Ibid.*

¹⁶Staffan Müller-Wille, "Linnaeus and the Four Corners of the World," 19 (in PDF document).

¹⁷*Ibid.*

¹⁸Buffon, *Histoire Naturelle*, 437.

more sublime spirits to tell you, if they can, what is your soul... I will just tell you about the origin of your body”, wrote Maupertuis at the start of his *Vénus Physique*.¹⁹

Even if the similarity between Man and animals did not sit entirely well with the idea that Man was the product of God’s special creation, the problem could still be “by-passed” by the soul/body dualism. Man could comfortably sit side by side with animals when it came to his body, whilst standing above them all, thanks to his rational soul. Besides establishing Man’s absolute superiority over the rest of the natural world, the rational soul had another repercussion: it had the potential to unite mankind, all men believed to have a special soul, no matter their origin or physical appearance.

One and the same Man

At the same time as the soul separated Man from the animal world, the rational soul also created the possibility for male men to share the same nature. If Man was defined by his reason, and if this reason was an attribute of the divine soul, then all men ensouled by God could claim to belong in Man. In his study of race in early modern philosophy, Justin Smith argued that humanity was “all-or-nothing”: either you had a rational soul, and you belonged in Man, or you did not have it, and you were therefore external to Man.²⁰ For several eighteenth-century scholars, foreign or “savage” men, too, were rational, and could share in the special status of Man. Buffon argued that “l’homme sauvage”, “savage man”, spoke like the “homme policé”, “civilised man”, in the sense that both had the capacity for thought and reason. Others, such as Carl Linnaeus and Gottfried Wilhelm Leibniz, maintained that the rational soul was the special marker of all men.²¹ Leibniz believed that no morphological variation could take the rational soul away from man.²² The rational soul granted men of different origins full status as Man.

The opposite belief, that foreign people did not possess a rational soul, was also possible. Smith has described how early modern travellers, as well as the people stayed in Europe, considered people in the Americas as pure outcroppings of nature, like crystals or clouds.²³ Because those foreign people were so close to Nature, they had likely been generated without God’s special intervention, meaning without the rational soul.²⁴ Those foreign people were not considered as reasoning beings. They did not belong in Man.

¹⁹Maupertuis, *Vénus Physique*, 5-6.

²⁰Smith, *Nature, Human Nature, and Human Difference*, 137.

²¹Müller-Wille, “Linnaeus and the Four Corners of the World”, 19; Smith, *Nature, Human Nature, and Human Difference*, 134-135.

²²Smith, *Nature, Human Nature, and Human Difference*, 134-135.

²³*Ibid.*, 90.

²⁴*Ibid.*, 91.

Still, many eighteenth-century scholars seemed to favour the first half of the “all-or-nothing” rational soul. Historians have noticed how, in the early modern period and into the eighteenth century, bodies were malleable, and racial labels did not stick easily on those malleable bodies.²⁵ At that time, racial identities were much more fluctuating and unstable.²⁶ One reason for the malleability of racial characters might be that the rational soul provided a common backbone to all bodies. According to Smith, so long as the soul was independent of the body, physical differences between human beings were not essential differences.²⁷ What came on top of the rational soul was more superficial. In fact, eighteenth-century attempts to divide mankind in physical categories often stressed the fluidity and arbitrariness of those categories.

The *Encyclopédie* starting describing different human populations by remarking that “l’homme considéré comme un animal, offre trois sortes de variétés: couleur, grandeur et forme”, “man considered as an animal, offers three sorts of varieties: colour, size and shape”.²⁸ Note that it specified “man considered as an animal”, in the sense of Man under the aspect of his material, animal body. The soul of man was simply not the subject here. The author of the entry continued by describing different populations in different geographical regions. “Certains Chinois sont blancs, au reste ces caractères varient”, “Some Chinese are white, those characters vary”, he pragmatically remarked.²⁹ His list of the “whitest” and “most handsome” men included: Persians, Armenians, Turks, Greeks, and Europeans.³⁰ The author also noticed that when examining the people that made up the “races noires”, “black races” one discovered in them as much variety as within the “races blanches”, “white races”.³¹ Racial differences existed not as strict categories, but rather as multiple gradations.

The author of the entry still tended to associate particular mental traits to particular populations. He wrote that the inhabitants of the Arctic regions were ugly, superstitious, and stupid, and he remarked that black people were simple-minded and had no genius.³² But mental differences between people did not immediately match physical characteristics. Climate, diet, and customs all affected skin colour, meaning that be-

²⁵Jorge Canizares-Esguerra, “Demons, Stars, and the Imagination: The Early Modern Body in the Tropics”, in *The Origins of Racism in the West*, ed. Miriam Eliav-Feldon, Isaac H Benjamin, and Joseph Ziegler (Cambridge: Cambridge University Press, 2009), 313-325; Wahrman, *The Making of the Modern Self*, 86-87.

²⁶See e.g. Benjamin Braude, “The Sons of Noah and the Construction of Ethnic and Geographical Identities in the Medieval and Early Modern Periods,” *The William and Mary Quarterly* 54, no. 1 (1997): 103-42; Wahrman, *The Making of the Modern Self*, Chapter 3. Climate, Civilization, and Complexion: Varieties of Race.

²⁷Smith, *Nature, Human Nature, and Human Difference*, 18.

²⁸Diderot and d’Alembert, *Encyclopédie*, 8:283.

²⁹*Ibid.*, 283.

³⁰*Ibid.*

³¹*Ibid.*, 284.

³²*Ibid.*, 283-284.

ing “white” or “black” did not indicate essential differences between people.³³ Racial divisions were present, but they depended on the effect of the environment on the body. Historian Dror Wahrman summarised eighteenth-century ideas of race by stating that, for the greatest part of the century, the idea of innate and stable races was still “an insignificant blob on the horizon”, though it was nonetheless in sight.³⁴

For Smith, the lack of deep racial divisions can be attributed to humanity’s possession of the soul.³⁵ Because the soul provided a shared essence, there could be no deep racial divisions between people. If a group of men were believed to possess a soul, then they were part of rational Man. Physical characters were not indicators of an essential inferiority. Maupertuis made that clear in his *Vénus Physique*, when he turned to describing differences between men living in different regions of the globe. Men’s skin colour mattered less than their status as educated, knowledgeable, thoughtful men:

Si les premiers hommes blancs qui en Virent de noirs les avoient trouvés dans les forêts, peut-être ne leur auroient-ils pas accordé le nom d'hommes. Mais ceux qu'on trouva dans de grandes villes, qui étoient gouvernés par de sages Reines, qui faisoient fleurir les Arts & les Sciences dans des temps où presque tous les autres peuples étoient des barbares; ces Noirs-là auroient bien pu ne pas vouloir regarder les Blancs comme leurs frères.³⁶

[If the first white men that Saw black men had found them in forests, they might not have granted them the name of men. But those who were found in large cities, governed by wise Queens, who made the Arts and Sciences flourish at a time when almost all other people were barbarians, those Blacks might well not have wanted to view the Whites as their brothers.]

Having a black skin colour did not mean that a man was less “civilised” than his white counterparts. Black men living in cities, dedicated to the arts and sciences, would have been justified in not regarding whites as part of their same species. What mattered was Man’s status as a thoughtful, educated creature, more than Man’s physical differences. The soul and reason made it possible for men living in different parts of the world to be united under the banner of Man.

The status of foreign men remained nevertheless different from that of European people. “Savages” were sometimes idealised as “noble savages”, as possessing a nature that was uncorrupted by the growth of civilisation. Buffon, for example, compared foreign customs to civilised society in order to criticise the latter. He poked fun at European fashion

³³*Ibid.*

³⁴ Wahrman, *The Making of the Modern Self*, 91.

³⁵ Smith, *Nature, Human Nature, and Human Difference*, 137.

³⁶ Maupertuis, *Vénus Physique*, 97.

stating that it was the most impractical of all styles of clothing.³⁷ He also deplored how civilised men, due to their sluggishness, were much weaker than the “savages” who could walk and run incredibly fast.³⁸ Buffon admired savages and thought that European men could learn from their example. But the nobility that he found in savages was mostly in their practical wisdom or in their physiques. When scholars idealised “savage” or “primitive” customs, those ideas rested on the principle that savages were closer to nature than European men. In principle, “savage” men could possess a rational soul and function as a model of an ancient and more noble state. But in practice, they were eons away from the civilised rationality (even if viewed as having gone wrong) of European men. Even exalting the savage preserves existing categories.³⁹

We should not overlook that the eighteenth century saw the trafficking and enslaving of African people. Slavery seems to squarely contradict fluid racial differences. Some scholars, such as the author of the *Encyclopédie*'s entry on Man, vehemently expressed their distaste for the slave trade: “Quoiqu'en général les nègres aient peu d'esprit, ils ne manquent pas de sentiment. Nous les avons réduits, je ne dis pas à la condition d'esclaves, mais à celle de bêtes de somme, & nous sommes raisonnables! Nous sommes Chrétiens!”, “Even if in general negroes have little spirit, they do not lack in sentiment. We have reduced them, I do not say to the conditions of slaves, but to that of beasts of burden, and we are reasonable! We are Christian!”⁴⁰ We are reasonable, and yet we condemn other men to living a life fit for animals, not for men.

But in the eighteenth century, there were other reasons than intellectual views about the rational soul for the slave trade to persist, including perhaps the strongest reason of all: that it continued to be profitable. In the words of Jorge Canizares-Esguerra, it took the “massive presence of ‘black’ bodies working as slaves in plantations” for strict racial differences to emerge.⁴¹ The persistence of slavery might have eventually led Westerners to believe that black people were essentially inferior to white people, rather than the other way around. For the moment, eighteenth-century scholars continued to support fluid racial categories, turning a half-blind eye to the slave trade that their countrymen (and perhaps they themselves) benefitted from. Man's special soul did not mean that eighteenth-century men did not discriminate against non-European people. They simply viewed human difference through different categories than strict racial divisions.⁴²

³⁷Buffon, *Histoire Naturelle*, 2:537-538.

³⁸*Ibid.*, 552-553.

³⁹Smith, *Nature, Human Nature, and Human Difference*, 36-37.

⁴⁰Diderot and d'Alembert, *Encyclopédie*, 8:284.

⁴¹Canizares-Esguerra, “Demons, Stars, and the Imagination,” 322.

⁴²Wahrman, *The Making of the Modern Self*, 90.

The rational soul united men from different origins. The unity of Man, through the fluidity of racial categories, also found support through the study of generation. As eighteenth-century scholars started to argue against preformation theories, they also mobilised evidence about populations living in different parts of the world. The shift towards more epigenetic theories, in turn, led scholars to view “races” as shifting and malleable entities. The study of generation pointed towards fluid racial divisions, and towards monogenism. Once again, reproduction was closely implicated in questions about humanity.

Observations about foreign populations and their encounters with Europeans did not fit easily with the theory of preformation. In his *Vénus Physique*, Maupertuis attempted to understand how ovists and spermist systems could account for the presence of different varieties of men. Ovism implied that some original mother, some Eve, contained eggs upon eggs, black, white, brown, or of whatever colour. Spermism was similar, except that all those tiny beings existed inside the body of the father, in the “vers spermatiques”. As Maupertuis put it ironically: “le ver père des Nègres contenoit de ver en vertous les habitans de l’Ethiopie, le ver darien, le ver hottentot, & le ver patagon, avec tous leurs descendants étoient déjà tous formés”, “the father worm of Negroes contains from worm to worm all habitants of Ethiopia, the darian worm, the hottentot worm, the patagon worm, with all their descendants are all already formed”.⁴³ Needless to say, the previous solution did not strike Maupertuis as very convincing. The fact was that, as he stated, there were thousands of human physical varieties, for skin as well as for eye colour.⁴⁴ Preformation simply did not provide a convincing reason for why so many different “shades” of people existed.

Evidence of mixing between populations also posed a difficulty for preformation. If people from different races could produce offspring that looked like a mixture of the two parents, then that did not sit well with the argument that organisms existed preformed in either of those bodies. Erasmus Darwin used the example of mixed human offspring to show how that both parents affected the embryo:

The colour of the progeny produced between a white man and a black woman... if I am well informed, is always of the mulatto-kind, or a mixture of the two; which may perhaps be imputed to the peculiar form of the particles of nutriment supplied to the embryo by the mother.⁴⁵

⁴³Maupertuis, *Vénus Physique*, 108.

⁴⁴*Ibid.*, 108-109.

⁴⁵Erasmus Darwin, *Zoonomia: or the Laws of Organic Life* (New York: Swords, 1796), 1:379.

Erasmus Darwin hypothesised that the nutritive particles of the mother could change the embryo. This was the same kind of remark that came from the observation of mules, the offspring of horse and donkey. But scholars knew that there was a rather big difference between mules and the offspring produced by the mixing of human populations, since in the latter case, the offspring remained fertile. Erasmus Darwin discussed the “whitening” of children in mixed race families. By crossing with Europeans, black children in successive generations eventually became “quite white”, as he wrote.⁴⁶ Individuals from different races could mix with each other and eventually even become indistinguishable from “unmixed” individuals.

All in all, the evidence provided by different races worked in favour of systems in which new organisms were formed from a mixture of “particles” from both parents, or at least were influenced by both parents, rather than spring from a preformed being. Those more epigenetic generation systems, in turn, agreed with the idea that races were not strictly separate entities, but could change and merge. The new systems also had implications for the origin of different races. If the generation of new organisms depended on a combination of particles from the mother and the father, then the physical makeup of future people had an element of chance. For Maupertuis, people of different colours appeared through chance combinations of generative particles.⁴⁷ After some generations, the particles of the original colour would get fewer and fewer, until a new race emerged.⁴⁸ Maupertuis’ solution implied that races could descend from the same ancestors, and diverge into different populations through time.

This monogenist view of human races was also supported by the observation that, in rare instances, white children were born from black parents. Today, we would refer to this phenomenon as “albinism”. At the time, Maupertuis described an albino child as a “small monster” and as a “marvel”, which, for eighteenth-century scholars, often came down to the same thing.⁴⁹ The term monster did not necessarily carry a connotation of horror; scholars saw monsters as anomalies that could help in the search for nature’s laws.⁵⁰ The reverse phenomenon, meaning a black child born from white parents, was a lot more rare, or even entirely absent. Some scholars reasoned that this asymmetry would fall into place if white was the ancestral colour of mankind. Albinism could then be interpreted as the occasional return of the original human colour.⁵¹ This was more evidence that “le genre humain n’est pas composé d’espèces

⁴⁶*Ibid.*, 379-380.

⁴⁷Maupertuis, *Vénus Physique*, 120-123.

⁴⁸*Ibid.*, 123.

⁴⁹*Ibid.*, 117.

⁵⁰Katharine Park and Lorraine Daston, *Wonders and the Order of Nature: 1150-1750* (New York: Zone Books, 1998), 204-208.

⁵¹Diderot and d’Alembert, *Encyclopédie*, 8:284.

essentiellement différentes”, “the human race is not composed of essentially different species”, as the *Encyclopédie* reported.⁵²

Questions about human variety and generation fed into each other. Evidence from varieties of men weakened preformation theories, which could not easily explain why and how so many different human varieties existed on Earth. Theories that posited the mixing of parental particles, or at least accepted the influence of both parental bodies on the foetus, could account for the existence of many different races of men by viewing them as varieties derived from a single parent stock. For scholars such as Darwin and Maupertuis, the study of generation pointed towards fluid racial divisions and towards a monogenist view of the species.

Man versus Woman

Both the study of generation and Man’s shared rational soul promoted a vision of humanity where the category of Man could extend to many different people. This vision of the world is in line with Smith’s argument that “humanity” was all-or-nothing. However, I want to point out one important nuance: it would be more accurate to say that “Man” was all-or-nothing. As I have argued in Chapter One, the category of Man implicitly excluded women. Whereas all men could be defined by virtue of their reason, both European and foreign or “savage” women tended to get defined by reference to their bodies. The common rational soul that unified Man was not shared by Woman. In a sense, Woman was unified through her sexual and reproductive body.

Because women performed the act of getting children into the world, scholars perceived women to be standing closer to Nature than Man. Buffon talked of natural maternal tenderness, which could best take care of infants.⁵³ According to him, “savage” women were even closer to natural behaviours than “civilised” women, and as such should provide a model for European societies. When Buffon described infancy in the human race, he criticised the practice of tightly wrapping babies in tissue, saying that this was much worse than the savage custom of letting infants move freely.⁵⁴ Both savage and European women, moreover, were considered in terms of their physical body. Notice how Maupertuis wrote about variation in human skin colour:

En s'éloignant de l'équateur la couleur des peuples s'éclaircit par nuances. Elle est encore fort brune au-delà du y tropique & l'on ne la trouve tout-à-fait blanche que lorsqu'on s'avance dans la zone tempérée. C'est aux extrémités de

⁵²*Ibid.*, 285.

