CHAPTER ONE
THE QUEST TO CONCEIVE

“Give me sons,” cried Rachel to Jacob. “Give me sons or I shall die.”

Genesis, 30:1

For most people, the production of babies is one of the simplest tasks around. It happens quite easily, often by accident, and only requires, as political scientist Melissa Williams is fond of remarking, “things lying around the house.” There are no messy market interventions to worry about; no technical requirements, not even much practice. Baby-making, after all, is the oldest production known to mankind; a process that is programmed into the biological fiber of our being and defines our very survival.

For a significant minority of would-be producers, however, the mechanics of baby-making break down. These would-be producers want children – they crave children – but can not produce them on their own. Over time, they form the ranks of the infertile, a group that includes roughly fifteen percent of women and ten to fifteen percent of men.¹ According to the most recent U.S. data, 17% of all married women suffered in 2002 from either infertility or impaired fecundity.² Medically, the members of this group may have little in common. Some will have been rendered infertile by ostensibly unrelated illnesses – a woman may have had cancer treatments, for example, that involved the removal of her ovaries; a man may have suffered exposure to chemical toxins. Others will have genetic problems with their reproductive systems, or randomly-appearing maladies. Some men will suffer from low sperm counts or impaired sperm mobility. Some women will be allergic to their husbands’ sperm or simply too old to produce viable eggs. And some infertile couples will have no discernible medical problem


² Technically, infertility is defined as applying to married couples who are not using contraception and have not become pregnant in the course of 12 months or more of regular intercourse. Impaired fecundity, which includes all women regardless of marital status, encompasses a broader range of medical issues. For definitions, see Elizabeth Hervey Stephen and Anjani Chandra, “Use of Fertility Services in the United States: 1995,” Family Planning Perspectives, vol. 32, no. 3 (May-June 2000), pp. 132-137. For more recent data, see Anjani Chandra and Elizabeth Hervey Stephen, “Infertility and Medical Care for Infertility: Trends and Differentials in National Self-Reported Data,” Presentation at NIH Conference on Health Disparities and Infertility, March 10-11, 2005. Conveyed directly to author.
at all. What joins this disparate community, therefore, is only their shared inability. They want to
bear children. And they cannot.

At the start of the 21st century, one might be tempted to regard infertility as a relatively
minor problem. Infertile people, after all, do not suffer from any life-threatening illness. They
can pursue adoption, if they like, or simply enjoy the company of other people’s children. They
do not have to bear the financial costs of raising a child, or the emotional strain of emergency
room visits, temper tantrums and adolescence. It doesn’t sound all that bad, especially if one
notes that birth rates have plummeted across the industrialized world and that even fertile
couples are increasingly choosing to remain childless.3

To those who suffer from it, however, infertility is a wretched curse – a disease that isn’t
really a disease, with an outcome that seems to defy nature. Some resign themselves to their fate;
others adopt. But many infertile couples become consumed with the desire to conceive, willing
to do whatever it takes to create a child of their own. For most of these would-be parents, the
economic value of their desire – the price of a child, in other words – is literally inestimable.

At a personal level, of course, such unmet demand is simply tragic: millions of people are
fervently seeking to purchase what everyone around them gets for free. At a commercial level,
however, it is exceedingly attractive. For who wouldn’t want to sell in a market of millions, each
of whom is desperate to buy? In 2004, more than a million Americans underwent some form of
fertility treatment, participating in what had become a nearly $3 billion industry.

Table 1-1: The U.S. Market for Fertility Treatment, 2004

<table>
<thead>
<tr>
<th>Product or Service</th>
<th>Revenue (millions of US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>In vitro fertilization</td>
<td>1,038,528</td>
</tr>
<tr>
<td>Fertility drugs</td>
<td>1,331,860</td>
</tr>
<tr>
<td>Diagnostic tests</td>
<td>374,900</td>
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<tr>
<td>Donor eggs</td>
<td>37,773</td>
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<tr>
<td>Surrogate carriers</td>
<td>27,400</td>
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<tr>
<td>Donor sperm</td>
<td>74,380</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,884,841</strong></td>
</tr>
</tbody>
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Sources: Author’s calculations, based on data provided by the American Society for Reproductive Medicine, the Centers for Disease Control, Business Communications Company, and individual providers. Figures for IVF are for 2002. Revenues from PGD were not included.

As a commercial enterprise, though, the fertility business remains rather odd. On the one hand, it is undeniably a business: fertility clinics earn profits, advertise their wares, and compete, albeit subtly, on the quality and reliability of their services. They boost cadres of technologists who push the boundaries of production and sit amidst clusters of related providers: sperm banks, testing facilities, hormone producers, and the like. On the other hand, though, the entire apparatus of this for-profit structure is devoted to producing a distinctly non-commercial outcome: a child. And thus fertility providers tend to shy away from the hard-core aspects of their trade. They don’t reveal their financial rewards that openly. They don’t revel in their sales figures or compensation schemes. Many providers, moreover, maintain an uneasy balance between the worlds of compassion and commerce: they are making money, yes, but also creating lives. This ambivalence, a trademark of the baby business more generally, is particularly evident in the fertility field, where the demand for conception essentially knows no bounds.

