## Chapter 11: Both/neither

Until very recently, every state in the US listed only “male” or “female” on birth certificates, allowing (or compelling) parents to always have an unambiguous answer to that inevitable first question, “Boy or girl?” In 2012, Ohio became the first state to formally recognize intersexuality on a birth certificate, and New York followed suit in 2016,[[1]](#footnote-21) but this kind of official recognition remains extremely rare.

This is hard to square with the actual incidence of intersexuality in the population, which the survey suggests is well above 1%. This figure is consistent with the medical literature, though the range of percentages is very broad due to varying definitions, much as with ambidexterity. For comparison, the graph below also shows the number of people who answered “yes” to both or neither of “Do you have a vagina?” and “Do you have a penis?”; while there are a variety of potential reasons for *that* excluded middle (and it’s a population that doesn’t fully overlap the intersex population), it’s noteworthy that the curves look quite similar. In particular, they both rise from 0% at the youngest end of the age range, for reasons that will soon become clear.

There’s much more to intersexuality than ambiguous genitals, but they’re a good place to start, since for many thousands of years the “Boy or girl?” question has been answered within seconds, by visual inspection at birth. This is still how sex is determined for the overwhelming majority of babies, and that determination goes on to influence nearly every aspect of that child’s upbringing and place in the world.

These days, we can all look at fully sex-differentiated adult genitals on display, in unlimited quantity and resolution, on the internet. In fact, online, the differentiation tends to be extreme, featuring unusually large breasts and penises. Armed only with this kind of visual evidence, it’s not immediately obvious what “somewhere in between at birth” might look like. Of course there’s lots of porn featuring trans people too, who may have any combination of vulvas, penises, testicles, and breasts. But these bodies don’t shed much light on intersexuality either; in fact their penises and breasts, when present, also tend to be highly developed. We’ll explore trans identity more deeply in the next chapter, but for now, suffice it to say that most visibly trans bodies we see in porn are made possible by modern medicine, including hormone treatments and often surgery, not to mention lots of time in the gym and the salon. (In fact the same might be said of *most* bodies featured in porn.) Intersexuality, though, is both more common than the body types we generally see in porn and also, paradoxically, more obscure. Yet intersexuality has been a part of life not only for us, but for every species that reproduces sexually, going back hundreds of millions of years.

As embryos, we don’t begin with strongly differentiated genitals, but with primordial structures that can over time develop either way. The ovaries or testicles (or, when ambiguous, “ovotestes”) start off as a pair of small organs within the abdomen. In female differentiation, a pair of internal structures called the Müllerian ducts develop into the uterus, fallopian tubes, and upper part of the vagina, while in male differentiation they disappear, so that these organs don’t develop— though for those with “persistent Müllerian duct syndrome” (PMDS), this can fail to happen, resulting in men with uteruses. PMDS is considered a rare disorder, with only 250 cases documented in the medical literature, but the reality is that we have little sense of how common it is, since the uterus is an internal organ and will only be noticed during medical imaging or surgery.[[2]](#footnote-23) We know that PMDS can cause infertility, undescended testes (meaning testicles that remain in the abdomen), and increased risk of eventual cancer in the uterine or testicular tissue, all of which can motivate imaging and surgery. But an unknown number of cases— and, for all we know, it could be a great majority— don’t lead to these problems, hence may never be discovered.

When a variation in fetal development affects the *external* genitals, it’s harder not to notice. The visible part of the clitoris and the head of the penis are the same structure, but during male development, the inner labia fuse to create the bottom surface of the penis, the outer labia fuse to form the scrotum, and the testes descend into the scrotum. If some of these steps happen but others don’t, or some steps happen halfway, the resulting genitals are visibly ambiguous at birth. A few different diagnostic tools have been developed over the years to help doctors grade these in-between cases, such as the “Prader scale” and the “Quigley scale.” The latter is shown below.

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When pediatric endocrinologist Charmian Quigley and colleagues introduced this scale in 1995,[[3]](#footnote-25) they explained that “Grades are numbered l-7 in order of increasing severity (more defective masculinization)”; grade 1 is “normal masculinization in utero,” grade 2 is a “male phenotype with mild defect in masculinization,” grade 4 is “severe genital ambiguity,” and so on. The language here suggests a value judgment, with the fully differentiated penis as the gold standard and anything else lesser and defective. Is a clitoris really nothing more than a defective and underdeveloped penis?