⁵³Buffon, *Histoire Naturelle*, 460.

⁵⁴*Ibid.*, 457.

cette zone qu'on trouvé les peuples les plus blancs, La Danoise aux cheveux blonds éblouit par sa blancheur le voyageur étonné: il ne sauroit croire que l'objet qu'il voit, & l'Africaine qu'il vient de voir, soient deux femmes.⁵⁵

[When getting further away from the equator, the colour of peoples becomes clearer by shades. She is still very brown on the other side of the tropics and we only find her completely white when we advance in the temperate zone. It is at the extremities of this zone that we find the whitest peoples, the Danish woman with her blond hair dazzles the traveller by her whiteness: he cannot believe that the object he sees, and the African woman he has just seen, are two women.]

Maupertuis played on the fact that in French, “la couleur”, the colour, is a feminine word. As he referred to this colour with “elle”, “she”, the reader cannot tell when he is referring to skin colour and when to women. Indeed, Maupertuis continued with a description of the white Danish woman, and of the dark, African woman. There are obvious undertones of a scale in beauty, as pale women “dazzle” the traveller, which does not happen with darker women. Yet both women are considered with respect to their physical body, a body weighted according to its attraction to men.

Maupertuis promptly embarked on a digression on how ideal beauties were found not in extreme countries where everything was black or white, but in temperate zones such as France, where women varied in their colours:

Une brune aux yeux noirs brille de tout le feu des beautés du Midi; des yeux bleus adoucissent les traits d'une autre: ces yeux portent partout où ils font les charmes de la blonde. Des cheveux châains paroissent être ceux de la nation. La Française n'a ni la vivacité de celles que le Soleil brûle, ni la langueur de celles qu'il n'échauffe pas: mais elle a tout ce qui les fait plaire.⁵⁶

[A brown-haired woman with dark eyes shines with all the fire of Midi's beauties; blue eyes soften the traits of another: those eyes make the charms of a blonde. Brown hair seems to be that of the nation. The Frenchwoman has neither the vivacity of those whom the Sun burns, nor the languor of those whom it does not warm, but she has everything that makes them be liked.]

The gist is that all women, no matter their colour or provenance, were considered in terms of their physical ability to please men such as Maupertuis. A similar treatment of womankind appeared in the *Encyclopédie*, which featured a long list of populations on the four continents, accompanied by a physical description of the men of those populations, and often also of the women. When it came to women, the description

⁵⁵Maupertuis, *Vénus Physique*, 103.

⁵⁶*Ibid.*, 104-105.

insisted on two criteria in particular: their beauty, which also depended on their skin colour, and their fertility: “Les femmes danoises sont blanches, assez bien faites, & fécondes”, “Danish women are white, quite well-proportioned, and fertile”.⁵⁷ When turning to African populations, the author similarly commented that, skin colour aside, “leurs femmes sont belles”, “their women are beautiful”, and that “les Nègresses sont fort fécondes”, “Negro women are very fertile”.⁵⁸ For eighteenth-century French scholars, all women, European and non-European, were considered primarily as sexual and reproductive bodies.

This does not mean that there were no perceived differences between, say, African women and European women. African women were often viewed as more sexually loose than their European counterparts.⁵⁹ Hottentot women were particularly judged as strange or repugnant for having a large excrescence of fat on their buttocks (now known as steatopygia).⁶⁰ But the canons by which women were judged were the same for everybody: bodily attractiveness and reproductive quality. Unlike both European and foreign men, women could not possess a special rational soul. What united them was their common reproductive function. The lines of sexual difference ran deeper than the lines of racial difference.

Understanding the perceived differences between Man and Woman, in terms of their naturally different roles and capacities, is especially significant as many eighteenth-century scholars started to talk in the language of natural rights of men. With the outbreak of the French Revolution and the writing of the *Déclaration des droits de l'homme et du citoyen* (1789) [Declaration of the rights of the man and of the citizen], the hope rose that women might claim similar rights to men's.⁶¹ Yet, as I have argued, the category of “Homme” or Man did not leave space for women. In fact, female scholar Olympe de Gouges soon followed with her *Déclaration des droits de la femme et de la citoyenne* (1791) [Declaration of the rights of woman and the female citizen], since she felt that the previous declaration did not extend to women.⁶² Mary Wollstonecraft produced a work of similar inspiration, *A Vindication of the Rights of Woman* (1792), where she argued that women should have the same fundamental rights as men. The pleas of those early feminist scholars show that the

⁵⁷Diderot and d'Alembert, *Encyclopédie*, 8:284.

⁵⁸*Ibid.*

⁵⁹Silvia Sebastiani, “‘Doubts about man’: Apes and global markets in Enlightenment debates,” Lecture. Utrecht-Amsterdam Global Intellectual History Seminar. December 8, 2020; Sebastiani, *The Scottish Enlightenment*, 154.

⁶⁰Diderot and d'Alembert, *Encyclopédie*, 8:284.

⁶¹Londa Schiebinger, “The Anatomy of Difference: Race and Sex in Eighteenth-Century Science.” *Eighteenth-Century Studies* 23, no. 4 (1990): 404.

⁶²Marie Josephine Diamond, “OLYMPE DE GOUGES AND THE FRENCH REVOLUTION: THE CONSTRUCTION OF GENDER AS CRITIQUE,” *Dialectical Anthropology* 15, no. 2/3 (1990): 99.

new discourse of natural rights was far from referring to the other half of the human race.

Even if that avenue was largely closed off to women, perhaps non-European men could claim access to the new “universal” rights. The shared rational soul in Man’s definition, in principle, supported such a claim. But another way of thinking about human difference was on the rise, one that would insert a tall hierarchy between Europeans, both men and women, and foreign people.

Enter stadial progress: The rational soul erodes

British and especially Scottish thinkers started to view human diversity in a different way. Rather than focusing on the possibility of shared reason, or of a shared soul, those scholars emphasised that qualities such as reason or civilisation could only be acquired through progressive development. This was part of a grand scheme of human progress. Human populations started from a barbaric hunter condition and progressed until reaching a civilised state of commerce.⁶³ The connection between modes of subsistence and social organisation had already been suggested by the French political philosopher Charles Louis de Secondat, Baron de Montesquieu.⁶⁴ The idea of universal progress was not new either, present from the Enlightenment in the works of optimistic statesmen and philosophers.⁶⁵ The innovation of Scottish thinkers was that they fit savages, barbarians and civilised people into an evolutionary scheme.⁶⁶ Each type of society matched a different stage of progress. As a result, the full weight of history separated “savage” people, down at the lower stages of progress, from “civilised” people.

The new way of seeing human difference becomes apparent when looking at the treatment of non-European and “savage” women. Whereas French scholars focused on the physical characteristics of both European and non-European women, Scottish scholars started to find stark differences between those women. Human progress had put a great distance between non-European women, defined by their material bodies, and European women, who could make a claim to higher faculties.

Like French scholars, Scottish scholars also drew on savage women to make inferences about the natural state of the human species. Henry Homes, Lord Kames, author of the *Sketches of the history of man* (1774), sometimes wrote about savage customs to make a point about which virtues were essential to female nature. On the topic of chastity in the female sex, for example, Kames remarked that even foreign people

⁶³Sebastiani, *The Scottish Enlightenment*, 48.

⁶⁴*Ibid.*, 24-25, 47-48.

⁶⁵For example, Anne Robert Jacques Turgot: *Ibid.*, 47.

⁶⁶*Ibid.*, 48.

shared some of the same virtue: “In the land of Jesso, young women sometimes go naked in summer. If however they meet a stranger, they hang the head, and turn away through shame. Nature here is their only instructor”.⁶⁷ This observation supported Kames’ argument that chastity was natural and essential to the human race.⁶⁸

Most of the time, however, non-European women were far from Kames’ idea of a chaste and modest nature. “In the warm regions of Asia, where polygamy is indulged, the education of young women is extremely loose, being calculated for the sole end of animal pleasure. They are accomplished in such graces and allurements as tend to inflame the sensual appetite”, he wrote.⁶⁹ When savages, not Nature, instructed young women, the result was a marked departure from Kames’ natural ideal. Kames believed that most male savages were too pleasure-driven to obey the preferences of nature, such as monogamy: “The pairing principle, though rooted in human nature, makes little figure among savages, yielding to every irregular appetite”.⁷⁰ Instead of standing for human nature, savages now departed from it. Male savages dragged their women away from nature, down the path of degeneration.

Almost anywhere Kames looked, he found evidence for the degenerated and unnatural behaviour of non-European people, no matter whether the evidence contradicted his previous reasoning. Kames deplored how, as a consequence of polygamy, some women were forced to cover themselves with veils.⁷¹ Yet, just a few pages earlier, he had described the virtues of chastity and modesty as natural and essential to the human race. This contradiction could not make a dent in Kames’ iron belief that foreign men and women were corrupted. Compared to them, European people and especially British people fulfilled Nature’s purpose, by recognising the value of women.

Kames sketched an account of the “progress of the female sex” based on leaving behind the harmful, pleasure-driven customs of the savages. Attractiveness and sensuality belonged to less civilised women who did not know any better. Their sole purpose was to please men with their bodies. But European women could elevate themselves from their carnal bodies, to become proper companions for men:

Delicate organisation, great sensibility, lively imagination, with sweetness of temper above all, qualify women for a more dignified society with men; which is, to be their companions and bosom-friends. In the common course of European education, young women are trained to make an agreeable figure... [T]he purpose of nature [is] that of making women fit companions for men of sense.

⁶⁷Kames, Lord, Henry Homes, *Sketches of the History of Man*, vol. 1, 2nd ed. (Edinburgh: 1813), 422-423.

⁶⁸*Ibid.*, 420.

⁶⁹*Ibid.*, 465.

⁷⁰*Ibid.*, 426.

⁷¹*Ibid.*, 464-465.

Due cultivation of the female mind would add greatly to the happiness of the males, and still more to that of the females.⁷²

The fulfilment of women's natural purpose as men's companions necessitated a proper education of the mind. Kames stated that women needed to improve their "rational faculties", and deserved to be treated as "rational beings".⁷³ Women, Kames insisted, were intended not as instruments of pleasure, but "for the more elevated purposes of being friends and companions, as well as affectionate mothers".⁷⁴ Even if women's improvement in rationality ultimately aimed to benefit men, Kames explicitly admitted that women could become rational creatures.

This assertion contrasts with French scholars' view of women's condition. It is true that Buffon thought, like Kames, that savage women existed in a degraded and lower state. He wrote that only in civilised nations could women aspire to equality, "qui cependant est si naturelle", "which is however so natural".⁷⁵ Again, civilised people, when it came to women, were closer to nature than savages themselves. But Buffon's idea of equality between the sexes rested on a belief in the naturally different qualities of men and women. According to him, women had become equal to men by having beauty and sentiment be recognised as important qualities.⁷⁶ Women could not be equal to men on the same terms as men, on the terms of their reason. Rather, men had accepted to value the different natural attributes of women, such as beauty.

For Kames, instead, the progress of women hinged on acquiring reason, even though men stayed superior to women. In his *Sketches*, Kames described the "progress of men" in population, property, commerce, arts, manners, and so on. The "progress of the female sex" formed a separate chapter. It was an appendix to the general progress created by men. Still, women could influence man's progress. Kames explained how the fierce and brutish medieval ancestors of European people had gradually become noble, humane and gallant (all in all, civilised men) by taking the role of protectors of women, and holding their beloved damsels as their idols. Slowly, society moved from being characterised by masculine values to more feminine values, or at least, feminine delicacy tempered the fierce character of men.⁷⁷ Women's history became a model of historical progress. The more women were treated as worthy companions to men, meaning the more they were valued as intelligent creatures, the more men had gained that civilised attitude which was the aim of human progress.⁷⁸

⁷²*Ibid.*, 474.

⁷³*Ibid.*, 465-467.

⁷⁴*Ibid.*, 461.

⁷⁵ Buffon, *Histoire Naturelle*, 554.

⁷⁶*Ibid.*, 554-555.

⁷⁷Silvia Sebastiani, "Race', Women and Progress in the Scottish Enlightenment," 79.

⁷⁸*Ibid.*, 75, 79.

The peoples who did not go through a similar transformation, meaning virtually any society apart from northern European countries, were relegated to the lower steps of the grand staircase of progress. “Nations polish by degrees”, Kames wrote.⁷⁹ The human species had seen “progress from the savage state to its highest civilisation and improvement”, but only very few societies had reached the higher stages.⁸⁰ Some populations lagged behind in the march of progress. Others, such as the pleasure-driven Asian societies that Kames described, seemed to have lost the right path, and would perhaps only degenerate further.

Instead of a universal, rational soul of man, which gave all men their special status, philosophers such as Kames substituted a slow and painstaking process of improvement. Although they did not stray far from Christianity, and followed the idea of an immortal soul, scholars separated the soul from reason. Men did not acquire reason by virtue of their soul, but became rational through a process of improvement: “By the improvement of our rational faculties, truth and nature came to be sway”, Kames wrote.⁸¹ This was why women could become rational creatures: rationality was not an automatic attribute of the (male) soul, but a quality that could be attained over time. The idea of progress meant that European women could potentially, eventually, reach a similar status to male men, just like male savages might eventually become rational and civilised creatures. Prospects for non-European women were more bleak. Following Kames’ reasoning, female savages could not immediately count on their husbands to recognise their value and elevate their condition. They would be the last creatures to ever become rational.

Scholars such as Kames sought justification for the deep differences that the stadial model of progress hinted, by embracing polygenesis: the idea that savage people were the product of a different creation from that of European men, and that they formed separate species.⁸² This position different from that of Buffon, Maupertuis, or the author of the *Encyclopédie*’s entry on Man, who believed in the common descent of all humanity from the same ancestors. Just as monogenism made it easier to think that the same rational soul could be shared by all men on Earth, polygenism buttressed the differences between human races.

Man as a product of development: The unity of Man fractures

According to Justin Smith, Linnaeus’ insertion of Man in a broader zoological order created the notion of essential racial differences between human populations.⁸³ Once man became part of nature in Linnaeus’s system, it became possible to extend taxonomic thinking to the human

⁷⁹Kames, *Sketches of the History of Man*, 433.

⁸⁰*Ibid.*, 1.

⁸¹*Ibid.*, 156.

⁸²Sebastiani, *The Scottish Enlightenment*, 166.

⁸³Smith, *Nature, Human Nature, and Human Difference*, 137.

species, and to think of distinct racial groups based on physical characters.⁸⁴ The soul could not provide a shared essence for people anymore. But, as I have shown in this chapter, the questions raised by Linnaeus' taxonomy could still be by-passed by the soul/body dualism. Man possessed a special, immaterial, rational soul, and that alone placed him a world away from other animals. The special soul of Man meant that savage Man could, in theory, have a similar status to civilised Man. Classifications of Man based on different races had already appeared, for example in Linnaeus's own taxonomy. But even Linnaeus wrote that all men shared an immaterial soul and formed a single species. Racial differences did not yet run so deep, supported by studies on generation that stressed the capacity of different human varieties to mix with each other.

For racial differences to become more significant, the rational soul itself had to erode. This happened with the view of mankind based on progress from a savage condition. If Man had a special status, it was because European Man had acquired reason by a process of improvement, not because every man had that status by virtue of his soul. To put it in terms of the Great Chain, savage and European Man were not on the same echelon anymore. Ideas of progress through stages were born in Scotland, but rapidly spread in Britain and the continent. By the nineteenth century, ideas of stadial progress and hard contrasts between European and non-European people had become a staple for students of human diversity.⁸⁵ Mankind developed through stages, and Europeans reached further than any other people. The process leading to rigid ideas of race started with the separation of reason from the soul, and with the related idea that mankind developed through stages, rather with than Linnaeus' classification system.

This changed the relationship between racial and sexual difference. For eighteenth-century French scholars, Man's rational soul meant that human difference ran deeper along sexual lines, than along racial lines. In the body/soul dualism, women were most properly the sexual and reproductive body, whereas all men were closer to the immaterial soul, and to the quality of reason. The masculine notion of Man captured this state of affairs.