In most other industries, supply, demand and price are locked into their familiar and predictable embrace. A high level of demand for any good or service drives up its price and induces other suppliers to enter the trade. An expanded supply then pushes prices downward, restoring some sort of equilibrium to the market. So long as suppliers can enter freely, the market thus works to dampen prices, preventing them – in most cases at least – from soaring too high. In the fertility trade, by contrast, supply is limited by the level of expertise involved and demand doesn’t function as it does in other markets. When people are buying bananas, for instance, there is a price beyond which they simply will not go. Ten cents a banana is okay; fifteen cents still permissible. But if banana prices were to rise to $5 a bunch, most customers simply wouldn’t buy. Likewise, if Nike were to raise the price of even its most popular basketball shoe way above what adidas or Reebok were offering, customers would eventually turn to the competition. And so long as Nike is aware of this fact, it – and nearly every other corporation – will be careful not to raise prices too quickly or too high. What drives this downward pressure, of course, is the combination of competition and substitution: the ability of customers to choose Reebok over Nike, or apples in place of bananas. Even those products that seem irreplaceable generally have substitutes at some price level. If housing prices are too high, for example, people will rent. If gasoline rises beyond some (admittedly high) level, people will eventually opt for smaller cars, or learn to take the train. Where fertility is concerned, however, demand knows no limit. If parents want “their” children – children made with their blood, their genes – then the possibility of substitution disappears. They don’t want to adopt; they don’t want to babysit; they don’t want to make do. Instead, they want what to them is irreplaceable, and they will frequently pay whatever they can. They will mortgage their houses, sell their cars, deplete
the family savings. In some cases, of course, the funds run out well before a child is conceived. In others, insurance steps into the breach, or potential clients step out, realizing that they don’t have the money to buy. But when people can pay for fertility services, they generally do. Over and over and over again.

To be sure, there are other markets that resemble the fertility trade. The healthcare industry, for example, is full of insatiable demand and inestimable costs. What is the value of a kidney to a patient without one? Or of chemotherapy to a child suffering from leukemia? We simply can not price these goods, and cringe at the thought of subjecting them to the market. As a result, governments across the developed world have yanked healthcare from the roughest edges of the market, either thrusting it fully into the public realm or erecting concrete regulatory boundaries. We prohibit, in nearly all countries, the sale of kidneys. We regulate the provision of chemotherapy and shield patients from the full cost of their treatment. Yet in the world of reproduction, government’s response has been mixed. In some countries – England, Australia, and Israel, for example – state authorities have treated infertility as a somewhat troubled offshoot of medicine. They cover the costs of infertility treatments, but only under strictly defined conditions and in accordance with carefully specified guidelines. The private provision of fertility services – the fertility market, in other words – is sharply constrained. Other countries prohibit much wider swathes of treatment, preventing either public or private clinics from applying science to the reproductive process. In the United States, however, both regulatory and legislative authorities have largely ignored the market for reproductive services. There are very few restrictions on fertility treatments and little regulation of providers. Instead, the market for fertility in the United States is vibrant, competitive, and expanding in the absence of any kind of formal controls. Because the United States is such a large and technically-advanced market, moreover, it serves as a magnet for infertile couples around the world. Would-be parents from Japan, for example, can travel to Virginia and pay for the donor eggs or gender selection techniques that are unavailable at home. Gay or lesbian couples from England can hire American surrogates, buy American eggs, and produce their children in a customer-friendly California clinic. Price in these cases is rarely an issue and supply slips unnoticed across international lines.

The quest to conceive, therefore, is more than a personal prayer or a biological drive. It is a global industry that is quietly growing; a business that thrives on technology and refuses to acknowledge its market roots. It is an industry that sells salvation of the most primal sort, yet exists in a white-robed cloister of vials and drugs and probes. And it is an industry, most notably, that thrives on people’s excruciating desire to buy – to find someone, somehow, who will give them children before, like Rachel, they die.
Genesis: The Historical Treatment of Infertility

It seems appropriate that one of the first ancient references to infertility occurs in Genesis, and amongst the founding families of Western theology. Jacob’s wife, like many of her Biblical peers, was unable to bear a child. After praying to God and begging her husband, she resorted in the end to a method common in her day, sending Jacob “unto” her maid and then adopting the resulting child as her own. Sarah did likewise, sending Abraham to her maid, Hagar, so that “I shall obtain children by her.”

Such explicit and persistent stories bear witness to infertility’s long history. For eons, societies have worshipped procreation – they have revered and been awed by the power to reproduce. One of the oldest vestiges of worship, in fact, is the fertility goddess, a symbol that crossed cultures and continents in the ancient world. Depicted usually as a pregnant (or at least particularly robust) female, the fertility goddess played a central role in worship ceremonies. Paleolithic tribes arranged cowrie shells in the shape of a female “portal,” the Romans lit torches and built fires to honor Diana, the Goddess of Fertility; the Scandinavians revered Freyja, daughter of the sea god who controlled life and death. In all cases, their prayers before these gods were largely the same: for children, for reproduction, for life. When women bore children in these societies, therefore, they were perceived as following the ways of both God and nature. And when their wombs were barren, life had gone astray.

Accordingly, the ancient world looked harshly on women like Rachel. Because fertility remained so closely tied to womanhood, childless women were regarded with a mixture of pity and scorn. The Bible paints childless women as tragic and incomplete; ancient Egyptians likewise described them as “mothers of the missing ones.” Frequently, infertile or “barren” wives were compared with their agricultural equivalents: a “field without crops,” according to many depictions, or a “tree without leaves.” Unlike trees or fields, however, childless women were also typically held responsible for their fate. Because ancient societies did not know how to

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4 The results of this particular relationship, though, were less than ideal. When Sarah miraculously gave birth at the age of ninety, Hagar was exiled to the desert along with her son, Ishmael.
explain either conception or childlessness, they interpreted infertility as either an act of God or a sign of sin. According to this logic, women like Rachel were childless because they deserved it in some way; because God had determined that they were unworthy of conception. And men who were married to unworthy women were free, in many cultures, to kill or abandon them. In ancient India, a husband could tie up his childless wife and burn her. In China, the childless wife was not permitted to die at home. Elsewhere – in pockets of Greece and Turkey and Bali, depending on the mood of the time and creed of the ruler – sterile women were forced to commit suicide, “disgraced, hated, and maltreated” by societies that equated childlessness with godlessness.