Before rushing to our own judgment, though, we should note that the biases at play here are more complex than they first appear. This 1995 paper focuses on one particular set of genetic routes to intersexuality, the Androgen Insensitivity Syndromes (AIS). These involve mutations that cause the body to respond less or not at all to androgens, the key virilizing (meaning, “masculinizing”) hormones during development, and insofar as we consider this a medical condition (an analogue would be diabetes caused by insensitivity to insulin, also a hormone), words like “defect” and “severity” make more sense— though of course they imply teleology. People with AIS are in fact genetically male, with XY chromosomes. The real biases in play in this paper and many others like it are not so much about the superiority of the penis, as about the following assumptions:

1. sex is inherently binary,
2. intersexuality is a medical disorder, meaning
3. it should be diagnosed and treated by doctors, and finally
4. a person’s genes are the ground truth telling us whether they’re “really” men or women.[[4]](#footnote-26)

These assumptions are widely held by laypeople too, and reflect the way modern medicine and genetics have influenced popular mental models. The belief that sex and gender are binary (and equivalent), is of course consistent with many longstanding religious traditions; as a pious 35 year old woman from Opelika, Alabama put it,

God is the supreme Ruler and Creator of this world. He gets to make the rules, not us. His order of creation was to form male and female. I’m female. That’s really all there is to it. People are trying to come up with their own “rules” regarding sexuality, and it’s just not our place to do that. Our Holy God is the Sovereign Lord, not us. We get to do things His way, not ours.

Nettie Stevens and Edmund Beecher Wilson independently discovered the XX (female) and XY (male) sex chromosomes in 1905, putting this religious conviction in binariness on a seemingly rational scientific footing. “I’m a male because I have XY chromosomes, and nothing can change that. There are only 2 genders,” per a 36 year old from Brighton, Colorado. “XX or XY, that’s all there is. The rest is BS,” agrees a 43 year old man from Dallas, Texas. The fact that genes are inherently discrete or “digital” is a good fit with human language, which also deals in discrete identity categories like “man” and “woman.” Further, genes are instructions you’re born with, a bit like an inner Bible inscribed in each of your body’s cells; choices, malfunctions, and obfuscations might happen afterward, but your God-given DNA must, so the thinking goes, be ground truth. Per a 36 year old man from Kissimmee, Florida,

While I do not support any discrimination against LGBT or any other life choice people make, and respect any identity someone decides to claim as their own, the fact is that gender is not a social construct. There is a huge amount of variety to human beings, but “male” and “female” are scientific designations that involve the number of chromosomes one has, and someone’s biological origin cannot be changed. Leave people to do as they wish as long as it is not hurting anyone, but at the same time, don’t ignore science and common sense.

So, does DNA always tell us whether someone is a man or a woman? Firstly, there are viable chromosomal variations that aren’t XX or XY, including XXX, XXY, and XYY, X0 (only an X chromosome), and rarer combinations like XXXY, XXYY, XXXY, and so on. Many people with these variations have intersex characteristics. But this is just the tip of the iceberg.

I found a curious short comment among the survey responses from a 61 year old man: “chromosomal mix, xx and xy. fusing of fraternal twin eggs.” This remarkable phenomenon is called *chimerism*, after the chimera of Greek mythology, an imaginary creature composed of the parts of other animals (traditionally, a lion’s head, a goat’s body, and a serpent’s tail). The survey respondent was originally a pair of twins in the womb, each a different egg fertilized by a different sperm cell, which fused early in development to form a single fetus. In such cases, there’s a 50% chance that the fused fraternal twins won’t be the same sex, as happened here. In adulthood, each of his body’s cells has a lineage tracing back to one or the other embryo, so genetically, his body is a mosaic of male and female cells! How those cells are distributed throughout the body depends on the timing and details of the fusion.

Chimerism is possible for any multicellular organism, including plants. Many calico or tortoiseshell cats are chimeras. So-called gynandromorphs, half female and half male, are especially striking in animals that are more sharply *sexually dimorphic* than we are— that is, where the sexes differ dramatically in size or coloration, as with peacocks and pea hens, or certain butterflies.

Like PMDS, chimerism in humans is considered very rare; there are only about a hundred documented cases.[[5]](#footnote-27) Singer-songwriter Taylor Muhl is one. She has taken selfies showing the striking change in coloration between the left and right sides of her abdomen, revealing the different genetic origins of those cells.