With the rising idea of human progress, savage men were relegated to the early stages of that process, far from the status of European men. Since reason could be acquired through progress, and not by having a special soul, this left space for women to improve themselves. Their improvement did not tend towards the acquisition of reason for their own sakes, but towards becoming appropriate companions for rational and civilised men. Non-European people could potentially rise to the status of European men, too. Sexual difference had become more

⁸⁴*Ibid.*

⁸⁵George W. Stocking, *Victorian Anthropology* (New York: Free Press, 1987) Chapter 4. The History of Civilization Before the *Origin of Species* (1851-1858).

similar to racial difference. Both hinged on a process of improvement, although the process would be more arduous for non-European people than for women. The perceived “degeneration” of some populations left little hope of redemption, and non-European people, unlike women, did not have the “advantage” of rational males to guide them. This new view of human difference, based on development, would eventually result in a different meaning for Man.

Chapter III. The indifferent stage and the birth of the human being.

The rational soul of Man had maintained a wide rift between Man and Woman, but the new view of human progress through stages had started to change this conception of humanity. Together with the weakening of the rational soul, other developments brought Man and Woman closer together, this time from the study of embryos. In this chapter, I explore how nineteenth-century reproduction systems treated sex formation. New models of conception, and closer attention to embryonic material, meant that scholars of reproduction increasingly prodded the “secrets” of generation. The young embryo had many eyes watching it. Unlike what earlier preformation scholars imagined, little to nothing seemed to pre-exist in the embryo. The mechanical universe of preformation was giving way to an organismic world, where embryos started out from just a few cells, and increased in complexity.¹

In line with these more epigenetic ideas, sex started to be seen as something that developed gradually during embryonic life. Scholars found that the embryo started from an “indifferent” sexual condition. Man and Woman originated from the same form, and kept similarities with each other as they developed into their respective sex. The new view of sex as starting from an indifferent condition ran against sexual dualisms. This gives us a nuanced understanding of nineteenth-century conceptions of sex, which historians have often identified as strict divisions between male and female.² Yet, the nineteenth century was not just about dualisms. The same period saw the birth of the “human being”, who referred to both Man and Woman.

Just like eighteenth-century theories of sex determination went hand in hand with the definition of Man as implicitly masculine, so nineteenth-century generation systems matched a new view of Man. In the latter decades of the nineteenth century, definitions of Man in encyclopaedias and dictionaries showed a noticeable change compared to their predecessors. Whereas Man had been previously defined by masculine qualities, now the meaning of Man was split into two. Man referred, first, to a neutral “human” or “human being”, and second, to an individual male. The general human being was born at the same time as embryologists uncovered that all embryos started in a sexually indifferent, purely human condition.

¹Nick Hopwood, *Haeckel's Embryos*, 12.

²See Thomas Laqueur, *Making Sex: Body and Gender from the Greeks to Freud* (Cambridge, MA: Harvard University Press, 1990); Alice Domurat Dreger, *Hermaphrodites and the Medical Invention of Sex* (Cambridge, Mass.: Harvard University Press, 1998); Londa Schiebinger, “Skeletons in the Closet: The First Illustrations of the Female Skeleton in Eighteenth-Century Anatomy,” *Representations* 14 (1986): 42–82.

Preformation scholars had found it difficult to conceive that the early embryo, barely visible to the human eye, could be anything more than a minuscule version of the bigger foetus. The embryo remained in a kind of “blind spot”: it had to be there, but nobody could imagine exactly how it looked in its early stages.³ In the nineteenth century, the very beginnings of embryos were still shrouded in mystery. But scholars were closing in from two different directions. On one side, new models emerged to describe what happened when male and female fluids mixed during coupling. On the other, embryological studies slowly went back in time by searching for ever-younger embryos.

Despite the fact that preformation theories proved increasingly unsatisfactory for the explanation of reproduction, the inheritance of preformation scholars, particularly ovist scholars, was still alive at the start of the nineteenth century. In France, without believing in extreme preformation, naturalists still argued that fecundation involved the effect of the male fluid on the preformed egg.⁴ German scholars, instead, were more inclined to believe in the epigenetic interaction of male and female fluids.⁵ Across the works of many French and German scholars, old associations remained, such as the belief that the female provided the material side to the embryo, whilst male influence was immaterial.⁶ But even these deep-rooted associations would soon be shaken up. Two Swiss scholars, Jean-Louis Prevost and Jean-Baptiste Dumas, proposed in the 1820s that the male spermatozoa and the female eggs came in contact with each other, and that spermatozoa were therefore materially necessary for reproduction.

Prevost and Dumas butted heads with major assumptions about generation that had been brought into the new century.⁷ By implying that spermatozoa were essential to fecundation, Prevost and Dumas’ theory seemed to resuscitate the spermist view that preformed embryos existed inside animalcules.⁸ Yet, their colleagues preferred to locate the preformed embryo in the female egg, not in the spermatozoo.⁹ This preference had a motivation. Since the spermatozoa looked so much like worms, they had been degraded from potential carriers of the future em-

³Nick Hopwood, “Producing Development: The Anatomy of Human Embryos and the Norms of Wilhelm His,” *Bulletin of the History of Medicine* 74, no. 1 (2000): 33.

⁴Farley, *Gametes & Spores*, 38.

⁵*Ibid.*, 37-8.

⁶*Ibid.*, 56.

⁷*Ibid.*, 39-41.

⁸*Ibid.*, 43.

⁹*Ibid.*, 38.

bryo to parasites of the testes.¹⁰ The importance of the male fluids remained vital as stimulators of the preformed egg.¹¹ But scholars tended to believe that the little worms visible inside those fluids were parasites of the same kind as intestinal worms, produced by spontaneous generation in the human body.¹² Prevost and Dumas' views squarely contradicted this idea.

The introduction of "cell theory", however, lent credibility to Prevost and Dumas' theory.¹³ The German scientists Matthias Jakob Schleiden and Theodor Schwann are usually credited with the development of this all-encompassing theory, which viewed cells as the basic units of life.¹⁴ Schleiden, working on plants, suggested that all parts of a plant were made up of cells (vegetal cells, unlike animal ones, have visible cell walls). Schwann extended this claim to animals. Cell theory implied a reductionist view of the organism, which was built up of small, functional units. The idea that cells are the building blocks of life, attractive in its simplicity, spread quickly.¹⁵ German physician Rudolf Virchow soon claimed that all cells arise from pre-existing cells. Others concluded that all living organisms begin as cells.¹⁶ The view that worms could spontaneously generate in matter became less likely. From this standpoint, spermatozoa were more likely the normal outcome of cell division or propagation, rather than tiny parasites.¹⁷ Spermatozoa could reclaim their role in reproduction.

Prevost and Dumas had already suggested that the spermatozoa's role involved material contact with the ovum. But how the egg and the spermatozoon interacted precisely, and what part the spermatozoon played in fecundation, initiated lively debates. Did the spermatozoon penetrate the egg, as British physiologist Martin Barry argued, and did that mean that sperm contributed materially to the generation of the embryo?¹⁸ Or, as German scholars would have it, did spermatozoa just come in contact with the egg to stimulate the egg's development, without actually entering it?¹⁹

Settling these questions, just like settling the spontaneous generation debate, was not as simple as peering into a microscope. From the 1820s, scholars started working with an innovation in microscopy: achromatic lenses, which reduced distortions in microscopic observations by eliminating a blurry, rainbow-like effect called "chromatic aber-

¹⁰*Ibid.*, 43-44.

¹¹See Lazzaro Spallanzani's view in Pinto-Correia, *The Ovary of Eve*, 196-203.

¹²Farley, *Gametes & Spores*, 43-44.

¹³*Ibid.*, 44-54.

¹⁴For a recent historical overview of cell theory, see Sherrie L. Lyons, *From cells to organisms: a history of cell theory* (University of Toronto Press, 2020).

¹⁵Maienschein, *Embryos Under the Microscope*, 42.

¹⁶*Ibid.*

¹⁷Farley, *Gametes & Spores*, 54.

¹⁸*Ibid.*, 58.

¹⁹*Ibid.*, 56.

ration”.²⁰ According to Jane Maienschein, the improved microscopes helped to disprove spontaneous generation. For her, the history of generation is the history of how “putting embryos under the microscope has changed our scientific understanding”.²¹ Yet, microscopes gave different results depending on who used them. Jean Baptiste Bory de Saint-Vincent, a French naturalist, wrote that “The notion of spontaneous generation is at first revolting to a rational mind, but it is, notwithstanding, demonstrable by the microscope. The fact is averred: Willer has seen it, I have seen it, and twenty other observers have seen it”.²² The observations available through microscopes were not enough to disprove spontaneous generation, far from it. They could also be used in favour of the theory. Similarly, scholars took different sides on the question of whether the sperm penetrated the egg, even as both sides used new achromatic lenses, and even as, until the 1870s, it was impossible to see the entry of sperm in cell nuclei even with microscopes.²³ The history of reproduction is more convoluted than straightforward seeing-and-reporting thanks to increasingly accurate microscopes. As Jutta Schickore has made clear in her study of microscopy, seeing involves particular epistemological commitments.²⁴

But whatever one’s position in debates about fecundation, the importance of the ovum and the spermatozoon for conception had been established. In the second half of the nineteenth century, the study of generation reached a point of no-return. Students of generation could not ignore the new view that embryos developed from the meeting of cells. Whilst the blind spot of the embryo’s beginnings was getting lit up by cell-level models of conception, other students of reproduction took the opposite approach. Rather than investigating what happened at the moment of conception, they focused on tracing back the embryo’s progress from a full-grown foetus to a minuscule creature. Those embryologists collected increasing numbers of human embryos from abortions and miscarriages, occasionally from post-mortems, and from existing collections.²⁵ Their success often depended on placing themselves at the centre of supply networks of scientists, physicians and midwives, who could tap into these different sources.²⁶ But the supply of embryo material was nevertheless erratic.

²⁰*Ibid.*, 35.

²¹Maienschein, *Embryos Under the Microscope*, 18.

²²Jean-Baptiste Bory de Saint-Vincent cited in James Rennie, *Insect Transformations*, (London: C. Knight, 1838), 10.

²³Farley, *Gametes and Spores*, 34.

²⁴Jutta Schickore, *The Microscope and the Eye: A History of Reflections, 1740-1870*, (Chicago: University of Chicago Press, 2007), Introduction.

²⁵Hopwood, “Producing Development,” 38.

²⁶*Ibid.*; Alfred Velpeau, *Embryologie ou ovologie humaine: contenant l’histoire descriptive et iconographique de l’oeuf humain*, (Paris, 1833), ij.

Even once an embryo ended up in the hands of some scientist, extracting information on human development from a specimen was not simple. The precise age of the embryo was usually unknown, making it difficult to understand where it stood on a time scale of development. Moreover, since the embryos that ended up in a scientist's study were those aborted, miscarried, or those who had died with their mother, another question was whether those embryos carried any abnormalities.²⁷ In Germany, Wilhelm His introduced criteria based on proportions and length to decide which embryos could represent human development, and for which stage.²⁸ His also promoted new techniques to extract stages of development from the messiness of human material. Those techniques included sectioning embryos instead of keeping them preserved in glass jars, using photographs as models for more accurate drawings, and creating 3-d wax models of embryos.²⁹ Human development was not merely seen, but produced through laborious techniques. The end-result of His' work were the 1880s *Normentafel*, the "normal plates" of embryonic development (*Fig. 3*). The specimens on the plates, cleanly severed from the membranes which enveloped them in the womb, illustrated the appearance and proportions of each stage of development in the human embryo.

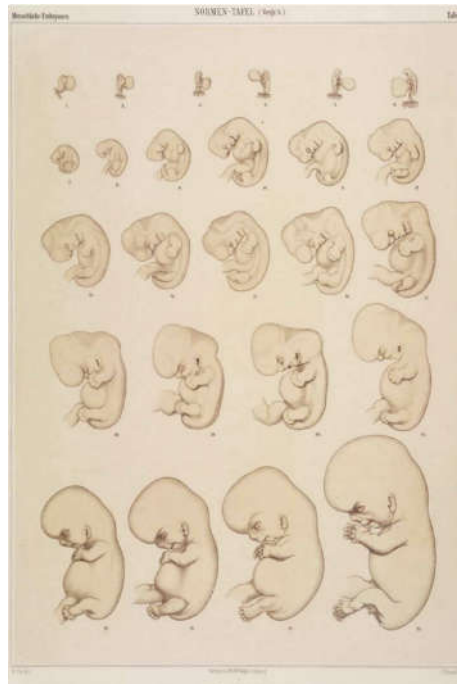


Figure 3. His' normal plates of embryonic development (1885). Source: Godoy-Guzmán, Carlos. "Contribuciones de Wilhelm His a la Embriología Humana." *International Journal of Morphology* (2013) 31, 70-74.

²⁷Hopwood, "Producing Development," 47.

²⁸*Ibid.*, 46-47.

²⁹*Ibid.*, 41-43.

As the plates show, embryos went through many changes on their way to becoming a full-grown foetus. By contrast to preformation theories, early embryos looked almost nothing like later newborns. In the 1760s, Charles Bonnet had written that “rien ne peut se développer qui n’ait été préformé”, “nothing can develop that is not already preformed”.³⁰ For Bonnet, development was simply the mechanical unfolding of the embryo’s parts, meaning that it hinged on the existence of a preformed embryo. But that view of development became increasingly untenable. Fecundation had come to be seen as a process in which cells met with each other in order to create a new being. In parallel, embryological studies revealed the extent of the changes that embryos underwent during their development. Development was not just an increase in size of the embryo’s body parts, but a process that virtually seemed to involve the creation of those parts from two initial cells. Development implied increasing complexity.

As development ceased to imply preformation, the embryo’s sexual development became more of an issue. Assuming that the sex of embryos had already been decided was less than ever an option. Theories that posited that the male body was able to produce both male and female particles, or that the male imagination was responsible for the sex of the embryo, also lost credibility as scholars moved to see conception as a fine-grained, cellular process. If an entire embryo could be formed from the interaction of just two types of cells, then the sexual characteristics of the embryo also had to be formed anew in the process. These considerations led nineteenth-century scholars to a new view of sex formation, and to a new focus on an ambiguous stage in the early embryo’s life.

The “indifferent stage” of embryonic development

For eighteenth-century scholars, the sex of the embryo was decided at a very early stage. It was already set by God at the dawn of time, as Ephraim Chambers seemed to imply, or alternatively, it was determined at the moment of conception, as Erasmus Darwin or Buffon would have it. In the first decades of the nineteenth century, the time of sex determination was pushed forward in time. As embryologists gained access to younger human material, they noted that, in the early stages of embryonic development, the embryo had no clear sexual characters such as the male or female genitals. Such was the observation of Alfred Velpeau, a French anatomist who claimed to have dissected two hundred “œufs de femmes”, “women’s eggs”, thanks to his large network of physicians and midwives.³¹ In his *Embryologie ou Ovologie Humaine* (1833), Velpeau noted that the place of the embryo’s genitals looked hollow until the age of five

³⁰Charles Bonnet, *Considérations*, 1:168.

³¹Velpeau, *Embryologie ou ovologie humaine*, ij.

or six weeks.³² After this time, a “tubercle” emerged, which formed the rudiments of the clitoris or penis. But this tubercle could look entirely smooth, so that “rien n’indique, à l’extérieur, les différences sexuelles”, “nothing indicates, externally, sexual differences”.³³ Embryos seemed to go through a stage in which their sex was, if not undecided, at least ambiguous. Sexual characteristics emerged not at the very start of embryonic life, but during embryonic development.

Besides embryological observations, the belief in the early “sexual indifference” of the embryo related to the study of “monsters”, those individuals with physical conformations which people saw as lying beyond the range of the normal. Between the late eighteenth and early nineteenth centuries, British and German scientists such as Everard Homes and Jakob Ackermann attempted to explain the formation of one such type of “monster”, the hermaphrodite. According to them, hermaphrodite organisms could come about if the embryo was predisposed for developing not one, but two sexes.³⁴ Supposing that the embryo was initially sexually indifferent, and then specialised into a male or a female, hermaphrodites must appear when the embryo exceptionally developed characters of both sexes. Because they stressed how both sexes arose from the same structures, Homes and Ackermann were eager to find homologies (similarities deriving from shared origin) between all parts of female and male anatomy, between penis and clitoris, scrotum and labia, testes and ovaries. Not all scientists shared their enthusiasm. Ackermann was accused of making airy speculations and indulging his imagination too much.³⁵ Nevertheless, the idea that male and female embryos shared homologies and a common origin persisted.

In the wake of studies such as those of Homes and Ackermann, the French naturalist Etienne Geoffroy Saint-Hilaire published a treatise on “human monstrosities” where he also discussed the homologies between the male and female sex. This take was part of his broader idea that all animals shared a similar organisation, and that one should investigate the relationships between different animals.³⁶ For Saint-Hilaire, it was absurd how people were convinced that all male animals belonged to the same category, the male sex, and all female animals to the female sex, whilst they neglected the similarities between the two sexes in one species.³⁷ Saint-Hilaire saw many homologies between male and female bodies, especially between the male and female reproductive apparatuses.