By the fifteenth century, several new theories had emerged to explain this unnatural state. One was that childlessness could be the work of witches as well as God; that it could be imposed upon innocent couples by living, evil forces. Particularly in western Europe, where witch hunts raged from roughly 1435 to 1750, God-fearing Christians believed that witches – often childless women themselves – could perform “knot-tying” ceremonies at weddings, tying a magical leather cord that would subsequently render a couple incapable of producing children. Witches were also believed to interfere with reproduction more generally, and to have the power of rendering men impotent. In 1487, the central text of the witch trials, a Dominican publication entitled *Hammer of the Witches*, made this link in startlingly clear terms. Witches, it argued, “surpassed all others in wickedness.” They performed contraception and abortion, crimes against the Church, and fell frequently guilty of seven major sins. Sin number 2 was making men impotent. Number 3 was performing sterilization and castration. Presumably, such sentiment reduced the wife’s burden a bit, since the possibility of impotence at least dragged husbands into the fertility equation. But this equation still painted male infertility as distinctly unnatural – the product, ironically, of women’s ill deeds.

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10 Siegler, *Fertility in Women*, p. 5.
As the furor over witches eventually subsided, a growing rationalism groped to discover other scapegoats for barrenness. One popular theory settled on sex, or at least on too much of it or not the right sort. According to this view, the existence of childless prostitutes suggested that sex itself could lead to infertility, since “slippery” wombs might easily prevent conception.\(^\text{13}\) According to one early treatise on fertility, for instance, “common Whores have none, or very rarely any children; for the Grass seldom grows in a Path that is commonly trodden in.”\(^\text{14}\) “Whores” also engaged in contraception and abortion, practices that were condemned by prevailing authorities and believed (with some justification) to result in permanent sterility.\(^\text{15}\) Prevailing religious attitudes then completed the package: infertility befell impious women, who engaged in prostitute-like behavior and indulged in too much sex. Such women were no longer hanged or driven to suicide, but society’s scorn remained largely unchanged.

For thousands of years and millions of women, therefore, infertility remained a silent and irrevocable curse. Shamed by their condition, childless wives confessed their problem to midwives or shamans or quacks, willing to engage in whatever remedies were thrust upon them. They drank potions of mule urine and rabbit blood and doused themselves with herbs believed to induce pregnancy. They kissed trees, slid on stones, and bathed themselves in brackish water thought to resemble the blood of childbirth.\(^\text{16}\) When all else failed, they prayed, or adopted, or, like Rachel, employed another woman to bear “their” child. Mostly, though, they resigned themselves to their barren state, seeking slender solace in the belief that this was God’s will. The demand for children remained persistent and harsh, exacerbated by the lack of other options for women and the status that heirs conferred upon men. But supply was simply not forthcoming. For centuries and centuries, science could not determine precisely how babies were conceived. And it certainly could not compel that conception when nature dictated otherwise.

This unfortunate state of affairs began to shift ever so slightly in the late 17th century, as science slowly joined nature as a source of physical knowledge. In 1684, an anonymous author published *Aristotle's Master Piece*, a popular compendium that drew on both emerging science and ancient Greek theories to describe procreation as a physical blending of male and female


\(^{\text{15}}\) According to one source, it was not until the 1920s or 1930s that contraception was no longer believed to cause permanent infertility. Marsh and Ronner, *The Empty Cradle*, p. 114.

“semence,” the seeds that were purportedly released by both partners in conception.17 The 
*Master Piece* was eventually reissued in dozens of editions, followed in due course by a stream of 
“marriage manuals” that explicitly linked conception to the “mingling of seed” and pregnancy, 
for the first time, to pleasure. *The Expert Midwife* (1694) for example, cautions that, “Sterility 
happens likewise, from the Womans Disgust…; or her dullness and insensibility therein.”18 So, 
too, was the conclusion of *An Inquiry into the Causes of Sterility in Both Sexes.* “When the female is 
not capable of gratification from debility, or against inclination,” its author intoned, “she is 
scarcely or ever fruitful.”19 Although evidence for this theory was slight, a logic was nevertheless 
laid out: conception depended on the mixing of fluids, and fluids didn’t emerge without orgasm. 
What’s most interesting about this reasoning (aside from the fact that it’s wrong) is that its 
proponents, for the first time, were painting infertility not as an act of God, or sin, or malice, but 
rather as a physical condition amenable to scientific remedy.

Insofar as conception did occur, however, these 17th century manuals assumed that the 
product of this mingling was a tiny, nearly perfect human. Building on the theories of Aristotle 
and Hippocrates, they believed that babies sprung from something akin to eggs; that they lived in 
some inchoate form and simply waited for the accompanying seed that catalyzed growth. In 
1681, for example, one eminent researcher wrote that, “the egg is weak and powerless and so 
requires the energy of the semen of the male to initiate growth.”20 Others, known as 
animalculists, argued that each drop of semen contained a microscopic human, waiting only for 
the nourishment that eggs provided.21 Both schools, though, reasoned that conception was more 
akin to growth than creation. The child already existed. It simply needed its parents to mix their 
fluids in the appropriate way, producing the food or spark or spirits (depending on one’s theory)
that would allow the child to grow. In this view, infertility became a physical, almost a mechanical, problem. Childless women were not necessarily hexed any more, or evil. They just had to have the right kind of sex.