If chimerism in humans were really so rare, it would be remarkable luck for one of these near-mythical people to have not only answered the gender survey, but to also have thought to write about it in the comment field. But in fact, there’s a *second* such respondent. She’s a 26 year old woman from Stafford, Texas, who wrote,

FAAB,[[6]](#footnote-29) woman in gender, born with chimeric teste in place of right ovary. I like to joke I ate my twin brother in the womb. I’ve named this prototeste Conrad the Gonad.

It’s hard not to conclude that the real rate of human chimerism must be far higher than those 100 documented cases suggest, especially since, again like PMDS, the great majority of chimeric people are unlikely ever to find out that they’re chimeric. We can’t pin down a real frequency with the scant data we have, but I’d guess that 1 in 1,000 is a better order of magnitude estimate than the “almost never” one would naïvely get by comparing the 100 documented cases to the world population. All of which is to say that even if we were to assume that genes are the ground truth for sex— and there’s good reason to doubt this— there are many more chromosomally ambiguous cases than one would think, because quite a few people are walking around with some combination of genetically male and female cells making up their bodies.

As we’ve already seen, intersexuality poses an even more fundamental problem for the idea of sex being binary in the first place, or being determined by chromosomes. The biological and social machinery of sex and gender differentiation is just so complex, and has so many moving parts and feedback loops, all of which can vary from person to person to produce different results. For instance, everybody with an Androgen Insensitivity Syndrome is genetically male, including people with complete insensitivity (grade 7 on the Quigley scale), most of whom are— by their account and pretty much everyone else’s— obviously women. Their bodies look female at birth, they are raised as girls and grow into women, and indeed many will never learn that they don’t have uteruses or a second copy of the X chromosome in their cells. Those discoveries typically only take place if they decide to have children, try for a while, and ultimately go to a fertility clinic to understand why they aren’t conceiving. (Note, also, that this implies actually *wanting* children, knowing this is an option, and either living in a country with socialized medicine or belonging to the kind of upper middle class milieu where visiting the fertility clinic is a done thing.)

At the clinic, they will learn that they’re sterile. Of course this won’t suddenly render them “not women,” any more than a hysterectomy or any other cause of sterility would. But they will also now know that they’re intersex. Doctor’s visits like these are almost certainly the reason we see the rate of response to “Are you intersex?” rise from zero to a high water mark during the years between 18 and thirty-something.

There’s every reason to believe that, insofar as we can talk about a “real” rate of intersexuality, it’s even higher than the survey’s numbers suggest. A 24 year old woman from Monroe, Louisiana wrote, for instance, “Sometimes I wonder if I’m genderfluid or intersex, but I’m not confident enough in the former and have never been tested for the latter.” A 25 year woman old from Bella Vista, Arkansas wrote in more detail about her experience, which is far from uncommon:

I don’t consider myself trans-anything, but I’ve always been fairly ‘masculine’ in my attitude, interests, desires and the way I express emotions (though I do have a feminine side). I suspect I have hormone problems, which gave me facial hair and makes me feel very unattractive as a female. I think I’d probably make a better guy because then maybe people wouldn’t notice the hair, but I don’t really ‘want’ to be a guy. I just don’t want to be an anomaly.

The fact that almost nobody grows up knowing they’re intersex, but some may then find out they are in a doctor’s office later in life, goes some way toward explaining the continuing invisibility of intersexuality. Since it’s widely understood as a medical diagnosis, it tends to fall under the veil of privacy we reserve for medical matters. It’s not anyone else’s business. Intersex people may seek out support groups, but they’re unlikely to “come out” to friends, family, or colleagues, let alone adopt intersexuality as an identity, especially if (as is often the case) they feel themselves to be men or women, and are thought of that way by everyone else too. In some cases, that feeling is unambiguous. In other cases, it isn’t, but there’s often a desire to “pass.” As a 23 year old man from Port Huron, Michigan wrote, “intersex people don’t want recognition, it puts a huge target on us for abuse.” An unfortunate side effect of this secrecy, though, is that it perpetuates the stigma of being intersex, as well as the mistaken belief on the part of most people that intersexuality is vanishingly rare. At somewhere between 1 and 2%, being intersex is actually about as common as having red hair. It’s almost certain that you know intersex people. However, it’s also very likely that you don’t *know* you know them.