³²*Ibid.*, 82.

³³*Ibid.*

³⁴Ross Brooks, “One «Both» Sex«Es»: Observations, Suppositions, and Airy Speculations on Fetal Sex Anatomy in British Scientific Literature, 1794-1871,” *Journal of the History of Medicine and Allied Sciences* 70, no. 1 (2015): 42-46.

³⁵*Ibid.*, 44.

³⁶Etienne Geoffroy de Saint-Hilaire, *Philosophie Anatomique des Monstrosités Humaines* (Paris, 1822), xxxvj-xxxiv.

³⁷*Ibid.*, 343.

For example, the female uterus had a similar function to a male structure, the “seminal vesicle”:

La vésicule séminale forme, aussi bien que l'utérus, un canal, dans lequel arrivent et duquel s'écoulent les sécrétions des testicules. Toute la différence est dans leur tenue respective droite ou recourbée; droite dans le sexe femelle, et coudée dans le sexe male.³⁸

[The seminal vesicle forms, just like the uterus, a canal, where the testicles' secretions arrive and flow away. The whole difference is in their straight or bent position, straight in the female sex, bent in the male sex.]

Male and female morphologies departed from each other, not because of essential differences between them, but just because of their shape and conformation. If males and females shared so many characteristics, especially in the sexual organs, it made sense to think that males and females originated from a single form, a sexually “indifferent” condition. Writing about the similarities between the female uterus and the seminal vesicle in males, Saint-Hilaire stated:

La plus grande indifférence pour l'un et l'autre résultat forme le premier caractère de cette organisation. Ce n'est d'abord qu'un réseau fibreux qu'on peut comparer à ces bourses tissées en filet, dont on fait usage pour porter sur soi quelque monnaie.³⁹

[The greatest indifference for one or the other result forms the first character of this organisation. It is at first only a fibrous net which we can compare to those purses woven from string, which we use to carry some coins.]

The initial state of the embryo was as neutral, as indifferent, as a string purse. Only the shape that the purse took eventually determined whether the embryo ended up with a uterus or a seminal vesicle. The embryo started off in a sexually neutral stage. The shared origin of male and female embryos meant that the sexes conserved homologies between them even after they diverged from each other.

The “indifferent” stage of embryonic development, and the homologies between males and females, had varying importance. For some scholars, the early ambiguous phase was a mere hiccup in an otherwise linear embryonic development. The entry on “Embryon” in the *Grand Dictionnaire Universel du XIXème siècle* (1866-1876) [Great Universal Dictionary of the XIXth century], directed by Pierre Larousse, related how the early embryo possessed two ambiguous organs, which the author called the organs of Wolff and Müller. If a male embryo developed, the organ of Müller disappeared, whilst the organ of Wolff developed in the

³⁸*Ibid.*, 400.

³⁹*Ibid.*

male sexual apparatus. If a female embryo developed, the organ of Wolff disappeared, and the organ of Müller became the female apparatus. When the early embryo still possessed both the organs of Wolff and Müller, it was impossible to tell the sexes apart. But the entry in the *Grand Dictionnaire* stressed the temporary nature of this stage and the early emergence of distinct sexes: “[les organes de Wolff et Müller] s’atrophient dès le deuxième mois, mais dans leur voisinage on aperçoit déjà, très distinctement, le testicule chez l’homme et l’ovaire chez la femme”, “the organs of Wolff and Müller already atrophy from the second month, but in their vicinity we can already see, very distinctively, the testicle in man and the ovary in woman”.⁴⁰ Although the article acknowledged that there was a moment when it was impossible to distinguish the sexes, it immediately added “mais la confusion cesse bientôt”, “but the confusion stops quickly”.⁴¹ Sexual indifference in the embryo was no more than temporary confusion.

Despite some scholars’ stress on the transitory nature of sexual “confusion”, the sexual indifference of the early embryo earned a place in the comprehensive textbooks and treatises that began to be published as embryology became a specialised research area, even though its status as an independent discipline in universities would only become established in the twentieth century.⁴² Here, I focus on two late-nineteenth century texts, respectively influential in the French-speaking and the English-speaking embryological worlds. The *Manuel d’embryologie humaine et comparée* (1886), written by French embryologist Charles Debierre, claimed to be the first elementary but up-to-date treatise on embryology in the French language.⁴³ The treatise *Human Embryology* (1892) was the offspring of American anatomist and homonym Charles Sedgwick Minot, a well-known researcher, working at Harvard Medical School and once president of the American Association for the Advancement of Science.⁴⁴ Taken together, those two texts show how the sexual indifference of the embryo became an accepted stage of embryonic development, even if it acquired a somewhat different meaning than what it started as.

Just like Velpeau half a century earlier, Minot and Debierre noted that the embryo’s genitals started off in a very ambiguous form. Debierre identified what he called a “bourgeon”, bud, or “éminence génitale”, genital swelling, which developed into the penis or clitoris only after the

⁴⁰ Pierre Larousse, ed., *Grand Dictionnaire Universel*, vol.7 (Paris: Larousse, 1870), 426.

⁴¹*Ibid.*

⁴²Nick Hopwood, “Visual standards and disciplinary change: Normal plates, tables and stages in embryology,” *History of science* 43, no. 3 (2005): 239-240, 241-242, 247-248.

⁴³Charles Marie Debierre, *Manuel d’embryologie humaine et comparée*, (Doin, 1886), iv-v.

⁴⁴Edward S. Morse, “Biographical Memoir of Charles Sedgwick Minot, 1852-1914,” in *Biographical Memoirs of the National Academy of Sciences*, vol. 9 (Washington: National Academy of Sciences), 1920.

second month of embryonic life (*Fig. 4*).⁴⁵ Minot likewise located the origins of the male penis or female clitoris in a general “genital tubercle”.⁴⁶ Debierre called this budding state a state of “indifférence sexuelle”, sexual indifference, and Minot echoed with the “indifferent stage”.⁴⁷ For both embryologists, this initial sexual indifference did not just concern the embryo’s external genitals. If anything, the external genitals were only a later manifestation of a process of sexual development that started earlier in the life of the embryo,⁴⁸ with two transitory formations: the “Wolffian tubules and ducts” and the “Müllerian duct”.⁴⁹ Those transitory organs had already been identified by earlier researchers. By Minot and Debierre’s time, their developmental trajectory was understood in much more detail. The Wolffian duct developed into the male epididymis (the tube that stores sperm and transports it from the testes), the vas deferens (the ducts that transport sperm from the epididymis to the ejaculatory ducts), and the ejaculatory ducts themselves. In females, the Müllerian ducts formed the Fallopian tubes (the tubes that stretch from the uterus to the ovaries), uterus, and vagina. In this way, from an original stage with both transitory organs, the embryo specialised into a male or female type.⁵⁰

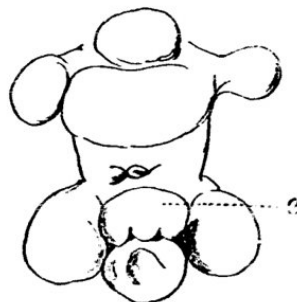


FIG. 280.
e, éminence génitale d'un embryon humain de six semaines. (D'après Cadiat.)

Figure 4. Debierre’s image of the indifferent genital swelling, from which the penis and clitoris would develop. Source: Debierre, Charles Marie. *Manuel d'embryologie humaine et comparée*. Doin, 1886.

The coexistence of the organs of Wolff and Müller in the early embryo led late nineteenth-century embryologists to think that the indifferent state may better be named a state of “primitive hermaphroditism”,

⁴⁵Debierre, *Embryologie humaine et comparée*, 694.

⁴⁶ Minot, *Human Embryology*, 516.

⁴⁷Debierre, *Embryologie humaine et comparée*, 694; Minot, *Human Embryology*, 490.

⁴⁸Debierre, *Embryologie humaine et comparée*, 698.

⁴⁹*Ibid.*, 588; Minot, *Human Embryology*, 490.

⁵⁰*Ibid.*; Debierre, *Embryologie humaine et comparée*, 643, 675.

as Debierre noted.⁵¹ This view had been championed by Robert Knox, an Edinburgh anatomist.⁵² Knox believed that sexual characters were essentially male or essentially female. The early embryo possessed both male and female characters, and even though they initially coexisted, one of them soon disappeared, leaving only the other.⁵³ There were no homologies between male and female sexual development, just the disappearance of one set of characters and the persistence of the other. For Knox, the closest thing to homologies was that some opposite sexual characters continued to exist in each sex. The clitoris was an essentially male character (the male penis) in the female, and the male nipple was an essentially female character (the female breast) in the male.⁵⁴ Sexual characters always existed in two distinctive forms, rather than springing from a single one. The indifferent stage was not a sexually neutral stage, but a dual-sexed or hermaphroditic stage.

Ross Brooks has claimed that Knox's primitive hermaphroditism became generally accepted in medical science by the end of the century.⁵⁵ But reading the works of late nineteenth-century embryologists shows that, at the very least, his theory did not survive without some alterations. Unlike Knox, embryologists continued to find homologies between the male and female sexes. In fact, the remaining organ of Wolff or Müller in the male or the female did not disappear entirely, but atrophied to form a rudimentary structure, surprisingly similar to that of the other sex. In males, the Müllerian duct atrophied in the "utricule prostatique", or "uterus masculinus", an indentation on the male urethra.⁵⁶ Debierre quoted an embryologist who wrote that "si... on eût porté un ovule fécondé dans ces uterus masculins, il se fût développé un embryon comme dans la matrice de la femme", "if one had brought a fecundated ovule in this masculine uterus, an embryo would have developed like in the uterus of woman".⁵⁷ In females, part of the Wolffian duct developed into a similar structure to the male epididymis; the epoophoron or organ of Rosenmüller. According to Minot, the similarity between the female epoophoron and the male epididymis was so great that "It is desirable to treat this organ... as a single organ, not, as it is often done, as a distinct organ in each sex".⁵⁸ Those homologies brought back the "unity of composition" between males and females.

Moreover, according to embryologists, not all sexual structures started off in a hermaphroditic state. The gonads, meaning the ovaries

⁵¹*Ibid.*, 639-643.

⁵²Brooks, "One «Both» Sex«Es»", 48.

⁵³*Ibid.*

⁵⁴*Ibid.*, 52-53.

⁵⁵*Ibid.*, 48.

⁵⁶Debierre, *Embryologie humaine et comparée*, 633; Todd and Bowman, *The Physiological Anatomy and Physiology of Man*, 613.

⁵⁷Debierre, *Embryologie humaine et comparée*, 635-636.

⁵⁸Minot, *Human Embryology*, 500.

and testes, seemed to truly pass through a sexually indifferent stage. Both structures arose from an initially indifferent “genital ridge” or “genital swelling”.⁵⁹ From this same beginning, the male and female sex followed shared developmental processes.⁶⁰ For example, in the first days of embryonic life, both the future male and the future female produced ovules. As Debierre reported, some embryologists viewed those “male ovules” as the seat of the production of spermatozoa.⁶¹ The comparison between ovary and testicle also went the other way around. At some point during the development of the female embryo, the ovaries lowered themselves to the position they take in the adult body, just like the testicles descended in the scrotum.⁶² Male and female gonads developed side by side, borrowing elements from each others’ sexual development.

Embryologists did not get rid of the idea of sexual indifference. Even if he supported primitive hermaphroditism (with the only exception perhaps that of the gonads), Debierre continued to use the term “indifférence sexuelle” to describe the early embryo.⁶³ The embryo was sexually indifferent, not because it had no sex, but because it possessed the germs of the two sexes at once: it was “indifferent” to one or the other sex. Other supporters of hermaphroditism, such as the German anatomist George Ludwig Kobelt, did the same.⁶⁴ Whatever way it was understood, the indifferent sexual state of the embryo impacted the nineteenth-century scholarly understanding of sex. The eighteenth-century systems that preferentially explained the formation of the male sex, and left the formation of the female sex as an afterthought, had little in common with the new view of development from an indifferent state. Male and female embryos started from the same condition, and kept parallels between each other even as they headed in different directions.

The meaning of sex in the nineteenth century

The idea that sex developed from an indifferent stage contrasts with a popular view developed by twentieth-century historians such as Thomas Laqueur, Alice Dreger, and Londa Schiebinger. Those historians portrayed the nineteenth century as a time when people saw stark differences between males and females.⁶⁵ But embryology suggests that there was more than strict a dualism to nineteenth-century understandings of sex. Tracing the nuances in the meaning of sex gives a better understand-

⁵⁹*Ibid.*, 490-491; Debierre, *Embryologie humaine et comparée*, 587-588.

⁶⁰Minot, *Human Embryology*, 490-492; Debierre, *Embryologie humaine et comparée*, 677.

⁶¹Debierre, *Embryologie humaine et comparée*, 685.

⁶²Debierre, *Embryologie humaine et comparée*, 658.

⁶³*Ibid.*, 694.

⁶⁴Brooks, “One «Both» Sex«Es»”, 61.

⁶⁵Thomas Laqueur, *Making Sex*; Alice Domurat Dreger, *Hermaphrodites and the Medical Invention of Sex*; Londa Schiebinger, “Skeletons in the Closet”.

ing of how the same century could see the birth of the neutral human being.

In his pioneering, yet controversial, *Making Sex* (1986), Laqueur argued that the idea of male and female bodies as two distinct entities, grounded in natural sexual differences,⁶⁶ appeared at some point towards the end of the eighteenth and start of the nineteenth century.⁶⁷ This “two-sex” model of the body contrasted with the earlier “one-sex” model, in which female bodies were less perfect and less powerful versions of male bodies.⁶⁸ As Laqueur phrased it, in the one-sex model of the body, “woman does not exist as an ontologically distinct category”.⁶⁹ Laqueur’s point about the one-sex body is close to my argument that male Man was the dominant category in the eighteenth century. One difference is that, in the eighteenth-century sources I have examined, Woman was not a secondary type of Man, as Laqueur implied with the one-sex body. Because Woman was implicitly excluded from definitions of Man, focused on reasonable qualities, the category of Woman was external to that of masculine Man. Moreover, the hypothetical one-sex and the two-sex bodies do not entirely match the evidence from the study of reproduction.

When it comes to the two-sex model of the body, it is true that nineteenth-century embryological texts stressed the depth of sexual difference. As Minot wrote: “Sex, as we encounter it in the human species, is the result of a long evolution affecting a large number of organs — perhaps all of the organs — so as to result in characteristic differences between the male and female”.⁷⁰ Sexual difference was so pervasive that it might even be present in every organ of a man’s or woman’s body. Minot also added that “the essential difference is in the relation of the two sexes to the production of the genoblasts; the male produces the spermatozoa, the female the ova”.⁷¹ Male-female opposition was most marked when it comes to the sexual products, to generation. This matches Londa Schiebinger’s view that, between the eighteenth and nineteenth centuries, sex became grounded in deep bodily differences.⁷² According to Alice Dreger, the insistence on gonadal anatomy reflected the nineteenth-century belief that men and women were fundamentally different because of their reproductive capabilities.⁷³

Yet, for embryologists, sexual difference did not exist from the outset. It was slowly formed after an initial sexually indifferent state. Even Minot’s “essential difference” between male and female was not

⁶⁶Laqueur, *Making Sex*, 149-150.

⁶⁷*Ibid.*, 5.

⁶⁸*Ibid.*, 25-35.

⁶⁹*Ibid.*, 62.

⁷⁰ Minot, *Human Embryology*, 84.

⁷¹*Ibid.*

⁷² Schiebinger, “Skeletons in the Closet,” 42.

⁷³Dreger, *Hermaphrodites and the Medical Invention of Sex*, 151-153.

that essential in early stages of the embryo's development, since the future male embryo produced ovules just like the future female embryo. Within embryology, the shift to the two-sex model did not just happen at a point in historical time. It happened during the embryo's development. The embryo started from the "indifferent state", or from a state of "primitive hermaphroditism", and then developed into a male or a female. Though nineteenth-century scholars upheld strict differences between the sexes, these differences did not exist from the outset; they were the product of development.