Such views persisted well into the late 19th century. They also gave rise to a small but rather lucrative treatment industry, the precursor to today’s self-help books and fertility clinics. Most of this field was comprised of marginal medical “experts,” people – mostly men – without any specialized training or knowledge. Most of them advertised their wares widely and loudly. And few of these treatments offered even the dimmest prospect of success.

One of the most ingenious of this lot was James Graham, an innovative Scotsman who built a sizeable fortune on “electrotherapy” and other “never failing prescriptions” for fertility. After practicing for some time in Philadelphia, Graham ventured back to England and won fame in 1779 for apparently curing the Duchess of Devonshire’s infertility. The grateful Duchess rewarded him well, and Graham moved to London, where he invested in a high-profile “Temple of Health.” In the Temple, men could listen to lectures on potency as they sat on chairs that emitted mild electrical shocks. Women could attend separate lectures, or indulge in Graham’s other electrical cures - the “magnetic throne,” for example, or an “electrical bath.” They could purchase Dr. Graham’s “aetherial balsam,” a concoction, he related, “of rich gum, with… ether, electricity, air, or magnetism.” Or they could purchase his Lecture on Love; or Private Advice to Married Ladies and Gentlemen. If all else failed – and the patient was extremely wealthy – recourse could be made to Graham’s “celestial bed,” a vibrating sensation that couples could rent for 500 guineas a night. According to Graham, “[the] superior ecstasy which the parties enjoy in the Celestial Bed [was] really astonishing…; the barren certainly must become fruitful when they are so powerfully agitated in the delights of love.” One could only hope. At current rates of inflation, 500 guineas is worth approximately £22,700, or about $37,500.

Other remedies were less expensive, although not necessarily any more effective. Women who suffered from “obstructions” or “female weakness” in the 18th and 19th centuries were regularly advised to get exercise, take cold baths, or confine themselves to bed. They could doctor themselves with more modern equivalents of ancient cures – herbal tonics, for example, or special teas – or buy from an ever-expanding list of commercial products. Indeed, “female” illnesses became during this period one of the most attractive targets for patent medicines –

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concoctions which had little basis in science but thrived instead on the growing use of proprietary labeling and mass-market advertisement.  

Meanwhile, medical science was slowly moving into the field of fertility. In 1672, Renier de Graaf, a physician experimenting on rabbits, had found small follicles (now called Graafian follicles) containing the animals’ ovaries, and in 1677 Anton van Leeuwenhoek identified sperm under his microscope. In 1707, a serious treatise on infertility, *De Sterilitate*, demonstrated a growing understanding of physical impediments to fertility, including ovarian sclerosis and tubal blockages. And in 1797, *An Inquiry into the Causes of Sterility* painted childlessness as a physical ailment and “the cause of as much evil in the world, as any of those diseases to which we are liable.”

It wasn’t until the 19th century, however, that changing mores and advancing medicine allowed for a more explicit link between sex and procreation and more precise advice regarding the mechanics of reproduction. Part of this shift was simply the result of advancing science: as researchers probed more closely into the human body, they began to grapple with the biology of birth; with the organs and actions and chemicals that turned “animalcules” into babies. What enabled this science, though, was not just advancing knowledge. It was also the advance of medicine into both the bedroom and the female body. Until the late 19th century, after all, “feminine” illnesses were considered so private and so personal that male doctors were loath to investigate them too closely. Reproductive ailments were particularly tricky, since prevailing wisdom still treated them as acts of God. Around the turn of the century, though, a growing band of doctors began to differentiate themselves from the healers, apothecaries and midwives who had tended to illness in the past. Part scientist, part clinician, these new doctors defined themselves as professionals, university-trained specialists who understood the body’s inner workings. Although their training in many cases was quite perfunctory (some medical schools in the 1800s required only several months of training), they explicitly differentiated themselves from less-educated practitioners, and particularly from the midwives who had long relied on


25 At the time, van Leeuwenhoek’s discovery was taken as proof that life originated in semen, and that the spermatazoa – or “animalcules,” as they were called – constituted fully formed humans.

26 P Morice et al, “History of Infertility,” *Human Reproduction Update*, vol. 1, no. 5, 1995, pp. 497-504. With the publication of *De Sterilitate*, the term “barrenness” also gave way to the more scientific “sterility.”

personal and informal training. In Europe, doctors grouped themselves into professional guilds. In the United States, they gathered into professional societies and formed the American Medical Association in 1848. Slowly, some of this group began to specialize in women’s illnesses, peering into parts of the female anatomy that for ages had been both physically and socially taboo.

Initially, this emerging cadre of experts focused on the most obvious aspects of reproduction: the position and timing of intercourse. They advised their patients to restrict themselves to the missionary position, arguing that conception that occurred with the wife on top would result in an abnormal or otherwise-deformed offspring – “Dwarfs, Cripples, Hunch-back’d, Squint ey’d, and stupid Blockheads,” according to one source. They also stressed the timing of sex, urging couples to concentrate on the wife’s most fertile moments.

