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INTRODUCTION

Taking the Mystery Out of Menstruation

IN WRITING this book, I was confronted with a lot of disgust. Don't get me wrong—plenty of people got it and cheered me on. But I still encountered a number of people who did not get why I wanted to write about menstruation. Yet addressing the cultural prevalence of menstrual disgust, stigma, and avoidance is important to recognize why menstruation is understudied and often misunderstood.

My favorite-slash-least-favorite example of this phenomenon comes from a study by Dr. Tomi-Ann Roberts, a professor of psychology at Colorado College.¹ Roberts hired women actors to pretend to be fellow participants in a study on “group productivity.” The actor would join the participant in a room, and the two would sit and fill out one packet of questionnaires together. While the researcher left to get the second packet of activities, the actor would pretend to fumble in her handbag for some lip balm. Under one condition, she would drop a tampon in front of the participant, and in the other condition, she would drop a hair clip. She would then return the tampon or hair clip to her handbag, get out the lip balm, use it, and put it back. The researcher would come back, have both participant and actor fill out a second packet of forms with key questionnaires actually needed for the research, and then lead them to a waiting area. The actor would sit in one chair at the end of a

row in order to leave the participant a range of chairs to choose from, closer to or farther from her.

What Roberts and colleagues found using that second stack of questionnaires is that the participants who saw the actor drop a tampon viewed her as less competent and liked her less. These findings were true regardless of the research participant's gender. The participants exposed to the tampon-dropping condition were also then more likely to objectify women compared to those exposed to a hair clip drop. And the waiting area experiment, where the research participant could choose to sit closer to or farther from the actor? Fifty three percent of the participants with the tampon-dropping actor sat farther away, compared to only 32 percent of those hanging out with the hair clip-dropping actor, suggesting a disgust reaction among those exposed to the tampon.

Negative attitudes about menstruation are pervasive, and one of the main costs is silence. In the United States, for example, these attitudes fall along three axes: those of concealment, activity, and communication. American girls are taught by parents, teachers, and the broader public to conceal when they are menstruating and to reduce physical activity. The communication taboo often limits their ability to gain information about the practice, management, and experience of periods.² Similarly, focus group research on British girls found that they conceive of menstruation as shameful, as something to be hidden, and as a form of illness.³ Most menstruating people when surveyed regret that young people are taught so little about what periods will actually feel like and what to do once you start getting them.⁴ In a culture that still inherently sees menstruation as shameful and dirty, what gets neglected is engaging directly with menstrual management, with experiences of menstrual bleeding and with blood, in order to help children figure out what periods are like and how to manage them day-to-day.

Damaging views toward menstruation extend beyond menstruating people themselves. A study in Taiwan found that, despite education programs on menstruation at school, the boys in the sample had a significantly worse attitude toward menstruation than the girls.⁵ An older study from the United States showed that men tended to think the majority of menstrual symptoms occurred during the menstrual phase,

whereas women reported that they occurred during the premenstrual phase. Men also tended to think periods were more emotionally debilitating but less physically bothersome than women.⁶ Hostile beliefs about menstruation can even lead to stereotype threat: giving women a menstrual distress questionnaire before performing other cognitive tasks decreases their task performance.⁷ These beliefs get ground in.

These beliefs are in me too. I was surprised to notice that when my oldest wanted to use a tampon for the first time, I had to talk myself into slowing down, explaining everything fully, and being in the bathroom with them to coach them through the experience. Initially, I had wanted to just hand them a tampon, give them a quick rundown, and be done with it. It was only because my kid was bright enough and brave enough to keep asking me questions—but what part goes in? Does the whole thing stay in? What do I use to get the tampon applicator up in my vagina? How will I know if I've done it right?—that I realized my aversive behavior and corrected it.

Despite the sweeping nature of menstrual stigma, menstrual cycles do get studied in my field, anthropology, because of their relevance to reproduction and therefore to natural selection and evolution (since it is pretty concerned with how effective a given organism is at passing on its genes to the next generation). A lot of what we study concerns variation: how the timing of first periods and last periods, the concentrations of hormones, and the thickness of the endometrium vary with lifestyle and environment. Something I return to again and again in this book is how the physiology of the uterus is defined by its own flexibility in the face of stressors from the environment. Sometimes ovarian hormones are suppressed, or menstrual cycles even stopped, as a way for the body to adaptively respond to poorer conditions. This is not the same thing as free will or choice. But it ties in with a major element of human evolution—that humans have always made choices about reproduction. The autonomy of the uterus and the autonomy of the person with the uterus have acted in concert for hundreds of thousands of years.