Embryological studies showed the common ground between males and females. Laqueur acknowledged, in fact, that the two-sex body did not supplant all understandings of sex. According to him, nineteenth-century embryology rearticulated the older one-sex body.⁷⁴ The one-sex model of the body saw females as a less perfect version of males, especially in their genitals, which were inverted, not fully open versions of male genitals.⁷⁵ For Laqueur, this idea resurfaced in embryological studies of male-female homologies. But, at least at first sight, scholars did not think that female sexual characters were an imperfect version of male sexual characters. As Saint-Hilaire wrote: "On ne peut regarder un sexe comme une dégénération de l'autre: ils se ramènent à l'unité de composition, voilà le seul point incontestable", "We cannot view one sex as a degeneration of the other: they come back to the unity of composition, that is the only incontestable point".⁷⁶ The homologies that Saint-Hilaire found between male and female bodies supported the view that males and females were versions of each other, not a version of one sex only. These nuances show what several historians have pointed out since the publication of Laqueur's *Making Sex*: that the shift from the one-sex to the two-sex body cannot fully capture the complex history of sexual difference.⁷⁷ More recent historical work has shown how different understandings of sex and gender coexisted in the nineteenth century.⁷⁸

For Laqueur, the passage from the "one-sex" to the "two-sex" model shows that our very understanding of sex as something given by nature, which distinguishes males from females, comes from historical developments.⁷⁹ In other words, sex is subordinate to historical and cultural factors. Gender ideology determines the facts about sex, not the other way around. However, as Ross Brooks has remarked, the study of

⁷⁴Laqueur, *Making Sex*, 10.

⁷⁵*Ibid.*, 25-35.

⁷⁶Saint-Hilaire, *Philosophie Anatomique*, 348.

⁷⁷Brooks, "One «Both» Sex«Es»," 37-41; Harvey, "The century of sex?" 910-914; Helen King, *The one-sex body on trial: the classical and early modern evidence*, (London: Routledge, 2016); Angus McLaren, "Review of *Making Sex: Body and Gender from the Greeks to Freud*, by Thomas Laqueur," *The American Historical Review* 98, no. 3 (1993): 832-33.

⁷⁸Harvey, "The century of sex?" 910-914; Geertje Mak, *Doubting Sex: Inscriptions, Bodies and Selves in Nineteenth-Century Hermaphrodite Case Histories* (Manchester University Press, 2012), 14-15.

⁷⁹*Ibid.*, 10-11.

embryos left nineteenth-century men with uncomfortable observations about sex, such as the hermaphroditic or indifferent origins of embryos.⁸⁰ “Nature” pushed back against “culture”, too. The fact that embryos started off in a hermaphroditic or indifferent condition necessitated adjustments in the nineteenth-century view of sexual difference. One such adjustments might have concerned the term Man. Even if the nineteenth century saw no definite shift between the one-sex to the two-sex body, a different kind of shift might still have happened. Nineteenth-century encyclopaedias and dictionaries reveal an intriguing coincidence. New ideas about the indifferent sexual condition of the embryo were accompanied by a change in the meaning of Man. This change involved the first appearance of a notion of human being close to the meaning we have of it today.

Change in definitions of Man: The birth of the human being

In eighteenth-century sources, in Chambers’ *Cyclopaedia*, or in the French *Encyclopédie*, definitions of man appealed to qualities that were seen as mostly masculine, such as reason, willpower, or leadership. In this way, Man appeared as a general, yet implicitly male being. In the first half of the nineteenth century, definitions of Man in encyclopaedias showed no difference. William Brande’s *Dictionary of Science, Literature, and Art* (1842) stressed the mind and the rationality of Man. “Of all living beings on the surface of the planet, the first is Man”, started the entry’s author.⁸¹ He then went on to describe Man’s body and its abilities, stating that Man’s constitution required “rational will” to keep it in balance,⁸² and focusing especially on the head: “The predominant development of the cranium... is the mark, symbol, and condition of man’s characteristic excellence, as prominently gifted with mind”.⁸³ Later, the entry even added that “the head is carried on high as the most noble part of the frame which it surmounts, all the rest of the body seems as if intended to carry it... and it may be said to be the representative of the whole man”.⁸⁴ The emphasis on rationality, willpower, and the mind, places this description of Man on the first side of the man/woman dualism.

This definition was echoed by Marie-Nicolas Bouillet, a French professor and author of several widely read dictionaries and encyclopaedias, including the *Dictionnaire Universel des Sciences, des Lettres et des Arts* (1854), [Universal Dictionary of Sciences, Letters and Arts]. Bouillet started his entry on Man with a description of Man’s anatomy: “Au point

⁸⁰Brooks, “One «Both» Sex«Es»,” 40-1, 72-3.

⁸¹William Thomas Brande, ed. *A Dictionary of Science, Literature, and Art* (London: Longman, 1842), 705.

⁸²*Ibid.*

⁸³*Ibid.*, 706.

⁸⁴*Ibid.*

de vue purement anatomique, l'homme est un animal vertébré, mammifère, bipède”, “From a purely anatomical viewpoint, man is a vertebrate, mammal, bipedal animal”.⁸⁵ But just like the *Dictionary*, Bouillet quickly insisted on man's superiority over the rest of nature: “Ce qui fait essentiellement sa supériorité, c'est qu'il est le seul doué de la raison, de la parole, qu'il est libre, qui distingue le bien du mal, et qui est éminemment perfectible”, “What essentially makes his superiority, is that he is the only one endowed with reason, with speech, that he is free, that he distinguishes good from evil, and that he is perfectible”.⁸⁶ Reason, the typical masculine quality, is here the first adjective that marks man's uniqueness. In Bouillet's entry, “woman” was only mentioned to say that she had a shorter stature compared to man.⁸⁷

Yet, definitions of man soon underwent a surprising change. The next edition of Brande's *Dictionary*, published in 1875, got rid of the entire part on the ideal form of Man as gifted with mind. It delved immediately into a description of man's anatomy. The only mention to the mind was a note that Man had a relatively bigger brain size compared to other animals.⁸⁸ Though the next editions of Bouillet's *Dictionnaire* stayed, instead, close to its previous definition of “Man”,⁸⁹ new encyclopaedias started to show a departure from previous definitions.

Chambers's Encyclopedia, published in 1871 by William and Robert Chambers of Edinburgh (not to be confused with the eighteenth-century Chambers' *Cyclopaedia*) did not mention anything about the immaterial qualities of man, such as reason. The entry was limited to birth and death statistics, and to the weight, height, strength of people. Crucially, the entry always mentioned both man and woman. It started its description of man with the sentence: “It is a very remarkable fact that more boys are born annually than girls”, and went on to describe the differences in the physical make-up of man and woman, stating for example that “from birth, there is an inequality in weight and height between the children of the two sexes”.⁹⁰ In this encyclopaedia, though man had the upper hand on woman, Man was never used in his general, yet implicitly masculine sense.

A greater change would become apparent with the *Grand Dictionnaire Universel du XIXème siècle*, published by Pierre Larousse. The entry on man did stress man's unique qualities, such as reason: man was a

⁸⁵Marie-Nicolas Bouillet, *Dictionnaire Universel des Sciences, des Lettres et des Arts* (Paris: Hachette, 1854), 813.

⁸⁶*Ibid.*

⁸⁷*Ibid.*

⁸⁸William Thomas Brande and George W. Cox, eds. *A Dictionary of Science, Literature, and Art*, vol. 2, New Edition (London: Longman, 1875), 448.

⁸⁹Marie-Nicolas Bouillet, *Dictionnaire Universel des Sciences, des Lettres et des Arts*, 12th ed. (Paris: Hachette, 1877); Marie-Nicolas Bouillet, Jules Tannery, Emile Faguet, *Dictionnaire Universel des Sciences, des Lettres et des Arts*, 17th ed. (Paris: Hachette, 1908).

⁹⁰William Chambers and Robert Chambers, *Chambers's Encyclopedia; A Dictionary of Universal Knowledge for the People* (Edinburgh: Chambers, 1871), 293-294.

“animal doué de raison, qui appartient à la classe des mammifères, mais qui se distingue des tous les autres animaux par l'excellence de son organisation intellectuelle”, “animal endowed with reason, belonging to the class of mammals, but distinguished from all other animals by the excellence of his intellectual organisation”.⁹¹ Despite this start, which is very reminiscent of earlier encyclopaedias, the *Grand Dictionnaire* introduced a new meaning of “homme”. The second listed definition for “homme” was simply “individu appartenant au genre humain”, “individual belonging to the human race”.⁹² The neutral human being, who did not imply any differences related to sex, first appeared as a new definition of Man.

Importantly, the *Grand Dictionnaire* distinguished this new general human being from man as the male sex. The third definition for Man was “personne humaine ou ensemble des personnes humaines du sexe masculin”, “human person or whole of human people of the male sex”, referring to the male sex specifically.⁹³ Man was split in two: it referred, first, to a general, neutral human person, and second, to a male person specifically. In this definition, the general Man was not only understood through masculine qualities, but through the neutral term of human.

The separation between human beings and male men persisted was there to stay. In 1899, the *Columbian Cyclopaedia* defined man first as “a human being, the human race”, and then as “Man, the male sex, as distinguished from woman”.⁹⁴ In 1919, Fowler’s *Concise Oxford Dictionary of Current English* defined Man as a “human being”, a “person”, the “human race”, before mentioning “adult male, opposed to woman, boy, or both”.⁹⁵ Together with the meaning of Man, the meaning of Woman also came to change. Eighteenth-century sources had tended to define woman as the “female of Man”, indicating Woman’s belonging to Man. The *Grand Dictionnaire* also defined Woman as “femelle de l’Homme”, but added: “Etre humain organisé pour concevoir et mettre au monde des enfants”, “Human being organised to conceive and bring children into the world”.⁹⁶ Even though Woman was defined by her reproductive capacities, those capacities were ascribed to a general “human being”. The *Columbian Cyclopaedia* and *Oxford Dictionary* continued the trend, by calling Woman respectively “female of the human race”, and “adult human female”.⁹⁷ Woman had become a particular type of a human being, just like Man.

⁹¹Pierre Larousse, ed. *Grand dictionnaire universel du XIXe siècle*, vol.9. (Paris: Larousse, 1873), 357.

⁹²*Ibid.*

⁹³*Ibid.*

⁹⁴*The Columbian Cyclopaedia* (New York: Garretson, Cox, & company, 1897), 18:720.

⁹⁵Henry Watson Fowler, Francis George Fowler, James Augustus Murray, *The concise Oxford dictionary of current English* (Oxford: Clarendon, 1919).

⁹⁶Pierre Larousse, ed. *Grand dictionnaire universel du XIXe siècle*, vol.8. (Paris: Larousse, 1872), 202.

⁹⁷*The Columbian Cyclopaedia*, 32:383; Fowler, Fowler and Murray, *The concise Oxford dictionary*.

Interestingly, unlike Man and Woman, the term human itself did not change its meaning as much. Just as in the eighteenth century, the *Columbian Cyclopaedia* defined human as “pertaining to mankind, having the qualities or nature of man”, and the *Grand Dictionnaire* similarly stated that “humain” is something “qui appartient, qui a rapport à l’homme”, “that belongs, that relates to man”.⁹⁸ The notion of human being was born through a change in the meaning of Man.

The indifferent embryo was the neutral human being

From the second half of the nineteenth century, a split appeared in definitions of Man. Man was not a general, yet implicitly male being anymore. Man was first a general human being, and second, the male sex as distinguished from the female sex. This new definition matches the nineteenth-century understanding of embryonic development. In its early stages, the embryo was sexually indifferent, or possessed both sexes at the same time. In other words, the embryo, like the human being, was neither male nor female. Only after some time did the embryo specialise into a male or a female. Being human took precedence over sex. In a sense, the indifferent embryo *was* the human being: both started in a neutral condition. Sexual differences only came as a second step.

When it came to the use of “man” and “human” in embryological texts, changes were subtle but nonetheless detectable. The term “man” seemed to be more easily associated to the idea of a general human. Writing about the development of the Müllerian ducts in the embryo, Debierre observed that “Chez l’embryon *humain* de 2 centim. 5 de long, les canaux de Müller sont soudés... La formation du canal utéro-vaginal peut donc être placée chez l’*homme* à la fin du deuxième mois”, “In the *human* embryo of 2 cm. 5 in length, the Müller canals are welded. The formation of the utero-vaginal duct can therefore be placed in *man* at the end of the second month”.⁹⁹ If Debierre used “man” in this context, it is certainly not because he thought that a male could possess a utero-vaginal duct. Debierre’s initial use of the term “human embryo” and the seamless transition to “man” indicated that he referred to a general idea of the human species. After all, embryology was the one area where the neutral human being was empirically detectable in the indifferent embryo.

When the sex of the embryo was either preformed or decided immediately at conception, human beings could only be either male or female. Sex was not something that could be dissociated from a human body. But studying the process of embryonic development seems to

⁹⁸*The Columbian Cyclopaedia* (New York: Garretson, Cox, & company, 1897), 15:543; Larousse, *Grand Dictionnaire*, 430.

⁹⁹Debierre, *Embryologie humaine et comparée.*, 663. My emphasis.

have given nineteenth-century scholars a different idea. Realising that an embryo started its life in a condition that was neither male nor female meant that, at some stage, human bodies existed independently of their physical sex. Even though the existence of androgynous or hermaphroditic bodies was well-known, those remained exceptions. Nineteenth-century scholars found that all human bodies, without exception, started their life as an indifferent human embryo, before being physically male or female. The indifferent stage of embryos gave reality to the neutral human concept.

The ever more marked distinction between human embryos and embryos of other species might have promoted the use of man and human as terms referring to the general human species. Before the mid-nineteenth century, students of generation often used other animals to complement the lack of human specimens.¹⁰⁰ By the end of the century, human embryos were still a rare commodity (and there were disputes about whether some early specimens were indeed human and not, say, chicken embryos).¹⁰¹ But, perhaps because embryology as a discipline was growing in status,¹⁰² enough embryologists pursued enough human embryos to develop a true “human embryology”. Comparisons between embryos of different species now had explicit comparative aims, such as investigating the timings of embryonic development in different species, rather than just standing as a proxy for human embryos. Debierre, for example, recorded the time that the chick, rabbit, sheep, and human embryos took to develop different body parts.¹⁰³ The development of human embryology on one hand, and of a comparative study of embryos on the other, made it more important to distinguish embryos belonging to the human species from embryos of other animals. The terms of human and human being found a new use and popularity.

The question of why the neutral human emerged still remains. Although the indifferent stage made the idea of a neutral human empirically observable, other events were shaking the nineteenth-century scholarly world at the time the human being was born. In the final chapter, I propose an explanation for the change in the meaning of Man, through to the process by which Man became increasingly closer to animals. I also explain how, despite the birth of the human, the old conception of Man came back.

¹⁰⁰The scarcity of human bodies and use of animal bodies seemed to concern the whole discipline of anatomy: Cunningham, *The Anatomist Anatomis'd*, 308-330.

¹⁰¹Hopwood, “Producing Development,” 54-70.

¹⁰²Hopwood, “Visual standards and disciplinary change,” 239-240, 241-242.

¹⁰³See e.g. for the development of the vertebral column: Debierre, *Embryologie humaine et comparée*, 292.

Chapter IV. Animalisation versus progressive development: How the human being was born, and how Man came back.

In this final chapter, I tackle the crucial question raised by this thesis: why did the masculine world-structuring category of Man give way to a neutral understanding of human being towards the end of the nineteenth century? And what did that have to do with embryological studies on the “indifferent stage”, which also emerged in the same period? Here, I explain the birth of the human being by connecting it to a trend which I call the “animalisation” of Man. As evidence piled up in favour of the kinship between Man and animals, and as the rational soul was left out of scientific research, the special notion of Man lost some of its power. Embryological studies contributed to the animalisation of Man, by supporting the idea that the primitive condition of Man closely resembled that of other animals, and by showing that males and females shared the same origin. The old notion of Man, the masculine being who reigned over nature by virtue of his unique quality of reason, was overthrown by these new understandings. The human being, as a biological individual that included both the male and the female sex, was born from the new kinship that Man found with the rest of the natural world, including Woman.

But the old Man had not said his last word. Together with the animalisation of Man came the belief, inherited from Scottish thinkers, that Man progressed through stages. Even though everyone on Earth started from the same human condition, in a lowly, almost animal state, populations developed to different degrees. In other words, all people evolved or developed, but some people developed further than others. Those fortunate people happened to be, yet again, European males. The development of the embryo in the womb mirrored the development of the human being in evolutionary time. For nineteenth-century scholars, the embryo and the human being were one and the same. As embryos reached the final stage of development, they became Man. Although the “human” is considered a neutral concept, the basis for equality between all people, the historical notion of human came with an in-built hierarchy based on levels of development.