Accordingly, the mid-19th century saw a small wave of texts dedicated to the science of reproduction and the treatment of infertility. In the spring of 1844, for example, a doctor named Frederick Hollick began giving lectures in New York on “woman’s diseases.” Using life-sized papier-mâché models, Hollick gave his audiences a complete tour of human anatomy, including, he boasted, “the development of the new being in the womb at every stage.” After lecturing to packed audiences along the eastern coast – “upwards of four hundred ladies… in one day!” he reported – Hollick retired to a literary career, publishing a series of illustrated advice books for women. His counsel – relatively sound, if not precise – was echoed by other popular manuals of the time, including Francis Low Nichols’s *Esoteric Anthropology* (1853) and William Alcott’s *Physiology of Marriage* (1855). On a more technical level, Augustus Garner’s 1856 text, *On the Causes and Curative Treatment of Sterility*, publicly located crucial elements of female anatomy and

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30 Unfortunately, while their theory was correct here, the details were not: until quite recently, doctors believed that women were most fertile in the days just after their periods, exactly when they are least likely to conceive.

reputed the still-prevalent notion that women needed orgasms to conceive.\textsuperscript{32} This era also witnessed the birth of reproductive surgery, crude attempts to “fix” the female organs that had just barely been identified. In 1855, Dr. J. Marion Sims presided over the opening of the Woman’s Hospital, the first U.S. medical facility devoted entirely to feminine complaints. Sims, who had risen to prominence after devising a surgical cure for a particularly miserable complication of childbirth, firmly believed that all reproductive problems were mechanical ones, amenable to the right form of surgical intervention. He also believed in the powers of experimentation, having arrived at his first cure after years of trying one method and then another on the slave women that neighbors brought to him. “I went on improving the methods of operating,” he later recalled, “eliminating first one thing and then another till I had got it down to a very simple practice.”\textsuperscript{33} Throughout the 1850s and 1860s, Sims and his associates continued to experiment, working now with the poor and immigrant women who filled their public wards. They operated on hundreds, maybe even thousands of women, removing ovaries or clipping cervixes to fix what they described as the purely physical impediments to reproduction.\textsuperscript{34} Sadly, most of these “cures” proved as ineffectual as their medieval predecessors. Records from Sims’s famous Woman’s Hospital show virtually no evidence of subsequent pregnancies and modern medical knowledge suggests that Sims was almost certainly operating far from the source of his patients’ problems.\textsuperscript{35} But in treating infertility as a surgical situation, Sims and his colleagues had finally and permanently repainted childlessness as a medical condition; as the realm of doctors and specialists, rather than witches and gods.

\textit{Failing to Produce: The Causes and Conditions of Infertility}

Today, modern science confirms the biological basis of infertility. Couples are not childless because of who they are or what they’ve done, but because they suffer from some underlying physical flaw. Occasionally, that flaw can result from particular actions that one of the partners has engaged in or fallen victim to. Occasionally, emotional or psychological concerns can impede reproductive process. But in the vast majority of cases, infertility is a fairly straightforward, utterly physical condition.

Essentially, infertility results when a given couple is unable to produce a viable embryo – a sixteen-cell mingling of egg and sperm that will subsequently embed itself in the mother’s womb.


and evolve into a living child. A formal definition comes from the American Society for Reproductive Medicine, which states that “a marriage is to be considered barren or infertile when pregnancy has not occurred after a year of coitus without contraception.”

Sometimes the problem comes from the sperm, sometimes from the egg, and sometimes from the channels that either bring the two together or allow their product to flourish. For sperm, the problem usually resides in either quantity or speed. Some men simply produce too few sperm, or sperm that tend to perish before they reach the egg. Some have had operations that destroyed their bodies’ ability to produce sperm, or suffered exposure to toxic chemicals (in war, or certain industries, or as a result of prolonged chemotherapy) that led to the same result. Where sperm production is normal, men may still have physical problems that block the sperms’ passage from the testes. In very rare cases, a man may produce sperm that actually engenders an allergic reaction in his partner. Overwhelmingly, though, male infertility springs from a simple physical flaw: the inability of the man’s sperm to penetrate or fertilize the egg of his desired partner.

Female infertility is more complicated, tracing as it does the more complicated biology of female reproduction. Whereas male infertility is caused nearly always by problems with the mechanics of sperm production, female infertility can reside in one of three sites: in the eggs, fallopian tubes, or uterus. Since all are necessary components of reproduction, all are also equally capable of contributing to infertility.

Statistically, female infertility stems most frequently from problems with the fallopian tubes, the microscopic channels that serve, under normal conditions, to bring a woman’s eggs into her uterus. Because the tubes are small and delicate, they fall prey to a wide range of ailments, any one of which can seal the tiny opening and prevent pregnancy. Endometriosis, for example, a relatively common affliction of the uterus, can cause bits of the uterine lining to slough off and block the fallopian tubes. Ectopic pregnancies, in which the embryo implants in the tubes rather than the uterus, can also cause blockage or even destruction of the fallopian tubes. So can pelvic inflammatory diseases (PIDs), illnesses that occasionally result from sexually transmitted diseases.

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35 See the discussion in Marsh and Ronner, *The Empty Cradle*, pp. 48-64; and Harris, *Woman’s Surgeon*, p. 247.
Although less common, uterine disorders are in many ways more devastating than tubal ones, since the uterus is inherently more difficult to circumvent. In cases of uterine infertility, a woman may suffer from a misshapen or scarred womb, a womb that is physically unable either to secure the developing fetus or carry it to term. She may have had to undergo an early hysterectomy, usually as a result of either cancer or advanced endometriosis. Occasionally, a woman may even be born without a womb.

Most remaining cases of infertility are attributed to ovarian disorders. More treatable than uterine problems, they are also more enigmatic, tied to personal decisions as well as physiology. Traditionally, ovarian problems have emerged from the same kind of biological misfortune that haunts other instances of female infertility. Barren women were born without ovaries (rarely), or suffered from hormonal imbalances that rendered egg production either scarce or nonexistent. Their bodies refused to ovulate, or to produce viable eggs. These conditions still apply, and account for an estimated 33% of total female infertility. Increasingly, though, ovulatory disorders are linked directly to age and with the inescapable correlation between fertility and youth.