That autonomy is under threat. The racist practice of fertility control, or the “rational planning of future populations” to avoid “degeneration,” has been part of our political climate for almost two hundred years.⁸ The

unreasonable, unscientific desire to control uteruses has led to some in the United States outlawing abortion for ectopic pregnancy, a condition in which embryo implantation occurs in the fallopian tube or outside the uterus and leads to death for parent and fetus.⁹ Some people would literally rather have a fallopian tube explode and have a pregnant person die from internal bleeding than let them have a lifesaving abortion. Other state laws so fundamentally misunderstand early miscarriage that, technically, they require an official burial for menstrual blood.¹⁰

The political Right is arguing from a position of a naturalistic fallacy—that what happens in nature is good (perhaps they are using phrasing like “God’s will,” but it amounts to the same thing), and therefore any pregnancy, whether it is wanted or unwanted or life-threatening, should be forced to continue. Their position on uteruses is impinging on the bodily autonomy of those with uteruses. The way these politicians, fueled by money from special interest groups, steamroll onward with abortion omnibus bills, trigger laws (antiabortion laws that can take effect now that *Roe vs. Wade* is overturned), and more have killed people. They will continue to kill people. This is intentional.

When it comes to understanding the uterus, there are two core scientific principles: that it will vary in response to stressors and that the agency with which it acts only works in concert with the agency of the person housing that uterus. Our bodies are built for choice, and people without uteruses have been jealous of and have wanted to exert power over them for a long, long time. Many people are disgusted by menstruation because they have been taught to be disgusted because disgust leads to silence, and the more everyone stays quiet about the wonders, the spectacles, the generative power of this organ, the more those of us with uteruses cede of our agency.

Menstruation is something that half the world does for a week at a time, for months and years on end. Yet menstruation is stigmatized, largely erased from public life. In the pages that follow, I will show how knowledge was stolen and withheld from wise women in order to boost the status of professional men seeking to legitimize the new field of gynecology, how the cultural and historical underpinnings of the study of menstruation come from race science, and how a feminist orientation

to menstruation science is needed to expose and address these histories. I hope to deepen your view on periods and make apparent their rightful place as one of the most wild, captivating biological processes in the human body.

MENSTRUAL MYSTERIES AND FERTILITY CONTROL

When I completed that project on periods and iron, I did not realize that it would be the first of many times I found an assumption was based more on bluster than scientific scrutiny. I did not expect menstruation to be so mysterious. Menstruation is not inscrutable or enigmatic because it is magical, though I will talk later in this book about how many cultures consider it sacred, and for good reason. It has to do with both the history of gynecology and with what people with money decide is important to fund; that is, it has to do with who controls the scientific study and medical care of the uterus.

For centuries, knowledge about menstruation, pregnancy, childbirth, contraception, and abortion was developed and passed among those who had uteruses, mostly women. And in many cultures, that is still the case. Yet a paternalistic perspective that grew dominant as gynecology took root is that knowledge of the uterus (and anything else worthy of scientific study) should be held among people with a particular kind of formal education and authority. As the historian Dr. Deidre Cooper Owens has shown, for well over a century gynecology was dominated by white men who sought to gain credibility and professionalization by operating on unanesthetized enslaved Black women, by working with and learning from these same women without ever crediting their knowledge, and by pushing out the midwives who had been doing this job in the first place—often Black and brown women.¹¹ There are brave examples of people who tried to subvert efforts to criminalize professional midwifery, yet over time the hoarding of knowledge among professional gynecologists was a successful venture. Discouraging and even forbidding passing on knowledge, creating community, and caring for each other between people with uteruses was formalized in many ways by early (and still by contemporary) medical societies and hospitals to

control who could practice medicine.¹² There is a long line through the history of dominant science being practiced by titled men of the gentry, property-owning men, and now professional men that continues into the modern day. For some time now, in public and private life, uteruses have been under the control of people who tend not to have them.

Even the people who are first-line medical providers for children—children who could use support as they encounter menstruation for the first time—are inadequately, almost embarrassingly, unprepared. A recent survey assessed pediatricians' knowledge and clinical practice around menstruation, including whether these doctors discussed menstruation, menstrual practices, or menstrual health with their patients.¹³ Fewer than half of respondents knew when in puberty menarche (that is, the first menstrual period) happens, how long menses lasts, and even how long it is safe to wear a tampon. Almost 15 percent of women pediatricians and 34 percent of men pediatricians surveyed provided an incorrect answer to the question "Can girls/women swim in the ocean with a tampon inserted?" (The correct answer is yes. Yes, they can.)