Man gets closer to animals: The weakening soul, evolution, and human history

The rational soul of Man, the formidable quality that separated him from Woman and from other animals, was getting weaker. Already towards the end of the eighteenth century, scholars of the likes of Kames had

posited that Man's reason, rather than being an automatic attribute of his soul, was slowly acquired through a process of improvement. One result of this idea was that Man was not immediately distinct from animals. In the nineteenth century, scholars started to view animals as possessing some degree of reason, however rudimentary. At least in terms of Man's intelligence and reason, differences between Man and animals were of degree, not of kind.

The French naturalist Georges Cuvier, known for having refined Linnaeus' classification in his *Le Règne Animal* (1817), made that point clear. True, Man was special because of his intelligence and his capacity for language. Animals were "infiniment au-dessous de l'homme", "infinitely below man".¹ Cuvier argued that Man should be placed in the separate order of the "Bimanes" to mark his uniqueness.² But Cuvier was also certain that animal intelligence executed operations of the same kind as that of Man. Animals, especially the higher vertebrates, responded to sensations, were capable of lasting affections, and acquired knowledge of the world from their experiences. "On aperçoit dans les animaux supérieurs un certain degré de raisonnement... qui paraît être à peu près celui des enfans lorsqu'ils n'ont pas encore appris à parler", "We perceive in animals a certain degree of reasoning... which appears to be more or less that of children when they have not yet learned to speak".³ Though animals were by no means close to Man, they were not completely separate from him, either. They were like human children, whose reasoning capacities had not yet developed.

Others pushed this argument further. The French naturalist and politician Bory de Saint-Vincent had originally written an entry on Man for the *Dictionnaire Classique d'Histoire Naturelle* (1822-1831) [Classic Dictionary of Natural History], which he wrote together with other noted French scientists. His entry became so famous that the editors of the *Dictionnaire* decided to publish it as a separate monograph.⁴ Perhaps its popularity was due in part to Saint-Vincent's brazen stance on the status of Man. In his essay, Saint-Vincent nagged all anatomists who had given a special place to Man in the animal kingdom. His predecessors, including Buffon and Cuvier, had attempted to preserve a degree of nobility for Man, by calling him the "Roi de la Terre", "The King of the Earth". But these acts were vain, Bory admonished his readers, because Man's nobility was mere illusion.⁵ The epigraph to his book, an extract from the book of Job, put it plainly: "Qu'est-ce que l'Homme que tu le regardes comme quelque chose de grand ?.. Il est né de la Femme, vit peu, est

¹Cuvier, *Le règne animal distribué d'après son organisation*, vol. 2. (Paris: Deterville, 1817), 48-51.

²*Ibid.*, 81.

³*Ibid.*, 52.

⁴Jean Baptiste Bory de Saint-Vincent, *L'homme (homo) essai zoologique sur le genre humain* (Paris: Rey et Gravier, 1827), 1:vj-vij.

⁵*Ibid.*, 1:3.

rempli de misères; il est comme une fleur qui s'épanouit et se flétrit, il passe comme l'ombre", "Why do you regard Man as something grand?.. He is born of Woman, lives shortly, is full of miseries; he is just like a flower that blossoms and wilts, he passes like the shadow".⁶ In this passage, Bory de Saint-Vincent pointed out, almost with disgust, the utter insignificance of Man as living creature.

The same intensity with which Saint-Vincent mocked those convinced of Man's high status, he directed to his admiration of how Carl Linnaeus had dared to place Man among the rest of the animals. If anything, Saint-Vincent thought that Linnaeus had not made Man's place clear enough. If one tried hard enough, Saint-Vincent mused, one could even find a relation between Man and a bat, as differences in the animal kingdom existed on a scale of degrees.⁷ Moreover, describing the anatomy and capacities of Man, Saint-Vincent argued that the family of the "Orang" should be placed in the same order as that of Man.⁸ By "Orang", contemporaries of Saint-Vincent usually referred to what we would now call the great apes, including chimpanzees and orang-utans. At the time, many myths circulated on those creatures. The Scottish philosopher James Burnett, Lord Monboddo, maintained that the Orang-Outang, despite its hairy and unsettling appearance, lived in society just like men.⁹ For Monboddo just as for Bory de Saint-Vincent, Man could not possibly be imagined to occupy a special place in the universe. He had to share that place at least with those animals most similar to him, the great apes. Learned men were growing sceptical of the special status of Man, which he supposedly possessed by virtue of his rational soul. Man's reason was a matter of relative development, not an all-or-nothing attribute based on the soul, as it had earlier been understood.

Moreover, the importance of the soul waned in scientific circles. Already back in the eighteenth century, some radical scholars, such as Frenchman Julien Offray de La Mettrie, had posited that the entire world consisted of matter, with no special divine substance such as God or the soul. But radical materialists were exceptions.¹⁰ Most scholars did not reject the Christian doctrine that saw Man as the special product of God's creation, nor did they deny the existence of the soul. However, that soul had ceased to be a valid object of scientific investigation. Andrew Cunningham remarked that whereas the soul had earlier organised all the body's organs, in the nineteenth century the body was believed to become animated just from the interrelationship of its organs.¹¹ The soul

⁶*Ibid.*, 1:iv.

⁷*Ibid.*, 1:6.

⁸*Ibid.*, 1:12-25.

⁹Silvia Sebastiani, "A 'Monster with Human Visage': The Orangutan, Savagery, and the Borders of Humanity in the Global Enlightenment," *History of the Human Sciences* 32, no. 4 (2019): 91.

¹⁰Cunningham, *The Anatomist Anatomis'd*, 383-385.

¹¹*Ibid.*

was not doing any organising, or if it did, it was not worth researching. French scholars adopted this new view of the soul earlier than British scholars, likely because of the transformations in French anatomy that followed the Revolution of 1789.¹² For Cuvier, for example, the aim of comparative anatomy was to uncover laws of organisation, like physics or chemistry.¹³ In line with this objective, Cuvier did not waste time on the role of the soul. Bory also did not pronounce himself directly on the soul, although he warned that “vermisseaux”, lowly worms such as men, should not imagine themselves to be an important emanation of the “être suprême incompréhensible”, “supreme incomprehensible being”, as Saint-Vincent concluded his treatise on Man.¹⁴ The message is clear: lowly Man, the first slave of Nature, should leave the incomprehensible God to his own devices, and focus on getting through his life just like any other miserable animal on Earth.¹⁵ The binary between Man and animal had started to erode. Man was slowly getting “animalised”.

There were those who saw the narrowing of the gap between Man and animal as a threat to the old Man, the Man endowed with a rational soul that set him apart from the rest of the world. In *Man, in his Physical Structure and Adaptations* (1838), the British author Robert Mudie argued that the human body was organised for purposes that could not have their complete fulfilment in the present life. Man was not a simple animal, but had been chosen by God to have an immortal life. By finding examples of how Man could not be reduced just to animal matter, Mudie defended the duality between mind and body, between Man and the rest of nature. This was crucial: “If we do not... establish the Man in one firm and demonstrative belief, then we are at the mercy of the animal – the mere slaves of animal passion”.¹⁶ As the status of Man wavered, some scholars, including Mudie, feared the consequences of placing Man amongst animals. But it would not be long until the old Man would receive an even more severe blow.

The animalisation of Man accelerated with the publication of Charles Darwin’s *Origin of Species* (1859), and its implications for the place of Man in the new evolutionary system. In the introduction to the *Origin*, Darwin remarked that a naturalist might easily come to the thought that each species had not been independently created, but had descended from other species. This argument was not new, and had appeared in different forms in the last century, not least in the writings of Erasmus Darwin, Charles Darwin’s grandfather. But, Darwin continued, the crucial question was *how* species could have been modified from a common

¹²*Ibid.*, 375-385.

¹³*Ibid.*, 375-379.

¹⁴Saint-Vincent, *L’homme*, 2:250.

¹⁵*Ibid.*, 1:40.

¹⁶Robert Mudie, *Man, in His Physical Structure and Adaptations* (Boston: Otis, Broaders and Co, 1838), vi.

stock.¹⁷ A convincing, encompassing mechanism to explain the modification of species had so far been lacking. Darwin, tailed closely by his younger colleague, Alfred Russel Wallace, provided this mechanism with natural selection.

Natural selection rested on the idea that natural resources were simply not abundant enough for every organism born in the world to survive. It ensued that all organisms must be engaging in some struggle for their existence. Those individuals that managed to gather enough resources to survive and reproduce passed down their characters to the next generation. A series of individual organisms could slowly adapt to its environment, or in other words evolve, in the direction indicated by the struggle for resources. Although Darwin never denied the existence of a God, nor of a divine soul, his theory of evolution by natural selection had little use for a superior power. A limited number of resources, competition, and the transmission of characters between generations, were all the conditions needed for evolution to work, and in fact, for the whole of nature to live on.

Man was not exempt from the reach of natural selection. Darwin did not dwell on the topic of Man in the *Origin*, but readers were quick to see the implications of Darwin's argument for the question of the human species' origins.¹⁸ If species could come into existence by the slow modification of a common stock, then Man might have appeared through the same process. In fact, even if the thought was not pleasant, Man might share a blood relationship with other animals. Four years after the publication of the *Origin*, Henry Thomas Huxley's *Man's place in nature* (1836) addressed what he termed the "question of the questions", "the ascertainment of the place man occupies in nature".¹⁹ In his book, Huxley reviewed the physical similarities between the human species and different ape species. He acknowledged that there were significant differences between the apes and Man.²⁰ But, at the same time, Man was separated "by no greater structural barrier from the brutes than they are from one another".²¹ Therefore, Man could justifiably be placed in the same order as the "brutes".²²

Huxley's point was not merely about classification. Since Man could be placed among apes, "if any process of physical causation can be discovered by which the genera and families of ordinary animals have been produced, that process of causation is amply sufficient to account

¹⁷Charles Darwin, *On the origin of species by means of natural selection, or, The preservation of favoured races in the struggle for life* (London: Murray, 1859), 3.

¹⁸John McNabb, *Dissent with Modification: human origins, palaeolithic archaeology and evolutionary anthropology in Britain 1859-1901* (Oxford: Archaeopress, 2012), 27.

¹⁹Thomas Henry Huxley, *Evidence as to Man's Place in Nature* (London: Williams and Norgate, 1863), 57.

²⁰*Ibid.*, 104.

²¹*Ibid.*, 105.

²²*Ibid.*, 104.

for the origin of Man”.²³ As Huxley soon added, the only known “process of physical causation” was Darwin’s natural selection. Although Huxley had misgivings about the mechanism of natural selection, he nevertheless thought it made sense to adopt it for the time being.²⁴ Admitting Darwin’s theory, Man could conceivably have been produced, “from the gradual modification of a man-like ape”, or from “a ramification of the same primitive stock as those apes”.²⁵ At least in scientific terms, Man was another ape-like creature among others.

The contemporary debate on the antiquity of Man also supported Man’s belonging in the natural world. In the traditional biblical chronology, the Earth and humankind were only a few thousand years old. This chronology was called into question as scholars started to dig up evidence of a vanished world. As John McNabb has put it, geology showed that world to be very ancient, palaeontology filled that world with extinct animals, and archaeology populated it by uncovering what looked like human-made stone tools.²⁶ A momentous event occurred between 1858 and 1859, when excavations in Brixham Cave, Kent, revealed human tools mixed with the bones of extinct animals, key evidence for proving that Europe had been inhabited by human people in very remote times.²⁷ At the time, scholars imagined the makers of hand axes as none others than modern human beings, perhaps because they could not visualise them otherwise.²⁸ Still, the new long chronology, together with Darwin’s theory of evolution, placed the question of human origins firmly within the natural world.²⁹

The animalisation of Man, especially championed by Darwin and his supporters, may be one reason why scholarly definitions of Man changed towards the second half of the nineteenth century. Previous definitions had appealed to Man’s dual nature, as a being with a physical form on one hand, and with a special soul on the other. As I have shown in Chapter Three, the new definitions of Man did not insist on his rational soul anymore. For most nineteenth-century scholars, Man still had something divine in him. But, on the one hand, that divine part of Man had been left out of scientific research, and on the other, Man’s history was found to be more and more entangled with the history of the natural world. Definitions stressing the absolute superiority of (male) Man over the rest of nature became increasingly untenable. Before being male,

²³*Ibid.*, 105.

²⁴*Ibid.*, 106-108.

²⁵*Ibid.*, 105-106.

²⁶McNabb, *Dissent with Modification*, 10.

²⁷*Ibid.*, 30-36; Chris Manias, “Contemporaries of the Cave Bear and the Woolly Rhinoceros: Historicising Prehistoric Humans and Extinct Beasts, 1859-1914,” in *Historicising Humans: Deep Time, Evolution, and Race in Nineteenth-Century British Sciences*, ed. Efram Serran-Shriar (Pittsburgh: University of Pittsburgh Press, 2018), 16; George W. Stocking, *Victorian Anthropology* (New York: Free Press, 1987), 50, 73.

²⁸McNabb, *Dissent with Modification*, 11.

²⁹*Ibid.*, 10.

Man was first and foremost a “human”, part of the biological human species, which included Woman.

Coincidentally, Darwin put forward an argument for the unity of the two sexes in the *Origin*. As Darwin promoted the common descent of all animals, he argued that natural classifications of animals implicitly supported his principle that animal species are related to each other. According to Darwin, without even noticing it, naturalists had always classified organisms based on their descent from a common ancestor.³⁰ In fact, naturalists automatically grouped two sexes in the same species: “With species in a state of nature, every naturalist has in fact brought descent into his classification; for he includes in his lowest grade, or that of a species, the two sexes; and how enormously these sometimes differ in the most important characters, is known to every naturalist”.³¹ Because of the common descent criterion, no amount of difference between the two sexes actually mattered, even if that difference would, in theory, be enough to classify them as different species. Males and females belonged to the same species simply by virtue of the fact that they descended from the same ancestors, and that they would continue to reproduce together.

Masculine man had fallen from the pedestal granted to him by God and his soul, and landed on the ground with the rest of nature’s inhabitants. Those inhabitants included half of the human population that had been previously excluded from masculine Man: Woman. Man found a new kinship with the companion he had so far ignored. As a product of the union of Man and Woman, the “human” as a natural and neutral being, distinct from the male sex, was born.

The animal embryo: Studying embryos to find evolutionary ancestors

Whilst Man underwent an animalisation, the embryo, too, became animalised. In fact, understandings of embryonic development contributed to the “animalisation” of Man. Since the beginnings of the study of embryos, several scholars had seen the embryonic life of the human species as an illustration of Man’s humble beginnings. At the start of its life, the human embryo was just like a “worm”.³² In the early 1800s, a German anatomist, Johann Friedrich Meckel, and a French physician, Antoine Etienne Reynaud Augustin Serres, turned that expression into a literal event in embryonic development. Those two scholars independently reached the position that, as embryos of higher organisms (such as human embryos) developed, they ascended the scale of the animal kingdom

³⁰Darwin, *The Origin of Species*, 413-414.

³¹*Ibid.*, 424.

³²Pinto-Correia, *The Ovary of Eve*, 70-79.

and passed through the forms of the lower organisms.³³ Geoffroy de Saint-Hilaire, who worked with Serres, stated that lower-ranking animals corresponded to the different ages of the foetuses of high vertebrate animals.³⁴ The embryo “recapitulated” different animal forms.

This so-called “recapitulation theory” would be forcefully opposed by the German embryologist Karl Ernst von Baer. Von Baer argued that embryos did not pass through the permanent structures of other animals, but diverged from shared embryonic forms.³⁵ Early embryos looked like each other because they might share, say, the vertebrate body plan, but as they continued developing, embryos diverged into distinct forms; the bird form or mammal form, for example.³⁶ Anatomists across Europe picked up Baer’s argument, including Robert Bentley Todd and William Bowman, two British physicians, authors of an extensive medical treatise. Todd and Bowman allowed that up to a time, the changes in the human embryo were similar to those in the development of all other vertebrate embryos.³⁷ But, they quickly added, after this time the characters became marked, and it was easy to tell whether the embryo was to become a fish, reptile, bird or mammal.³⁸ Despite the difference with recapitulation theory, von Baer’s views implied, again, that the development of human embryos had nothing special; it started in a shared form with other mammals and even with all animals.³⁹

Understandings of ontogeny would change again with Darwin’s theory of evolution. In the *Origin*, Darwin showed how evolution could make sense of the well-known fact that embryos of different species were often “strikingly similar”.⁴⁰ Darwin reasoned that the modifications that evolution created between different species became useful only when the organism had already grown, for example when it needed to find food, or to reproduce. The embryos of different species should not be expected to look very distinct, as there would be no evolutionary advantage to that. For Darwin, “the embryo is the animal in its less modified state; and in so far it reveals the structure of its progenitor”.⁴¹ Rather than recapitulating the structures of other animals, or even of going through a general vertebrate plan, embryos showed what the ancestor of a species looked like. Embryos were therefore a crucial source of information in tracing the evolutionary relations of present species.