It seems reasonable to suppose that intersexuality is a clearly defined lifelong condition, and that it crops up at some fixed rate— some number of births out of every thousand. These are widely held assumptions, but we should hold them only tentatively. Definitions may be too slippery for any single number to be the right one. Also, there’s mounting evidence that environmental factors may be altering the odds over time. It has been found, for example, that estrogen-mimicking compounds in wastewater have been both changing the sex ratio and increasing the numbers of feminized intersex frogs in suburban neighborhood ponds.[[7]](#footnote-30) Something like that may be happening to us too. It’s one of many ways our reshaping of the environment seems to be coming back around to reshape *us* in a feedback loop of unintended consequences. We’ll return to this question. For now, though, if we assume that people of all ages have an equal probability of being intersex, the implication is that the large variability in responses to “Are you intersex?” we see by age is a function of how many people *know* they’re intersex, as opposed to how many of them actually *are*.

The real number of intersex people is then at least as high as the peak of this curve, around 1.5%. (Presumably it’s higher still, since there’s no reason to believe that 100% of intersex 32 year olds find out that they are.) You might suppose older would mean wiser, but by age 65, only about half as many people seem to know as at age 32. Why does the number of people who know they’re intersex *drop* in the older population? This is most likely linked to evolving attitudes and practices regarding intersex births; these changes may also have far-reaching implications. To understand them, we need to go back once again to the 19th century.

Well before the genetic basis of sex was understood, in 1883, U.S. Army Surgeon General William Hammond wrote a book called *Sexual Impotence in the Male*. In case the title wasn’t clear enough, he noted in the preface that the book “relates solely to sexual impotence as it exists in the male,” adding that he might later enlarge it to “include the subject of sterility, and to consider both these affections [meaning disorders] as they occur in men and women.” But in describing congenital presentations of the genitals that could result in “sexual impotence in the male,” he covers a number of cases we now understand to be intersex. Quigley’s grades 2 through 4, for example, are described by Hammond as “hypospadias” and “suture of the penis.” He also describes the absence of testicles, or undescended testicles, and a tendency in some such cases to assume “in many respects the mental and physical attributes of the female sex.” What’s interesting about this kind of characterization is the way, like the Quigley scale, it views nearly every part of the excluded middle as a defective kind of masculinity— just as Quigley would in the next century. While some of the cases Hammond described were probably people with XY chromosomes and an Androgen Insensitivity Syndrome, others were likely people with XX chromosomes and a different set of genetic variations leading to virilizing effects, such as Congenital Adrenal Hyperplasia (CAH)— which is also considered rare but, as with the other conditions we’ve discussed, is likely underreported. Perhaps in the near future some national health system will begin doing full genetic sequencing of all newborns; only then (chimerism aside) will we really know.

In any event, when an (almost invariably male) doctor in the late 19th or early 20th century delivered a baby with genitals that looked like a Quigley 2 or 3, the verdict was invariably “it’s a boy,” with the caveat that surgical intervention might be needed to render the baby more “normal looking,” not unlike a cleft lip or palate. This “hypospadias surgery” might be quite minor, little more than a bit of sewing up of what would become the lower surface of the penis.

Throughout the 20th century, surgery became increasingly sophisticated and doctors came to better understand the role of hormones in sex differentiation. It became possible, also, to administer hormone therapies, to either virilize or feminize babies and children. This made it increasingly straightforward to treat many intersex births as boys whose penises simply needed a bit of surgical and hormonal “help” to develop “properly.” It was an age of… medical cockiness.

For intersex babies on the far right end of the Quigley scale, though— regardless of chromosomes or other factors— no matter how hard the doctors squinted, they couldn’t see a penis. Instead they saw an oversized clitoris, or “cliteromegaly.” And as a 1963 article on intersexuality explains, “In border-line cases with hypertrophy of the clitoris, *amputation* of the clitoris may be necessary for cosmetic reasons.”[[8]](#footnote-31) So, a century after Acton’s enthusiastic endorsement of surgical removal of the clitoris to deny women pleasure, doctors were still keen on cutting off clitorises— but now just for appearance’s sake.