The mysteries around menstruation, then, are mysteries because the people who hold the positional, financial, or cultural power in science and medicine have for a long time asked a limited set of questions, and employed a limited set of methodologies, that are interesting only to them in their desire to maintain power and control over fertility. At first look menstruation does not fit into our understanding of fertility and reproduction because the framework with which we have thought about why menstruation happens, and how, is one that has long viewed the biology of people with uteruses as a set of peculiar abnormalities.

When I examined the literature about periods while I was in college and graduate school, I found the most popular hypothesis for the evolution of menstruation is, effectively, that it didn't evolve.¹⁴ Instead, the reason humans menstruate has to do with a basic physiological phenomenon wherein once cells in the body hit their final, most specific form, they are counting down to their deaths. Endometrial cells do this to prepare for a possible pregnancy. So according to this hypothesis and its adherents, menstrual tissue is simply tissue that has hit its expiration date. We menstruate because we need to get rid of this tissue to start a

new cycle and try again (so really, not so far from the “failed baby” story I got as a tween). At about the same time that the “periods are useless” hypothesis was proposed, there were two women putting forward their own different hypotheses suggesting menstruation is meaningful: one to rid the body of pathogens, the other to conserve energy.¹⁵ Why had the women’s hypotheses gained far less traction than this other one?

I suspect the reason it was so easy to accept the “useless” hypothesis and reject the ones arguing for menstruation’s functionality has to do with the common refrain through the history of anthropology: female bodies and behavior are boring. Primate males (including men) are dynamic because they are violent and competitive.¹⁶ Females? Well, we don’t know much about what they do. They take care of the babies, I guess? It took decades for anthropologists to center the important research being done to recognize the value in female friendships, domestic labor, and care work.¹⁷ This is what happens when you just keep building upon a scientific foundation that used to think women were a secondary version of men and that vaginas were inverted penises.¹⁸

In this book, we will look at that foundation. And most of the time, we’ll blow it up and start over because it’s pretty difficult to build good knowledge on top of bad. The normal, healthy menstrual cycles so often detailed in medical textbooks and health classes are framed as static, twenty-eight-day phenomena: the reality is they are malleable, responsive, dynamic. Menstrual cycles, and therefore ovarian and uterine function, must be variable and responsive in order to determine whether conditions are good enough (or not) for reproduction. The investment of nine months of gestation and several years of lactation, not to mention overlapping dependent offspring, is no joke. And if conditions do not support this level of investment? Better to wait. There are multiple points at which the body can decide conditions are not right: at ovulation, at gamete fusion, when the trophoblast interfaces with the endometrium, or when it begins to dig in and get closer to the parental blood supply. At each of these points, the process of reproduction can and does end when it needs to.

These are autonomous decisions based on signals the body receives and interprets from the environment, even if they are not always the

choices we wish to make (meaning, sometimes we get pregnant when we do not want to, or sometimes a wished-for pregnancy does not happen). Physiology and behavior coevolve: our bodies might have ways of understanding whether we have the resources to reproduce, but our minds provide additional input, and strategy, regarding the timing and tempo of major life events. In this way body and mind are not separable but on the same team.

Essential to how we understand evolution is the key word “selection.” Natural selection and sexual selection are processes not just about adaptation but about what an individual does to shape their life within that environment, from the tactics they employ to the relationships they tend. Choice is fundamental to evolution: people from multiple cultures choose to avoid conceptive sex for a period of time after the birth of a baby to avoid children spaced too closely together and use contraception and abortifacients to avoid or end pregnancies.¹⁹ Our bodies and our minds take in different signals to together draw conclusions about the desirability of reproduction at any point in time.

The variability and ways in which the ovaries and uterus respond to environment form the core of this book because this variability contradicts the common medical lens of the single normative menstrual cycle. This concept of normativity comes straight from eugenic science, and it is a misplaced belief that those who occupy the averages are healthy, and those on the margins are flawed. Rather than eugenic science occupying some small niche of anthropology, in my reading it's clear that it's eugenics all the way down.

EUGENICS ALL THE WAY DOWN

I am an anthropologist, and I do love anthropology. But my field is not without its problems, as its roots are in race science. Anthropology was (is?) deeply connected to the activities of seventeenth- and eighteenth-century European travelers who used their observations of the world to fine-tune their theories about human nature.²⁰ Many of the most consequential and lasting ideas about race were also about gender, and vice versa; a particularly enduring idea has been that gender differences are

more pronounced among Europeans compared to Africans and that civilization and being of a superior race are what produce masculine men and feminine women. White femininity is therefore held up as a model toward which women of other races are expected to conform to survive within the civilizing forces of colonialism.