In the aggregate, female fertility peaks at around the age of 27 and then declines dramatically after 35. Although many individual women are capable of bearing children much later in life, the statistical chances of doing so decline precipitously over time. An average 28 year-old woman, for example, has a 72% chance of conceiving after a year of effort. An average 38 year-old, by contrast, has only a 24% chance. Put differently, female fertility drops 20% after the age of 30, 50% after 35, and 95% after age 40. These stark numbers speak to both a growing cause of childlessness and a growing demand for market-based solutions. Because women who suffer from age-related infertility aren’t barren in the physical, traditional sense; they have the physical means to carry a child and even, sometimes, to produce one. They just don’t have sufficient eggs to make conception as easy as it once might have been.

For women who suffer from age-related infertility, the emotional toll appears to be particularly high. These are women, after all, who could have had babies if they started earlier, women who may have put off child-bearing to pursue a career or other personal goals.

Acknowledging infertility in these cases is especially tough. Or as Diane Aronson, a former executive director at RESOLVE, a U.S. national infertility association, recounts, “I can’t tell you how many people we’ve had on our help line crying, saying they had no idea how much fertility drops as you age.”43 Regardless of the cause, however, and regardless of age, infertility wreaks inestimable havoc on those who suffer from it. Although it is not physical in the manner of, say, cancer or tuberculosis; although childlessness is not itself life-threatening, it tends to produce an emotional reaction akin to major illness. In studies conducted at Boston’s Beth Israel Deaconess Medical Center, for example, Dr. Alice Domar, an expert in the connection between women’s physical and psychological health, has shown that infertile women register abnormally high levels of depression, similar to those induced by cancer, HIV, and heart disease.44 More personally, one infertility sufferer recounts that, “When you take away being able to have a child biologically, it is like having to face death – almost like having half of you die… because having kids is the main way that people deal with the fact that they are mortal.”45 Other women (and men) express similar sentiments – of worthlessness, despair, lack of hope or desire.

On a personal level, such unsatiated demands are the stuff of tragedy. Infertility wrecks many of the marriages it affects; it drains bank accounts and often challenges the sexual identity of its victims. Yet commercially, such deep-seated demand is also undeniably attractive. In 1982, 4.5 million women in the United States reported that they suffered from infertility. This number rose to 4.9 million in 1988 and 6.2 million in 1995.46 Historically, these women have always existed: since Rachel’s time, we know, a significant percentage of both women and men have struggled with the burdens of barrenness. But because there were no cures for their condition, there was also no market. As science has slowly peeled back the mechanics of reproduction, however, the prospects for treatment have grown exponentially, carving out markets that never really existed before. Women who suffer from missing or damaged fallopian tubes, for example, can now avail themselves of in vitro fertilization, a popular and hugely successful technique described below. Men with low sperm counts can employ intracytoplasmic sperm injection (in

42 While a teenaged girl has over 250,000 eggs, these eggs die off rapidly with age. See “They are the Egg Men,” Economist, September 3, 1994, p. 79; and Lewis Krey and Jamie Grifo, “Poor Embryo Quality: The Answer Lies (Mostly) in the Egg,” Fertility and Sterility, March 2001, volume 75(3), pp. 466-468.
which a single sperm is injected directly into the egg), or venture with their partners to a thriving array of sperm banks. Women with uterine malfunctions can hire gestational surrogates, a practice described in Chapter Three. In all of these cases, the underlying dynamic is exactly the same: there is a demand for conception and a growing supply of technological fixes. There is, in other words, a market.

SEARCHING FOR A CURE

To be sure, there has always been a market of sorts for fertility treatments. Someone, after all, sold the amulets and potions prescribed in medieval times. Someone carved the fertility statues and peddled the balms and elixirs that the Victorians prized. None of this activity, though, amounted to very much; it was composed of a very small number of people, selling superstition or “cures” that were essentially worthless.

By the turn of the twentieth century, however, matters had begun to change. For the first time, doctors and scientists started to grapple with the physical causes of childlessness and with various treatments that actually worked. As these treatments evolved, they formed the critical supply side of the fertility industry, allowing demand to at last meet its match. Three developments in particular gave birth to the baby business. First was an increased understanding of the biology of reproduction. Second was the discovery of hormones and the development of endocrinology. And third, and most spectacular, was the invention of in vitro fertilization (IVF), a technique that shocked the world in 1978 and thrust the business of babymaking into a political and social maelstrom.

The first of these breakthroughs, by contrast, was much quieter. And it began, oddly enough, with gonorrhea, a sexually-transmitted disease that caused discomfort but not major illness among its male sufferers. Gonorrhea had been around for centuries, a covert disease that doctors traditionally treated with various emollients and elixirs. In the latter decades of the 19th century, though, infection rates began to soar, a result of shifting sexual mores and a thriving commercial sex trade in America’s urban cores. Around the same time, doctors also noted a marked increase in certain cases of infertility. Young women, newly married and previously healthy, developed abdominal pains and infections soon after marriage. Unable to conceive, they also had husbands who had previously been “cured” of gonorrhea. Initially, doctors refused to see any connection between these two facts: infertility, they insisted, was a woman’s disease and gonorrhea had nothing to do with it. But gradually, both anecdote and eventual examination provided the link. Many men who had been “cured” of gonorrhea, the microscope revealed, no longer produced sperm. Infertility in these cases was thus both male and biological; it was
caused, quite simply, by disease. This finding, together with developments from the growing field of gynecology, focused scientific attention on the biology of reproduction and the physical impediments to conception. Quietly, even furtively, a small band of doctors began to experiment with artificial insemination, and with various ways of repairing a woman’s fallopian tubes. Although their advances were still quite modest, infertile couples rapidly descended on this emerging corps of specialists, searching (and paying) for whatever treatment was available. In 1906, for example, one early gynecologist, Dr. Robert Tuttle Morris, was overwhelmed with patients after he successfully transplanted a small sliver of one woman’s ovary into a previously infertile patient. “I wished that surgeons everywhere could have seen some of the pitiful letters received from women who had lost their ovaries,” he later recounted. “I was offered extremely large sums of money contingent upon obtaining like results in other cases.”