I think it’s telling that once it was decided a baby was female, for the genitals to look “normal” at a glance was valued above any sexual pleasure they might provide.[[9]](#footnote-32) One can’t help wondering whether the conclusion would have been the same if something similar were needed to conform to “normal” male appearance? For girls, removal of the clitoris might be a necessary sacrifice, but for boys, as we’ll soon see, removal of the penis was an unthinkable tragedy.[[10]](#footnote-33)

In cases of so-called testicular feminization (which we’d now refer to as Androgen Insensitivity Syndrome), the 1963 article goes on to recommend that children be

[…] brought up as females in spite of their male gonads and chromosomal sex. They should never be told they have testes, or that they are hermaphrodites, but we always do explain to them that they are sterile, and will remain so, and that they will never menstruate. Usually they accept this knowledge very well. Most married women either adopt children or take part in extra-household activities which they often pursue with great success because of their above average intelligence.

The throwaway comment about “above average intelligence” is based on the notion that the XY chromosomes would, despite outward appearances of femininity, result in a more “male,” hence more intelligent, brain![[11]](#footnote-34) Setting this eyebrow-raiser aside, the article’s advice to doctors sheds further light on why young people who are intersex almost never know they are. Standard practice for doctors delivering an intersex birth was to either “sew them up” and give them virilizing hormones, or amputate and administer feminizing hormones— with a bias toward the former.[[12]](#footnote-35) This was all done as young as possible, in order to avoid presenting the child with any externally obvious sex ambiguity growing up.

The results could be devastating. In the 1990s, sex activist Annie Sprinkle wrote,[[13]](#footnote-36)

In my last workshop, we had a woman who was born with hermaphroditic genitals. At one and a half years old, the surgeons mutilated her. They removed her penis, which was really an enlarged clitoris, and her inner labia. Now she has horrible vaginal and psychological pain, and has never experienced orgasm. […] She’s very angry about having been mutilated, so now she’s organizing other people like herself through a newsletter. Unfortunately, this is very common, but rarely addressed. People who are not stereotypically male or female suffer so much.

Ironically, these practices were based on an idea that seemed very progressive in the postwar period: that gender was not innate or biologically predetermined, but was rather an emergent phenomenon, constructed socially and psychologically.

1. [Link](https://www.cnn.com/2016/12/30/health/intersex-birth-certificate/index.html). [↑](#footnote-ref-21)
2. [Link](https://rarediseases.info.nih.gov/diseases/8435/persistent-mullerian-duct-syndrome). [↑](#footnote-ref-23)
3. Quigley, Charmian A., et al. *Androgen receptor defects: historical, clinical, and molecular perspectives*. Endocrine reviews 16.3 (1995): 271-321. [↑](#footnote-ref-25)
4. Especially in his later work, Quigley himself expressed a more nuanced take, e.g. in Liao, Lih-Mei, et al. *Determinant factors of gender identity: a commentary*. Journal of pediatric urology 8.6 (2012): 597-601. [↑](#footnote-ref-26)
5. [Link](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1808039/). Wolinsky, Howard. *A mythical beast: increased attention highlights the hidden wonders of chimeras*. EMBO reports 8.3 (2007): 212-214. [↑](#footnote-ref-27)
6. This stands for Female Assigned At Birth. [↑](#footnote-ref-29)
7. Lambert, Max R., et al. *Suburbanization, estrogen contamination, and sex ratio in wild amphibian populations*. Proceedings of the National Academy of Sciences 112.38 (2015): 11881-11886. [↑](#footnote-ref-30)
8. Hauser, G.A., Testicular Feminization. In: *Intersexuality*. London and New York: 1963, Academic Press. p. 273. [↑](#footnote-ref-31)
9. John Money, soon to be introduced, argued for “no evidence of a deleterious effect [on erotic sensation] of clitoridectomy” (Venuses Penuses, p. 144), based on the reported experiences of a dozen women with CAH who underwent the procedure at an older age and consensually. There are, however, some obvious reasons to treat this assertion with more than a grain of salt. [↑](#footnote-ref-32)
10. Similarly, John Harvey Kellogg might have gotten away with cutting off the foreskins of boys who were caught masturbating one too many times, but he certainly couldn’t have gotten away with cutting off whole thing. [↑](#footnote-ref-33)
11. A couple of contemporary studies attempted to prove this rather dubious assertion, but they wouldn’t pass muster by any modern evidentiary standard. We pick this thread up in Chapter 14. [↑](#footnote-ref-34)
12. [[REF]] UN hypospadias stats [↑](#footnote-ref-35)
13. Voices From the Edge, 1995. [↑](#footnote-ref-36)