A furtherance of these ideas came from eugenics in the nineteenth century, the concept developed by Charles Darwin's cousin Francis Galton, who was interested in the cultivation of the English race and other "high races." Galton wished to use science to promote the selective breeding and careful improvement of people with European ancestry to maintain their dominance in the world.²¹ Like Darwin on the *Beagle*, early natural history replicated and reinforced colonial hierarchies in that white people wrote expedition observations regarding the peoples and places where they traveled that centered their perspectives and discoveries (and sometimes even made these remarks without actual observations). Studying the other was a study in objectivity, so the thinking went, and of course Europeans were the ones who should extract, discover, and pioneer in already populated lands, among people who already had their own science and own knowledge. This clarity of vision came from being part of a civilized and civilizing society and a hierarchy that kept Europeans and settlers of European ancestry at the top.

Of course, the way that power operates, especially when it comes to white supremacy, is that white people are the ones who dictate cultural values, which means that white femininity is the right kind of femininity, that white bodies are more valuable than Black, brown, or Indigenous bodies, and that the white social structure is the pinnacle of human achievement. For centuries, these notions have dictated how we think about evolution, natural selection, sexual selection, and reproduction. The connections between anthropology and eugenics, and gynecology and eugenics, are important to expose because the underlying values that drove the research questions that led to contemporary understandings of the uterus obscured the reality of what this rather marvelous organ does.

When white femininity is centered as the best kind of femininity, a few ideas about gender get embedded into our science. Normative

white femininity is often passive and in service to white masculinity, so we develop ideas about eggs as princesses in a tower and sperm as rescuing princes.²² Normative white femininity is thin, so fatness harms reproduction.²³ Normative white femininity operates in strong contrast to white masculinity, so a butch, nonbinary, or transmasculine menstruating person is inconceivable and receives delayed or inadequate care.²⁴ As it turns out, eggs are the dominant ones (in fact, the whole reproductive tract gets in on sperm selection), eating too little is the greater harm to reproduction, and plenty of people of all genders continue to menstruate and even desire pregnancy in equal proportion to cisgender people.²⁵

Notice that I equated “normative” with “best” here. Eugenicians had a direct role in linking these concepts, which affects not just gender (and race, class, and sexuality) but health. In the early nineteenth century, much of Western European medicine considered every patient’s struggle as unique, the work of doctors more art than science.²⁶ This kept accountability low; if you do not survive a doctor’s treatment, it cannot be medical error because we don’t know how many people typically survive any affliction. Seeing medicine only as art meant there was no standardization of care, leaving room for doctors to peddle their own cures. But soon the individualistic, authoritarian model of medicine somewhat gave way to standardization: of calculating averages and probabilities in order to determine best practices.²⁷ This is not all bad.

Yet the shift from art to standardization is also when the field of medicine started to equate certain statistical calculations, like normality, with health. Normal eventually came to be associated with the *normal distribution*, in particular the data that cluster in the middle, or the average. This definition of normality impacts how we understand menstrual cycles and their variability. A lot of factors relevant to the menstrual cycle are, guess what, *not normally distributed*. There is no cluster in the middle, so any calculation of average is not an actual calculation of normal. So if in medicine we tend to calculate that those who fall within the normal are healthy, a healthy menstrual cycle is by definition difficult to achieve. The idea that there can be a normative menstrual cycle goes against the contextual menstrual cycle that we actually see out in the wild, and this equation of normal with health is part of the reason so

many of us with uteruses develop ideas that we are somehow abnormal. Trying to repair this misapprehension of normality is a large part of what drives my lab's research.

The final point about eugenics that is key to this book is that eugenics has brought about a kind of medical paternalism, as a system that is upheld and reinforced by those who benefit from it. On the one hand, medicine cares deeply about preserving fertility, particularly of white women. On the other hand, medicine effectively gaslights people who express pelvic concerns, especially relating to pain or excessive bleeding, especially if those patients do not adhere to white normative femininity. This undervaluing of the lives of people dealing with illness, disability, and/or gender dysphoria lies at the heart of the medical betrayal experienced by many people with uteruses who seek care. Preservation of white fertility has been the goal for a long time: the earliest attacks on abortion in the United States were in the mid-nineteenth century, and physicians at the time made clear that their concern was in the use of abortion by white women. They argued that "middle-class Anglo-Saxon married women were those obtaining abortions, and that their use of abortion to curtail childbearing threatened the Anglo-Saxon race."²⁸