The second and more significant boon to commerce, though, emerged in the 1930s, when developments in endocrinology created, for the first time, a mass-market approach to childlessness. Over the previous few decades, scientists had begun to experiment with what were then called the “ductless glands” – organs that seemed to produce bodily secretions that were linked, in turn, to behavior. The researchers didn’t know quite what these substances were, or how they functioned. But they could demonstrate some causal, often sexual, relationship: castrating a rooster, for example, changed the bird’s sexual attributes, while re-implanting the testicles – even inside the animal’s abdominal cavity – restored his normal behavior. In 1905, a group of British scientists labeled these mysterious substances “hormones” and helped to launch a research program around them. Initially, much of this research concentrated on the possibility of concocting hormonal extracts; of using, say, testosterone derived from a fertile male to treat an infertile one. Then it migrated slowly to a more process-oriented phase, in which scientists tried to understand the role hormones played in regulating the body’s functions. In both phases,
though, the research rapidly revealed a commercial side – a business based on selling either hormonal extracts or hormonal treatments.

Not surprisingly, this first phase of commerce combined serious research with a fair amount of quackery. Surgeons experimented with glandular transplants; scientists offered preparations based on glandular extracts; and charlatans sold over-the-counter elixirs such as “spermin.”

These treatments flourished in the first two decades of the twentieth century, as researchers slowly began to isolate and identify the body’s major internal secretions. Then, in 1923, two scientists at Washington University in St. Louis succeeded in extracting estrogen.

More specifically, they demonstrated that a woman’s ovaries – like her pancreas or thyroid – produced a distinct and critical substance; a substance that was key to the entire process of reproduction. With estrogen, women were physically capable of conceiving and carrying a child. Without it, the entire process was doomed from the start to failure. Estrogen, in other words, controlled a woman’s fertility.

It is difficult to overestimate the importance of this research. For by identifying estrogen, the St. Louis scientists had unlocked at last the chemical basis of reproduction – the keys, in fact, to the creation of life. And once they understood how these keys functioned, subsequent researchers could begin to fix the process when it broke.

Technically, human reproduction depends on a complex and intimate blend of hormones. It begins (ironically, perhaps) in the brain, where the tiny hypothalamus gland secretes a substance known as gonadotropin-releasing hormone. This hormone prompts the pituitary gland (also located in the brain) to produce two more hormones, follicle-stimulating hormone (FSH) and luteinizing hormone. These substances, in turn, regulate the production of the more familiar reproductive hormones, estrogen and progesterone. Essentially, estrogen is the substance that launches conception: once the ovarian follicles receive the appropriate hormonal signal, they produce estrogen and release an egg into the fallopian tubes. Progesterone, by contrast, typically ends the cycle, preparing the womb for pregnancy and preventing any more eggs from ripening. For conception to occur, all of these hormones must be secreted, in the right

50 Such experiments with roosters were among the most influential and important early work on hormones. See George W. Corner, *The Hormones in Human Reproduction* (Princeton: Princeton University Press, 1947), pp. 228-29.


52 For more on this discovery and the chain of research that led up to it, see Corner, *The Hormones in Human Reproduction*, pp. 79-86; Albert Q. Maisel, *The Hormone Quest* (New York: Random House, 1965); and William P. Graves, *Female Sex Hormonology: A Review* (Philadelphia: W.B. Saunders Company, 1931). Much of this early research was supported by the Committee for Research in Problems of Sex, which was itself supported by the influential Rockefeller Foundation. For more on the committee’s work, see Sophie D. Aberle and...
amounts and concentrations, at precisely the right time. If any of the hormones are missing or weak or over-active, the entire process stalls and pregnancy becomes virtually impossible. On the male side, a similar though less intricate calculus applies, with sperm production dependent upon an appropriate level of testosterone.

As these processes became better and better understood, so too did actual “cures” for infertility seem suddenly within reach. Because if the reproductive cycle depended on the interaction of particular hormones, and if these hormones could be extracted or synthesized in the laboratory, then treatment became akin, theoretically at least, to normal pharmaceutical procedure: identify the problem, prescribe the proper medication, dose the patient, and await results. Such treatments avoided the uncertain risks of surgery and the discomfort that still surrounded artificial insemination. Like antibiotics, which were also emerging as marvels of the laboratory, hormones promised scientific fixes for age-old ills. And because the science was good at last and the ills so common, the market for these fixes was potentially vast.