³³Lindsey O’Connell, “The Meckel-Serres Conception of Recapitulation,” *Embryo Project Encyclopedia* (2013-07-10).

³⁴Saint-Hilaire, *Philosophie Anatomique*, 385.

³⁵Nick Hopwood, *Haeckel’s Embryos*, 18-9.

³⁶Dov Ospovat, “The Influence of Karl Ernst Von Baer’s Embryology, 1828-1859: A Reappraisal in Light of Richard Owen’s and William B. Carpenter’s “Palaeontological Application of ‘Von Baer’s Law’ ”,” *Journal of the History of Biology* 9, no. 1 (1976): 5-7.

³⁷Todd and Bowman, *The Physiological Anatomy and Physiology of Man*, 590.

³⁸*Ibid.*, 591.

³⁹Ospovat, “The Influence of Karl Ernst Von Baer’s Embryology,” 5-7.

⁴⁰Darwin, *The Origin of Species*, 438.

⁴¹*Ibid.*, 449.

Darwin's embryological digressions would be picked up by a young and eager German anatomist, Ernst Haeckel. Haeckel set out to show, through drawings comparing the embryos of different species, how "ontogeny recapitulates phylogeny": developing embryos follow the ancestral path of their species, taking the form of successive ancestors until they reach that of their present species.⁴² Though Haeckel was accused of embellishing or even faking his drawings so that they could fit with his theory,⁴³ his "biogenetic law", as it became called, resonated with nineteenth-century evolutionary science. Darwin and Haeckel both declared embryology's relevance to the new paradigm in the sciences of life, evolution. Findings about embryos could increase knowledge of the whole evolutionary process.

As nineteenth-century embryologists insisted on the similarities between the development of Man and of other animals, Man could not be left unscathed. Haeckel mocked that for the first weeks of development, you could not tell an aristocrat from a dog.⁴⁴ The phrasing would have pleased Saint-Vincent. As Huxley worked to put Man in his place among the great apes, he also drew on evidence from embryology. He stated that "it is very long before the body of the young human being can be readily discriminated from that of the young puppy".⁴⁵ The ape embryo was even more similar to the human embryo, suggesting an even closer phylogenetic relationship. This, for Huxley, supported the unity of man with the rest of the animal world. The evidence from embryology animalised Man further.

The recapitulation theorists of the early nineteenth century had already lowered the status of Man by stating that Man started in the form of the lowest organisms on Earth, the worm. But as evolution took its prominent place in the sciences of life, this hit differently. It was not just that Man's development in the womb started from a lowly form. It was that Man's development on Earth, as a species, started in the same form, and that a working mechanism to justify this assertion had been found. Embryonic development mirrored evolutionary development, and both indicated that Man's origins located him in the world of animals. Because of the belief that ontogeny followed phylogeny, the "indifferent stage" of the embryo's development also acquired an evolutionary meaning. The indifferent stage was a stage in evolution, too. The ambiguity of the sexes in the early embryo was not just a curious feature of embryonic development, but offered a mirror to distant times in evolution. In his work on embryology, Charles Sedgwick Minot noted how embryonic development could reveal the "primitive condition" of animals.

⁴²Elizabeth M. Barnes, "Ernst Haeckel's Biogenetic Law (1866)," *Embryo Project Encyclopedia* (2014-05-03).

⁴³Hopwood, *Haeckel's Embryos*, 62.

⁴⁴*Ibid.*, 1.

⁴⁵Huxley, *Man's Place in Nature*, 66-67.

It is generally believed that the primitive condition is hermaphroditic... In a certain sense this conception appears true, for in the embryo there is an indifferent stage in which the sexual glands are already differentiated, but in which the future sex is unrecognizable.⁴⁶

Minot, however, had reservations about this state of primitive hermaphroditism. Using the idea that some present animal forms corresponded to primitive organisms, he continued:

It is to be remembered, however, that if hermaphroditism were the primitive form we should expect to find the lowest metazoa hermaphroditic; but this is not the case either with all Coelenterata or all sponges... These and other considerations have led me to the hypothesis that primitively each individual animal is sexually indifferent when young, and becomes either male or female when adult.⁴⁷

Embryologists like Minot drew on the early state of the embryo and combined it with knowledge on the “lowest” animal forms, to surmise the ancestral state of animals. In the case of Minot, this ancestral state involved sexual indifference when young, and sexual specialisation when adult. The indifferent stage in the embryo’s formation could not be treated as a minor hiccup in development. This “hiccup” could tell a lot about the origin of all animals, including Man.

The growing realisation of Man’s place in the natural world, especially through Darwin’s theory of evolution, had made embryology a crucial part of the search for the primitive ancestors of Man and of other animals. At the same time, researches in embryology reinforced the animalisation of Man by showing how Man’s development in the womb was far from unique. When, as a result of Man’s transformation into an animal, the new definition of Man as “human” emerged, understandings of embryonic development were ready to support that definition. The sexually indifferent and animal-like human embryo found its counterpart in the new, neutral human being, which evolved from an animal state.

Arrested development: Males develop further than females

For all the talk about the origins of Man in an animal state, nineteenth-century scholars did not give up on the special status of Man. Even if all human beings, even all animals, started in the same state, development placed them on a hierarchy of progress. All embryos looked the same in their early days, but some developed further than others. Hierarchies did not disappear with the human being; they merely changed shape.

⁴⁶Minot, *Human Embryology*, 84.

⁴⁷*Ibid.*

To start with, the fact that humans shared common embryonic beginnings with other animals did not prevent the human species from gaining the upper hand over other creatures. After his book-length tirade on the place of mankind within the animal kingdom, Huxley turned to the “cry” that “we are men and women, not a better sort of apes”.⁴⁸ Huxley stated that even if there was no sharp distinction between men and apes, that did not eliminate the gulf between “civilised men” and the “brutes”.⁴⁹ Addressing his audience, Huxley asked: “Is he bound to howl and grovel on all fours because... he was once an egg, which no ordinary power of discrimination could distinguish from that of a Dog?”⁵⁰ Man might come from a lowly stock, but that did not diminish the superior status of the human race. Huxley continued:

Our reverence for the nobility of manhood will not be lessened by the knowledge that Man is, in substance and in structure, one with the brutes; for he alone possesses the marvellous endowment of intelligible and rational speech, whereby, he has slowly accumulated and organised the experience which is almost wholly lost with the cessation of every individual life in other animals; so that now he stands raised upon it as on a mountain top, far above the level of his humble fellows, and transfigured from his grosser nature by reflecting, here and there, a ray from the infinite source of truth.⁵¹

Terms such as “Man” and “manhood”, and the reference to “rational speech”, make this extract from Huxley sound very close to previous definitions of Man as male Man with his special soul. But Man did not need God’s intervention anymore. Progressive development alone elevated him above the rest of living creatures. The old idea of male Man’s dominion over nature had not died with the rational soul. It persisted, in the form of progressive development. Though all humans may start in a similar form, only male Europeans developed to the furthest point. The further development of males over females already started during the human being’s life as an embryo.

According to nineteenth-century embryologists, the development of the male embryo’s organs involved a great deal of modification, much more than was needed to develop the female organs. Writing about the development of embryos from a the common organs of Wolff and Muller, Todd and Bowman stated: “It is not possible to say whether the organ will develop into a testicle, or whether it is to retain its primitive characters, which agree with those of the ovary”.⁵² The female ovary corresponded to a “primitive” character, whilst male characters developed much further. According to Debierre, the male sexual parts eventually

⁴⁸Huxley, *Evidence as to Man’s Place in Nature*, 109.

⁴⁹*Ibid.*, 110.

⁵⁰*Ibid.*

⁵¹*Ibid.*, 112.

⁵²Todd and Bowman, *The Physiological Anatomy and Physiology of Man*, 610.

reached “completion”: “Chez la femelle, ces parties se modifient peu et conservent toute la vie la forme qu’elles avaient au début. Chez le mâle, elles se complètent et prennent un aspect tout différent.”, “In the female, these parts undergo little modification and conserve their whole life the shape they had at the start. In the male, they complete themselves and take on a completely different aspect”.⁵³ Here, Debierre assumed that, because male organs change more, they ended in a stage of completeness which females could not reach.

The association between female sexual characters and a less modified, more “primitive” form, was pervasive in embryology. Notice the language used by embryologists Foster and Balfour to describe the development of the genital organs: “The Wolffian duct *becomes* in the male the vas deferens and epididymis... The Müllerian ducts *persist* in the female as the Fallopian tubes and uterus”.⁵⁴ Writing on the development of the external genital organs: “[the genital prominence] in the male... *gives rise* to the penis... In the female... the prominence *remains* as the clitoris”.⁵⁵ The verbs used by those embryologists suggest that the male organs involved a process of “becoming”, of reaching a final form, whilst the female organs were a persistence of less developed embryonic forms.

Both males and females started from the same “indifferent” form, but females got “stuck” at an earlier stage of embryonic development. “The development of the genital tubercle in the female is in all respects similar to that of the male, but it does not pass beyond the stage in which there is an open urethral groove”, stated Minot.⁵⁶ Those differences, arising during embryonic development, lasted through the entire lives of humans: “The external genitals are homologous in the two sexes, but in the male they are more specialised than in the female; the condition in the adult female corresponds to that of the foetal male”.⁵⁷ Even adult human females could never reach the stage that males achieved in the womb.

Embryonic life placed males and females on a hierarchy of development. “The fundamental law of embryology is that the simple precedes the complex, the general and typical the special”, wrote Minot.⁵⁸ The simple and general female stage preceded the complex, specialised male state. Two decades before, Darwin had formulated a very similar definition for evolutionary progress: “The best definition of advancement in the organic scale ever given... rests on the amount of differentiation and specialisation of the several parts of the same being, when ar-

⁵³Debierre, *Embryologie humaine et comparée*, 694-695.

⁵⁴M. Foster and Francis Balfour, *The Elements of Embryology*, vol.2 (London: Macmillan, 1883), 415.

⁵⁵*Ibid.*, 417. My italics.

⁵⁶Minot, *Human Embryology*, 518.

⁵⁷*Ibid.*, 516.

⁵⁸*Ibid.*, 160.

rived... at maturity”, he wrote.⁵⁹ Darwin’s theory of evolution is often characterised as a “blind” process which took the shape of a tree, rather than a straight line. But this did not prevent Darwin from overlaying a process of “advancement” on this tree. Minot’s and Darwin’s ideas of progress implied that species without distinct sexes were less advanced than sexual organisms, and that “specialised” males were more advanced than “general” females, who stayed their whole lives in the condition of male foetuses.

When embryologists such as Minot wrote that the female embryo condition was more primitive than the male, they did not just mean that the female condition was primitive within embryological development. It was also primitive in evolutionary time. As Darwin and Haeckel argued, the development of the embryo reflected the evolutionary process. The embryonic development of the genital-urinary system of vertebrates, for example, reflected the primitive type of animals.⁶⁰ For Debierre, the organs of Wolff and Müller, which were transitory forms in the human embryo and in other high vertebrates, corresponded to a permanent stage in lower animal forms, such as in fish and batrachians.⁶¹ Since the female genital apparatus stayed closer to those transitory forms, the female body was also less modified, less specialised, less evolutionary advanced than the male body.

Minot described the evolutionary and developmental stage in which the intestinal canal got separated from the urogenital canal. The female body did not depart from the primitive form as much as the male body:

This may be called the monotreme stage, and is characterised by there being merely a single or cloacal opening, through which the excrement, urine, and genital products are discharged; the stage is the permanent one in non-mammalian vertebrates and in monotremata. An important advance is made in placental mammals... which takes place in the human embryo about the fourteenth week, and involves the complete separation of the urogenital sinus from the intestinal canal. In the male the closure of the raphe penis converts the sinus into the prolongation of the urethra proper... In the female the sinus persists as the vestibulum into which the urethra and vagina both open.⁶²

Minot mentioned how the male body departed from the evolutionarily primitive form by getting “converted” into a new form, in which the sinus became the urethra (the duct through which urine passes in its way out of the body). By contrast, in the female, the sinus “persisted” as its primitive form, in which both urethra and vagina discharged their products. Females were one developmental, and evolutionary, stage

⁵⁹*Ibid.*, 211.

⁶⁰Debierre, *Embryologie humaine et comparée*, 595.

⁶¹*Ibid.*, 589.

⁶² Minot, *Human Embryology*, 515.

behind man. But this hierarchy was not limited to the development of the sexual characters in the womb. Embryonic differences were one aspect of a much broader fact about the evolutionary development of the sexes.

In the *Descent of Man* (1871), Charles Darwin noted that male and female children resembled the mature female more than the mature male. Woman was also less courageous, pugnacious, and energetic than man. As Darwin plainly put it, Man could attain a higher eminence in anything.⁶³ Why were there such insurmountable differences between men and women? The root cause, Darwin argued, was male competition for finding mates. Since men had to compete between themselves in order to gain access to females, their faculties of observation, reason, invention, were put to the test. The smartest and strongest men would be able to reproduce more, and their faculties would be passed down, especially to their male offspring. Because females did not actively participate in this competition, they would not reap the benefits of this sexual selection.⁶⁴ Thanks to the effects of their competition, men had become increasingly specialised, and had departed even more from their ancestral state. Women had not. They looked more like children because they were evolutionarily closer to the simpler ancestor of mankind. Londa Schiebinger has remarked how likening women to children also extended to skeletons. Women's skulls were seen as more similar in proportion to children's skulls. Women ranked below men in ontogeny and phylogeny.⁶⁵

The only progress that women could claim was due to the side-effects of male competition for women. The victorious males would pass some of their good qualities onto the female side of the offspring. As Darwin put it: "It is, indeed, fortunate that the law of the equal transmission of characters to both sexes has commonly prevailed... otherwise it is probable that man would have become as superior in mental endowment to woman as the peacock is in ornamental plumage to the peahen".⁶⁶

Arrested development: Non-Europeans lag behind

The idea that some humans were not as advanced as others also applied to the different races that nineteenth-century embryologists saw in humankind (although they discussed the racial aspect less extensively than the sexual aspect, perhaps due to a lack of available embryos from other populations). Writing about the development of the cranium in the

⁶³Charles Darwin, *The Descent of Man and Selection in Relation to Sex* (London: Murray, 1871), 2:327.

⁶⁴*Ibid.*, 326-329.

⁶⁵Schiebinger, "Skeletons in the Closet," 63.

⁶⁶Darwin, *The Descent of Man*, 328-329.

newborn, Debierre stated that “chez les races supérieures, les sutures [sur le crâne] restent plus longtemps et plus largement ouvertes en avant qu’en arrière, tandis que c’est l’inverse chez les races inférieures (Australiens, Nègres) et chez les Anthropomorphes”, “in the superior races, the stitches [on the cranium] stay longer and more open forward rather than backwards, whilst it is the opposite in the inferior races (Australians, Negroes) and in the anthropoids”.⁶⁷ This, for Debierre, “n’est sans doute pas sans relation avec le développement des lobes frontaux, ce séjour de l’intelligence et du raisonnement”, “must be related to the development of the frontal lobes, the dwellings of intelligence and reasoning”.⁶⁸ The longer the development of certain parts of the brain in the foetus and the child, the more a population could claim to have developed intelligence. For Debierre, the shorter development of the “inferior” races, including Australians and black people, indicated that those people were not as intellectually developed as other races.

A similar reasoning applied to features of the human body that differed between population. About the development of the nose, Minot wrote that “It is at first short and broad, having at three months very nearly the shape which is permanent in certain negro races”.⁶⁹ The nose of African people was the product of arrested development; early and primitive structures that never continued to develop, and never reached a European nose.

Embryonic development reflected what nineteenth-century scholars already believed: that “lower” races were not as developed, and as evolved, as European people. In Chapter Two, I discussed how ideas of human stadial progress originated among Scottish Enlightenment thinkers of the likes of Lord Kames. By the nineteenth century, ideas of progress had gained the upper hand throughout Europe. In his description of Man, Saint-Vincent detailed the long progression of humanity through distinct ages. The earlier “Age d’Or” gave way to the “Age d’Argent”, which in turn was followed by the “Age de Fer”, which eventually culminated in the last stage of human progress: the “Age de Raison”, the age of reason.⁷⁰ The initial impetus for this progress had come from the development of language in man, which set him apart from the rest of nature.⁷¹ But not all of humanity had jumped on the bandwagon of progress. Savages, according to Saint-Vincent, were still in the sad state of Nature, where people were cowardly, cruel, and battled about everything and anything. Progress had not reached them yet, and perhaps it never would, since scholars believed that non-Europeans were degenerating.