Fertility control is a central tenet of eugenics. As the historians Dr. Susanne Klausen and Dr. Alison Bashford show, feminism and eugenics fell in and out of alliances as both favored the creation of contraceptive technologies. However, as Klausen and Bashford note, "Just as feminism was starting to promote voluntary motherhood, eugenics was arguing that women's reproductive capacity was too important to the race/nation to be left in women's charge."²⁹ Control over the uterus is evident in a lot of modern medical care and antiabortion activism today, just as it was then: Black patients are more likely than white patients to be encouraged to use long-acting forms of contraception (like intrauterine devices, or IUDs) even though scheduling IUD removal can be challenging and even met with resistance by one's provider.³⁰ Black patients, as well as disabled patients, have had to endure disingenuous allyship by antiabortion activists (including Supreme Court justices) as these bad actors chip away at reproductive rights with trait-selection laws (for example, banning abortion on the basis of race, sex, or ability status).³¹

This “Daddy Knows Best” model of reproductive control limits access to assisted reproductive technologies, contraception, and abortion to those with a uterus under specific conditions.

Our cultural climate affects my day-to-day, and it affects my science. Yet part of a feminist approach to the responsible conduct of research is reckoning with our history and our contemporary conditions and the responsibility we scientists often bear as people with authority. Many modern anthropologists, especially Black, Indigenous, and Latinx women scholars, have worked to forge a future for anthropology that problematizes colonial and race science rather than advances it.³² These anthropologists do not ignore our history but use it to understand why expertise is assumed in those with power, why that leads to people thinking one person can be the expert on another’s lived experience. They ask not only about quantitative evidence but about affective responses. These scholars are why I can write a book like this today that has any hope of disrupting the race science that has undergirded the study of the uterus almost from its inception. I want to get to the reality of how this organ works. Therefore, to do the work well, menstruation science requires a feminist approach.

This feminist approach must acknowledge histories and positional power and more and be careful with the language we use. Given the power I hold—I am white and cisgender (my gender aligns with what I was assigned at birth); I teach students, thereby controlling their academic success; I have tenure, thereby voting on employment decisions of more junior faculty; I’m writing this book; and much more—it’s important that I am clear about my methods and my language because this specificity can help make menstruation science inclusive, can help notice inequity, and can point toward justice. This is where I am grateful to be both a feminist scientist and an anthropologist.

WHAT IT MEANS TO WRITE A FEMINIST SCIENCE BOOK ABOUT PERIODS

For the last fifteen years, I have led a feminist science lab that studies the environmental stressors that can affect the menstrual cycle. We have looked at how childhood, physical activity, diet, immune challenges,

inflammation, and more affect ovarian hormones and how they in turn affect the uterus. The menstrual cycle, and menstruation in particular, is a fundamental biological phenomenon that happens to about half of us and is relevant to the continuation of our species.

I call the particular way we study the menstrual cycle in my lab feminist because of its practices as well as its outcomes. Feminist methodology is deceptively simple: uncover history, look to who holds power, and test the assumptions that tend to underlie it all. Feminist methodology in science requires one to be in conversation with social scientists, historians, and science and technology studies scholars to trace an idea backward and hear the stories of the people and ideas that were dominant at the time, as well as the views of those who spoke against that dominant thinking. Feminist methodology in biology, especially human biology, requires paying special attention to funder, researcher, and subject, to whose knowledge is valued, to what research aims get proposed, to what results end up in the peer-reviewed literature, and to what ideas and experiences persist even when supposedly rigorous science has ruled them out.

It also helps to be an anthropologist. Thanks to the feminist practitioners who came before me, I am an anthropologist who has been taught to pay attention to lived experience, and I try to withhold my own judgment or expert opinion on a topic until I have spent a lot of time listening. In our lab, we endeavor to perform what the anthropologist Dr. Anna Tsing calls the “art of noticing.”³³ Tsing uses the metaphor of polyphonic music, multiple independent melodies played together, to help us understand that in order to do the work of noticing we have to be willing to step back from the idea that there is one dominant melody and “listen for the moments of harmony and dissonance they created together.”³⁴ In her book *Against Purity: Living Ethically in Compromised Times*, the philosopher Dr. Alexis Shotwell steps into this conversation on noticing and adds that “to notice the world [is] a practice of responsibility.”³⁵ Noticing allows us to see power and to follow multiple threads without allowing one to overshadow the others. Noticing allows us to see variability, and subversion, and resistance.

I've talked about feminist practices, but I also want to say something about feminist outcomes. A feminist outcome in science is about repairing harms and seeking justice. Does this mean I'm biased? In a way, heck yeah! Thanks to feminist and restorative forms of science, I know that when I am dealing with a lot of stress and my stomach hurts, this is a psychosomatic response, which does not render my symptoms imagined but acknowledges connections between the gut and the brain. I know that when I am in labor, certain procedures that may be dictated to me by my practitioner often beget more procedures and lead me almost inevitably to a cesarean section (notice I am not devaluing cesarean sections here but simply pointing out how certain systems produce certain outcomes). I don't know if any of the people who did the work that led to this knowledge consider themselves feminist scientists, but I know the result of this work has empowered me as a person who desires knowledge, respect, and autonomy.

Because of my anthropology training, because of feminist methodologies, my approach to menstrual science is very different from a clinician's or an epidemiologist's. For instance, I think we over rely on the idea that randomized controlled trials are some sort of charmed methodology that verifies the truth of a medical claim. I am not interested in recruiting homogeneous data sets in the interest of controlling variation because I wonder in doing so who our findings represent. My research questions are not oriented around a particular disease state. Instead, I'm curious about the whole wide range of what it means to be a person who bleeds. And I like to learn directly from people who have the experiences I'm curious about and see what they think is going on.

My curiosity and openness have led to conversations with friends getting real intimate real quick, social media messages involving screenshots of data from period tracker apps, long email screeds from both doctors and concerned parents, and in one instance, a stranger sending me pictures of their blood clots hanging off a tampon. Like many other feminist scientists, I'm pretty committed to the idea that the people with the lived experiences are the experts on said experiences . . . even if it sometimes means a surprise iPhone photo attachment.

As I wrote this book, I kept being confronted with my own untested assumptions, my own logical fallacies, and times when scientists so

thoroughly failed menstruating people that I had to do a deep dive into the history and cultural context of a topic to understand why. I love science and the scientific method as the way that I make meaning and sense of the natural world. And yet to my mind, to truly love science means looking as much at its harms as its revelations. It means holding scientists and the broader scientific community accountable so that we can do our best work. I hope to take the mysteries out of menstruation without losing the magic.

HEY, YOU GOT YOUR SEX IN MY GENDER!

While I hope it is obvious that many people who are not women menstruate, and that many who are women do not, menstruation research often seems unaware of this fact. In addition to children who menstruate, and trans men and nonbinary people who menstruate, there are women and postmenopausal people who do not (and of course, plenty of people who occupy multiple of these categories at once, like my transmasculine teenager). Therefore, I have tried throughout this book to be very clear about what I mean when I use certain terms.

When I am discussing papers about girls or women, I am going to use terms like “girls” or “women”—these terms include anyone who is a girl or woman regardless of their assigned gender or sex. When I am expanding a paper’s findings and suggesting it applies to all menstruating people, I am going to use terms like “menstruating people.” It’s important to be specific because some research is relevant to people with uteruses whether or not they menstruate now, and of course there are people whose uteruses are quiescent because they are postmenopausal but in their history have had hundreds of periods. So you will see the word “women” some, when it applies, along with people with uteruses, people who menstruate, former menstruating people, postmenopausal people, and more, depending on what I am talking about. Often I will simply describe the relevant body part, organ, mechanism, or function without feeling the need to explain the human being the part inhabits. Menstruation contains multitudes!

That’s not to say menstruation is not without gender, given what I said above about how healthy reproduction is tied to normative white

femininity. Gender and other social categories influence experiences and knowledge around menstruation, which is why it's worth taking a moment to clarify what sex and gender are as they relate to how we understand menstruation.

If you are Gen X or older, you may remember the old Reese's Peanut Butter Cup commercial in which a guy is strolling down the street, enjoying a giant bar of chocolate, and bumps into a woman enjoying a giant plastic tub of peanut butter (can we normalize carrying around and eating directly out of tubs of peanut butter please?). They simultaneously exclaim, "Hey, you got your chocolate in my peanut butter!" and "Hey, you got your peanut butter in my chocolate!" Sex and gender are kind of like that: a delicious, disentangle-able combination of traits, experiences, assumptions, and resistances. Sex is a designation that often has to do with a person's gonads, genitals, and/or sex chromosomes, whereas gender refers more to shared cultural experiences or identity.³⁶ Yet both are neither solely biological nor solely cultural, and it would be scientifically inaccurate to try to make categories for sex or gender binary.