⁶⁷Debierre, *Embryologie humaine et comparée*, 339.

⁶⁸*Ibid.*

⁶⁹Minot, *Human Embryology*, 578.

⁷⁰Bory de Saint-Vincent, *L’homme*, 2:230-248.

⁷¹*Ibid.*, 2:230.

Although savages had earlier existed in a “state of Nature”, nineteenth-century scholars maintained that savages did not, in fact, truly represent Nature. According to Saint-Vincent, the defining feature of the Age of Reason was that the bases of human morality were grounded in Nature. Ultimately, progress tended towards realising Nature’s laws. European men, who had progressed further than any other human on Earth, were more properly natural than savages. The view that savages were degenerate more than natural persisted at least until Darwin’s time. According to Darwin, the “savage” state was the state when Man showed the most unnatural and harmful customs:

With mankind all the conditions for sexual selection were much more favourable, during a very early period, when man had only just attained to the rank of manhood, than during later times. For he would then, as we may safely conclude, have been guided more by his instinctive passions and less by foresight or reason. He would not then have been so utterly licentious as many savages now are... He would not then have practised infanticide; nor valued his wives merely as useful slaves; nor have been betrothed to them during infancy.⁷²

Darwin reversed the concern of some nineteenth-century people, such as Robert Mudie, that men might succumb to “animal passion”. To be in a state of nature, like animals were, meant obeying instincts that protected against immoral behaviours. The savage state, when men had just acquired some reason, was much more dangerous. At that point, the protection against immoral behaviours stopped. Reason needed to be developed further, and spread through habit, in order to reach the higher state of civilisation in which men did not commit offenses against nature.⁷³ Out of all the states (the animal, the savage, and the civilised), the savage state was, at least morally, the lowest of all of them. Gone were the days when an aura of primordial nobility surrounded the “primitive savages”.

The belief that deep differences existed between Europeans and non-Europeans, not only in physical appearance, but also in terms of intellect and morality, is easily associated to polygenism, the theory that posited different ancestral origins for different populations. In some cases, such as that of Kames, the idea that races existed on stages of development did come together with polygenism.⁷⁴ Yet, monogenist thinkers, too, could uphold strict differences between the races. In the late nineteenth century, monogenism did not come anymore with the idea that all men had originally been created by God and given a soul.

In *The Descent of Man*, Darwin addressed the question of whether human varieties belonged to a single species. One type of evidence that

⁷² Darwin, *The Descent of Man*, 2:383.

⁷³ *Ibid.*, 2:394.

⁷⁴ Sebastiani, *The Scottish Enlightenment*, 166.

could help give an answer to this question was evidence of interbreeding between different populations. If human populations could mix with each other, then they likely were not too different. Although Darwin was not entirely convinced that populations could always interbreed, he nonetheless stated that “the races of man are not sufficiently distinct to coexist without fusion”.⁷⁵ Whenever different populations co-existed side by side, such as Brazil or South Africa, a mixed race population never failed to emerge. Moreover, different human populations were separated by subtle gradations, so that “it is hardly possible to discover clear distinctive characters between them”.⁷⁶ Human populations did not have strict boundaries. For evolutionists such as Darwin, it was possible to think that all human varieties descended from a single ancestor.

Yet, that ancestor was not necessarily close to present human populations. Evidence from rocks, bones and tools had placed the origins of Man in the natural world. Another consequence of the lengthened chronology was that the common ancestor of human populations had been relegated to deep time.⁷⁷ No more the “familiar patriarch”, Adam, the common ancestor had become a “distant, brutish savage” as Theodore Koditschek phrased it.⁷⁸ Faced with the new chronology for the history of humankind, labels like “monogenism” or “polygenism” did not carry as much weight as before.⁷⁹ Darwin noted that it did not matter whether the races of man were called races, species, or subspecies.⁸⁰ The theory of evolution could trace back any separate species in the natural world to a single ancestor. The catch, of course, was that common ancestry, if ancient enough, did not necessarily imply much similarity. Although Darwin’s theory made the biological unity of humans more likely, it supported the nineteenth-century idea that deep differences existed between the human races.

Measuring up to European Man

Both women and people from other races could not reach the end of the evolutionary and developmental trajectory granted to European men. Nancy Stepan has explained the parallel between women and racial others by arguing that, for nineteenth-century men, the lower races represented the “female” type of the human species, and females the “lower

⁷⁵Darwin, *The Descent of Man*, 1:225.

⁷⁶*Ibid.*, 1:226.

⁷⁷McNabb, *Dissent with Modification*, 30, 36.

⁷⁸Theodore Koditschek, *Liberalism, Imperialism and the Historical Imagination : Nineteenth Century Visions of Great Britain* (Cambridge: Cambridge University Press, 2011), 214.

⁷⁹*Ibid.*, 211

⁸⁰Darwin, *The Descent of Man*, 1:235.

race” of gender.⁸¹ Scholars did sometimes liken women to other races: “With woman the powers of intuition, of rapid perception, and perhaps of imitation, are more strongly marked than in man; but some, at least, of these faculties are characteristic of the lower races, and therefore of a past and lower state of civilisation”, wrote Darwin in *The Descent of Man*.⁸² Women were like other races in having been left behind by the white man’s march of progress.

But overall, in the sources I examined, direct comparison between women and non-Europeans was rare. Here, I agree with Londa Schiebinger’s position. Rather than directly comparing sexual and racial others, nineteenth-century men asked themselves how both groups compared to the European male.⁸³ Although this meant that both groups related to each other, there were differences in how these groups measured up to the white man. As British scholars such as Kames and Darwin liked to think, the white woman had been dragged along on the path of progress by the white man. The effects of progress in one sex reflected, to some extent, on the other. Non-European women, on the other hand, could not hope for such progress, since their savage husbands were far behind, and below, European males. Savages stayed behind both white women and white men.

The neutral human being was born in the second half of the nineteenth century, just as Man lost his special status amongst the Earth’s beings. But this did not mean that the old hierarchies ceased to exist. As the human being grew up and developed, they became more and more similar to Man. All humans started in the same embryonic condition, but the fully developed human being was European and male. Far from equalising the human race, the “human being” came with a new mode of understanding the human species, one based on development both in the deep history of the species and in the womb. Man might have been dethroned by his animalisation, but progressive development brought him back.

This explains why, in “success stories” of human evolution, authors often appealed to the old version of masculine Man. When scholars such as Saint-Vincent, Huxley, or Darwin, mentioned Man’s progression to an “age of reason”, or an equivalent high point (Huxley favoured the mountaintop shining with the rays of truth), it was understood that not just any human being could ascend to that mountaintop. Only European males had the reason and intelligence, the strength and courage needed to reach the pinnacle of Nature.

⁸¹Nancy Leys Stepan, “Race and gender: The role of analogy in science,” *Isis* 77, no. 2 (1986): 261-277.

⁸² Darwin, *The Descent of Man*, 2:326-327.

⁸³Londa Schiebinger, “The anatomy of difference”, 404.

Conclusion

The human being was born towards the end of the nineteenth century, from the union of two beings that were previously entirely separate: Man and Woman. The rational soul of Man had placed him on an entirely different plane from all other creatures on Earth. Slowly, Man became more similar to other animals, and also got closer to that other half of the human race, Woman. The human being was conceived as a response to the new “animalised” Man. The human being, unlike Man, was the neutral member of an animal species, just like the embryo.

By telling the story of the human being, I have wanted to add to the anthropological and historical literature on moral concepts such as self or personhood, as well as to the work of historians who have shown the social and political implications of concepts relating to humanity.¹ I have scrutinised the human being as the supposedly natural being, in order to show that the human is no self-evident biological concept. The human being is an ontological category with a history, a history which also implicated ideas about reproduction and embryos.

In the introduction, I asked the question of how ideas about the human changed together with the study of embryos. The stories of the human being and the embryo unfolded in parallel. In Chapter One, I showed how both preformationists such as Charles Bonnet, and epigeneticists like the Comte de Buffon, created systems of reproduction where males, rather than females, played the active role, and where the outcome of reproduction was new males embryos. This sexed bias in eighteenth-century generation theories becomes understandable as a consequence of the structuring category of Man, defined as a rational (and hence masculine) being. The influence of Man also extended beyond theories of generation. Chapter Two addressed how Man united men from different provenances through a shared special soul, whilst viewing all women as reproductive beings. In the last few decades of the eighteenth century, this vision of the world and of Man changed. Scottish thinkers such as Kames imagined a process of stadial progress, where reason and civilization were acquired gradually instead of by virtue of the rational soul. According to the new vision of progressive development, non-European people were far behind or below Europeans. Racial difference became deeper than sexual difference.

In Chapter Three, I showed that Man and Woman got closer to each other through embryological studies. Embryologists started to stress that the embryo went through a period of sexual indifference before acquiring a sex. The implication was that, at some point during em-

¹Recent works with those concerns, which I have drawn from in this thesis, are Wahrman, *Making the Modern Self*, and Bourke, *What It Means To Be Human*.

bryonic life, the embryo was neither male nor female, only human. This new view of embryonic development matched a new definition of Man. Encyclopaedias in the latter decades of the nineteenth century began defining Man, not as a special creature endowed with the implicitly masculine quality of reason, but as a biological member of the human species; as the neutral human being.

Finally, in Chapter Four, I argued that the birth of the human being can be explained by the “animalisation” that Man underwent during the nineteenth century. As Man became part of the natural world, in part through the implications of Darwin’s theory of evolution, definitions of Man could not appeal to his special divine status, but had to focus on his membership in the biological human species, which included Woman. Man, however, had not said his last word. Animalisation might have taken away Man’s special status by virtue of his soul, but progressive development implied that some human beings developed further than others. Because the embryo was thought to reflect the evolutionary history of the human species, progressive development also concerned embryonic life. Embryologists described how male embryos progressed further than female embryos, and how European embryos progressed further than non-European embryos. Both the human and the embryo, in their most developed forms, became European males. Man was back, or to be more precise, he was never truly gone.

The outcome of linking sets of ideas in historical research is not a clean cause/effect understanding. It is difficult to determine what came first, or what caused what – did the neutral human appear through research on the neutral embryo? Or did understandings of a truly neutral embryo follow the emergence of the neutral human concept? One way to answer those questions would be to find points of contact between embryologists and encyclopaedists, and examine how ideas circulated between those scholars. Encyclopaedia entries on Man, Woman and human often referred directly to topics in reproduction, implying that their authors were aware of developments in that field.² Determining the extent of this influence and its direction would be an important addition to my research, although my thesis had a different concern.

By focusing on connections rather than causality, I have rather drawn attention to the way certain notions and theories are intimately bound up with each other. Historically, embryology has enabled scholars to think about the human, and vice-versa. When Man was an implicitly male category, the embryo, too, was implicitly male. As Man got closer and closer to an animal, the embryo became, in its early stages, a sexless and animal-like creature, just like the new human being. Concepts about Man and human have constrained the study of reproduction and of em-

²The entries on “Homme” and “Femme” in the *Encyclopédie*, for example, talked about male and female sexual anatomy, stages of life, and generation: Diderot and D’Alembert, *Encyclopédie*, 8:212-214, 224, 6:395-396.

bryos. Conversely, findings from embryology have supported, or undermined, ideas about Man and human.

Using the image of the human body, scientific and biological terms such as “human being” are not hard skeletons covered with softer and fleshier cultural ideas. The birth of the human being can be traced to both “scientific” and “cultural” developments. The embryonic indifferent stage promoted ideas of a purely human state, whilst cultural ideas about the progress of civilisation, by splitting reason from the soul, had a hand in the downfall of Man. Crucially, there is no way to tell where the hard skeleton begins, and the softer flesh ends. Nineteenth-century men thought that females were more primitive creatures, a belief which they justified by the fact that male embryos underwent more changes than female embryos. In more recent times, embryologists have even argued that the mammalian body is programmed to express a female phenotype, unless the Y chromosome kicks in.³ But instead of viewing this as a sign that females are less evolutionary advanced, some have instead stressed the importance of this primordial female state of affairs: “Were it not for the secondary intervention of the Y chromosome, the mammalian world would contain nothing but females”, wrote historian Eva Pinto-Correia.⁴ If there is a distinction between scientific and cultural judgments, between the bones and the flesh, it is hard to find, even today. Rather than a body with hard bones on one side, and muscles and fat on the other, a more appropriate image would be that of a body where these two components are morphed with each other. Only, some areas, when examined attentively, are denser than others.

Here, I have prioritised those “denser” or more “scientific” areas of the human category. In taking the apparently inflexible “bone” of a concept such as the human, I have attempted to show it is more supple and malleable than it appeared. The human being has a history and a surprisingly recent origin. This realisation may be helpful for historians encountering terms such as Man or human being in historical sources. To equate a eighteenth-century instance of Man to our current human, or to treat these terms interchangeably, misses an important aspect of those terms’ meanings. Just as eighteenth-century theory of generations became more understandable when viewed through the category of Man, other topics in history may gain in richness and nuance when matched to appropriate actor’s categories.

Moreover, the link between ideas about humanity and embryos opens an intriguing avenue for the history of science and of ideas. When wondering about why it is that notions of Man and human were so closely intertwined with embryological studies, and what established that connection, one almost tautological answer is that the connection already

³Pinto-Correia, *The Ovary of Eve*, 262.

⁴*Ibid.*, 263.

exists in the empirical world of humans. Conception, pregnancy, embryonic development, childbirth – those reproductive processes are the way new human beings come into the world. There is no getting around it: bodily reproductive processes inevitably implicate new people, new human beings. As such, it is perhaps not surprising that there has historically been such a close correspondence between theories of reproduction and notions about people. One strategy for future research in the history of ideas could be to pursue the connections that are already present in our material, bodily world. The move is not new. Just as reproduction implicates ideas about human beings, anthropologist Mary Douglas has shown how bodily secretions implicate ideas about what is “in” and “out” of the body, both in terms of the individual and the social body.⁵ The bodily lives of humans inevitably mould and connect scientific and cultural ideas. Turning this realisation into an explicit method may reveal some previously uncharted connections in history.

Finally, although the history of the human being appeared linear, with the final result in the birth of the human being, the story I have told is circular rather than linear. The birth of the human being did not correspond to the birth of universal equality, far from it. Perhaps the human concept was the first step towards the equality we uphold today, but the human being itself came with a rather unsavoury hierarchy between different populations and between the sexes. Sharing a common origin, being part of the same human population, are not synonyms of equality. The old Man returned through the development of the human. This comes back to the objection raised by Quentin Skinner against intellectual history: just looking at what something *means* without looking at what it *does* produces incomplete stories. In the nineteenth century, the category of the human especially allowed European men to preserve their status over other living beings through a hierarchy of development, as older understandings of Man were crumbling.

Today, the concept of a human being is the crucial basis of universal rights. The first article of the United Nations Universal Declaration of Human Rights begins by stating that “All human beings are born free and equal in dignity and rights”.⁶ I have shown that universal equality or universal rights did not immediately flow from the idea of a neutral and biological human being. Concepts that appear to have a natural equalising value, such as the human, can also uphold different kinds of inequalities. Activists and historians engaging with the question of who gets to be admitted among humans should be mindful that getting recognised as a “human being” cannot be the end of the story.

⁵Mary Douglas, *Purity and danger: An analysis of concepts of pollution and taboo* (Routledge, 2003).

⁶UN General Assembly, "Universal declaration of human rights," *UN General Assembly* 302, no. 2 (1948): 14-25.

List of figures

Figure 1. The ambiguous embryo. Source: Wikimedia Commons.
https://commons.wikimedia.org/wiki/File:Human_embryo.jpg

Figure 2. Anthony van Leeuwenhoek's animalcules in different species.
Source: Journal of Obstetrics and Gynaecology Canada.
[https://www.jogc.com/article/S1701-2163\(15\)30820-3/fulltext](https://www.jogc.com/article/S1701-2163(15)30820-3/fulltext)

Figure 3. His' normal plates of embryonic development (1885). Source: Godoy-Guzmán, Carlos. "Contribuciones de Wilhelm His a la Embriología Humana." *International Journal of Morphology* (2013) 31, 70-74. 10.4067/S0717-95022013000100010.

Figure 4. Debierre's image of the indifferent genital swelling, from which the penis and clitoris would develop. Source: Debierre, Charles Marie. *Manuel d'embryologie humaine et comparée.* Doin, 1886.
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