The social psychologist Dr. Suzanne Kessler shows how arbitrary and nonbiological sex designations can be in her interviews in the 1980s with surgeons who performed genital surgeries on intersex infants (these surgeries on nonconsenting infants are now, thankfully, rare). Urologists who "like to make boys" see a child who needs a penis; at the same time, what can dictate gender assignment surgery for an infant with a small penis is "whether it is 'good enough' to remain one."³⁷ Gender assignment of infants is a combination of bias and art, not science, just like those nineteenth-century doctors who did not want statistics meddling in their profession. One's gonads or outward-appearing genitals do not "match" one's chromosomes nearly as much as we assume because of intersex erasure; some studies suggest as many as 2 percent of infants are born with intersex traits.³⁸

An awareness of the biological shortcomings of prenatal or infant sex assignment is one of the reasons many scientists are moving toward terms like "gender/sex" to describe a phenomenon of expression, biology, culture, and lived experience that cannot be disentangled.³⁹ While

I will use “gender/sex” when it applies, I will also use the term “gender” when I am referring specifically to cultural forces acting on the body. As described above, gender is heavily influenced by race. That is, in the United States and many other countries the idealized forms of gender roles and behaviors are often drawn from what we as a culture want and expect white women to do and are in part intended to distinguish white women from women in other racial categories.⁴⁰

Ultimately, while *gender* may have some underlying biology because it is partly correlated with chromosomes, gonads, and genitals, *gender inequality* is a series of social practices unrelated to biology that has biological consequences. This means a menstruating person’s gender presentation, gender beliefs, and experiences of their gender will influence the experience of something as gendered as menstruation and have consequences for how they interact with the world. And when it comes to bathrooms or other ways that people experience menstruation in public, those consequences can be ones of real physical danger.

In addition to issues of gender/sex, there are a few sneaky terms I need to clarify. I’m talking about the anthropologist’s propensity to talk about Western cultures as though they are normative and to hide lots of other concepts inside the term.⁴¹ When I use the term “Western” in this book, I am referring to history, culture, and/or science as they derive from Western Europe. The history of the West (as well as how we sometimes imagine that history, true or not) plays a strong role in much of Western science. However, something that can also happen in anthropology is that when we say Western, we are also sneaking a little bit of race science into the mix, meaning that when we say Western, we are also conflating it with whiteness. This happens not just in concepts of Westernness but in the makeup and practice of Western science: most Western science is done by white people, and most Western science intended to establish universals or normative values is done on white people. As with gender/sex, specificity is key. Yet unlike gender/sex, we need to do the work to separate out these terms so that the impacts of race are made visible.

When I say white I am referring to ways whiteness is often positioned at the top of the racial hierarchy, which is of course enmeshed within a

lot of Western history, culture, and science. But it needs to get pulled out and specifically named more often than not, not only to notice how racism is acting on a given concept but to keep from erasing all the Black, brown, and Indigenous people who contribute to Western culture, who transform it, who resist it. Finally, when we are talking about “Western,” the other major conflation that happens is that we often also mean an industrial or postindustrial environment—living in cities or suburbs, lots of white-collar jobs, certain concepts and expectations around formal education, diet, and physical activity. But a population’s subsistence activities are more heterogeneous, as well as the impacts of those activities on the body depending on gender, race, and class. So when relevant, yes, I’ll talk about postindustrial environments and industrial environments, as well as farming, foraging, and the like. But none of these activities or broader cultural practices are Western versus non-Western.

Finally, with great appreciation I want to note the geographer Dr. Max Liboiron’s concept of dominant science, which they introduce in their book *Pollution Is Colonialism*.⁴² Liboiron points out that dominant science is defined as science that “becomes dominant to the point that other ways of knowing, doing, and being are deemed illegitimate or are erased.” While much of Western science dominates, to conflate the two misses there are some Western sciences that are not dominant, some that have been overpowered by other Western sciences, and some that Western scientists question regarding what has been and is dominant. The term “dominant science” is useful in the ways it allows us to notice when one melody overwhelms and invites us to ask what ways of knowing we might uncover if we listen closely.

I JUST WANT TO DO MY SCIENCE

If it sounds like I’m getting political in this introduction, it’s because I am. Science is performed by humans who live in society.⁴³ Medicine is administered by humans who have their own histories. I don’t want to be talking about this stuff; I want to be nerding out on mechanisms of menstrual repair. I don’t want to be Googling which states have trigger laws; I want to look at estradiol curves. I promise that this book is full

of science. It's also full of the history and systems at play that complicate the ability of menstruating people to get good information about their own bodies, ask their own questions, and be the ones setting the research agenda. This is tricky terrain because, in addition to the ways in which information has been withheld in the medical realm, in the political realm we see people who could use accurate information about uteruses to inform policy, and they choose not to, and that's kind of the point.

In the first few chapters, I will be taking on the why and how of menstruation. I will spend time on the concept of the menstrual taboo, how variably different cultures theorize about menstruation, how these things together led us to our twentieth-century view of periods as useless . . . and what a twenty-first-century reckoning does to modernize our understanding. I will look at the history of normality in science and medicine and show how the desire to conceive of normal, healthy people narrowly has influenced our understanding of the menstrual cycle. I'll cover ovarian hormones, feedback loops, and the endometrium, but I promise I'm a good guide. I'll share the latest research out of our lab revealing that the "normal menstrual cycle" does not represent the majority of individuals and what we are doing to show medicine how to better characterize variation.

Next are three chapters that look at the sorts of environmental factors that explain the majority of variation in menstrual cycles. Chapter 3 starts with the story of the limited energy theory, the hypothesis put forward toward the end of the nineteenth century that too much of any activity will detract from a white woman's ability to reproduce (especially mental activity, like the vulgar desires to go to college or vote). I also take on energetics: how much we eat and how much we move around, as well as how some of our misconceptions around food and body size lead to major misunderstandings around menstrual cycles and some of their pathologies, like polycystic ovary syndrome.

Chapter 4 covers immune challenges. I look at how inflammation can get in the way of signaling in the uterus and what that means for menstrual cycles. I also spend a lot of time on two phenomena close to my heart. The first is the concept of *menstrual hygiene management*, MHM for short, a public health intervention often intended to address period

poverty issues among menstruating people in the Global South. One of the rationales behind MHM is that many methods menstruating people are forced to use to make their menstrual blood invisible to others increase infection risk. But is the menstrual blood (and associated rags, straw, or newspaper) what is dirty here? Next, I'll discuss a project that recently took over our lives. Our project highlighting the heavy and breakthrough bleeding experienced by many after receiving a SARS-CoV-2 vaccine has ended up taking on issues of vaccine hesitancy, medical mistrust . . . and how vaccine trials were not designed to look at menstruation.

Chapter 5 covers the final major category of environmental factors that can affect menstrual cycles. Psychosocial stressors have an interesting place in the history of medicine: we have bouts of hysteria, nerves; we are tossed to and fro by our premenstrual phases. At the same time, I have met a lot of resistance over the years in my field when anyone tries to contend that psychosocial stressors may influence menstrual cycles. It's as though menstruating people (especially those who are women or feminine of center) are intensely susceptible to stress, yet it stays in our heads and is unlikely to become embodied in any meaningful way. I do not buy it.

Finally, in chapter 6 I take on the future of periods. Should we just suppress our periods indefinitely? Work toward a more accommodating culture for menstruating people? Science and technology studies and anthropology have had a little to say about this over the years—and I imagine you have your own thoughts about this too. How much of the hassle of periods is because they are a hassle, and how much is because the structures that underlie family, home, work, and being out in the world make them a hassle? What if it's okay to hate periods, okay to like them, okay to be largely ambivalent about them? A feminist future is going to have to make room for all of these perspectives, and an intersectional feminist future needs to grapple with not only what all of this has to do with gender but what it has to do with race, colonialism, class, heterosexism, and more. What does it look like for menstruating and nonmenstruating people to be in community with one another, to recognize the interdependence of all people and begin to take some responsibility for each other?

The boundaries of what is allowable in our period future—contraception, menstrual suppression, abortion, prenatal and postnatal care, medical treatments, and more—are constrained by what is known and who does the talking. Since the same constituencies telling us what we can do with our uteruses are the same as those who have dictated what we know about them, we have a bit of a problem. But now you have this book. With what we know, what different futures might we imagine, and how might that fuel our efforts at societal transformation?

In *Hope in the Dark: Untold Histories, Wild Possibilities*, Rebecca Solnit writes that “to hope is to give yourself to the future, and that commitment to the future makes the present inhabitable.” Hope has to be active to help us imagine and work for a better future. So I look ahead to the rest of the book with hope, in that activist sense of the term. My scholarly training happened not only in the classroom, the lab, and the field but at civil disobedience trainings and on picket lines. Some of my best teachers in graduate school were my fellow labor organizers because I learned that you have to get up quick after failure and get ready for the next battle. Being a part of the fight was what made the present inhabitable for me. And to me, this book is part of the fight for choice, for health care, for reproductive justice.

I hope that you will read this book with the eagerness with which I wrote it, that you will gobble up my descriptions of what uteruses can do, that you will revel in this organ’s agency and adaptability, and that you will at a minimum develop a grudging respect for menstruation and the mechanisms of menstrual repair. I hope you will see how inextricable the connections between power, gender, and race are when it comes to exposing menstrual misconceptions. The purpose of this book is not to fill a knowledge gap so much as to show you what is possible; to give hope, to act on hope, that what our bodies produce and excrete and transform matters and that to care for our material body is a radical act. I want these words to provide fertile ground for new ideas of what a world could look like where we demand and fight for our bodily autonomy and imagine radical futures.

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