The problem, however, was that hormones proved exceedingly difficult to extract, much less produce. Initially, scientists attempted to retrieve the key secretions from their animal equivalents – crushing bulls’ testicles, for instance, to extract testosterone, or using cows’ ovaries to produce estrogen. But the magnitudes involved in this method were staggeringly large. To generate one hundredth of an ounce of testosterone, for example, scientists had to process nearly a ton of bulls’ testicles. To get estrogen, they needed the ovaries of 80,000 cows. The price of these extracts reflected the cost of their production: $200 for a gram of progesterone in the 1930s, which was far too much for the average woman to afford. Accordingly, the great commercial race in the 1930s and 1940s lay in the quest for synthesis, for some way of recreating the body’s secretions in the laboratory and multiplying the amounts that nature felt fit to bequeath. Much of this work was done in a cluster of universities involved with the early hormonal research. Even more, however, migrated into the expanding pharmaceutical industry; into firms that saw the commercial benefits that were certain to befall the mass production of hormonal therapies. Schering-Kahlbaum and Parke-Davis, for example (now descended to Schering AG and Pfizer, respectively), both rose to prominence with the commercial production of estrogen in the 1930s. G.D. Searle, now a unit of Monsanto, was instrumental in the mass production of both progesterone and cortisol. Initially, these firms and their competitors concentrated on finding

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more efficient sources for their prized secretions. They discovered, for example, that the urine of pregnant women yielded a particularly high concentration of estrogen. And that the roots of the Dioscorea, a wild Mexican yam, could be used to produce progesterone. Over time, they also learned how to create the underlying chemical compounds, manipulating the molecular structure of the cholesterols that become hormones. Eventually, these discoveries began slowly to reduce the price of hormonal treatments and widen the market. By the late 1930s, most major US cities contained at least one private infertility practice, along with hospital-based clinics for poorer patients. And hormones were among the most effective tools in their kit.

Meanwhile, even as hormone therapy was rapidly defining the twentieth century market for fertility treatment, scientific developments were leading towards the third major breakthrough in the baby business. In 1944, John Rock, one of the nation’s leading fertility specialists, announced that he and his research assistant had managed to fertilize four human eggs in vitro (literally, “in glass.”) Using eggs donated from women undergoing hysterectomies, Rock and his assistant had matched the eggs in a petri dish with semen left over from earlier artificial inseminations. After over a hundred attempts, four of the matches finally worked, combining to create tiny fertilized ova. Their results were greeted, not surprisingly, with a mixture of awe and horror.

Within the fertility community, Rock was already regarded as a maverick. A staunch Catholic and professor at Harvard Medical School, he was passionately committed to researching the underlying causes of infertility and curing what he regarded as one of the saddest human plights. He was a master of tubal surgery – an extremely delicate operation – and had pioneered an innovative hormonal treatment known as the “Rock rebound.” By the 1930s, though, Rock had begun to despair of tubal repair: the operation only worked in less than seven percent of cases and offered no hope, obviously, to women whose fallopian tubes were missing or irreparably damaged. Looking back at some early and highly experimental attempts at “ovarian transplants,” therefore, Rock began to play with the idea of circumventing the fallopian tubes entirely; of extracting an egg from an otherwise healthy woman, fertilizing it outside her body, and then re-implanting the tiny embryo into the mother-to-be. In 1944, he achieved the

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first two stages of this rather extraordinary three-stage process. After that point, the experiment was stalled.

As word of Rock’s experiments slipped into the mainstream press, hundreds of infertile women sent their pleas to Boston, begging the doctor to cure them, or even to use their eggs and wombs as the site for further experiments. Sadly, there was little that Rock (or anyone else) could do at this stage. But the scientific promise he offered emboldened both the victims of infertility and those who hoped to serve them. In the 1950s, childless couples rushed to their doctors with unprecedented speed. Mainstream magazines routinely discussed the trauma of infertility and the treatments made possible through medical advance. A 1950 article in *Look*, for example, speculated that “babies born by proxy mothers are a distinct possibility;” while a 1947 article in *Parents* asserted that “nowadays specialists are effecting gratifying ‘cures’ of the apparently infertile.” In the midst of this excitement, not surprisingly, fertility clinics multiplied, rising from 52 in 1949 to 119 by 1955. The profession became more organized and launched its own society in 1944, the American Society for the Study of Human Sterility. By 1958 this once-tiny group had grown to include 840 members, an annual scientific conference, and a highly-regarded journal peppered with advertisements from the growing ranks of associated products: pregnancy tests, basal thermometers, and fertility drugs.

It is useful to recall at this point that the surge of interest in infertility represented a shift of supply rather than demand. The clamor for cures that emerged in the middle decades of the 20th century was part of the eternal demand for offspring; the same demand that had driven Rachel to desperation and pulled her Victorian heirs to the improbable pleasures of Graham’s vibrating bed. Although the data are sketchy, reliable estimates suggest that the rate of infertility in mid-century America was no higher than rates in 19th century America, or medieval Europe, or ancient Greece. Instead, what had exploded by the early post-war period was the supply side of the equation: the number and type of providers who actually offered solutions for infertility rather than vague promises of relief. Many of these solutions were undoubtedly exaggerated. In 1947, for example, physician Joseph Wassersug assured readers of the journal *Hygieia* that “expert

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60 Duka and DeCherney, *From the Beginning*, p. 69.
61 For evidence that US infertility rose slightly during the Victorian period and then declined toward the middle of the 20th century, see Marsh and Ronner, *Empty Cradle*, pp. 92-93, 113-122,185-187.
workers” in the field of infertility were able to cure fifty percent or more of their patients. Another specialist, Dr. Edward Tyler, told readers of Look magazine that success rates were roughly one third, and rising rapidly. Albert Q. Maisel, in Parents, asserted that “pregnancy follows treatment in from thirty-five to more than fifty percent of all cases.” But even granting a substantial discount for exaggeration, it is clear that the supply of solutions was simply greater in the 1950s than ever before. Doctors could reliably offer their childless patients a growing menu of options – from hormone therapies to artificial insemination and tubal surgery. Not all of these worked. In fact, roughly two-thirds of the infertile couples who sought treatment during this era were likely to remain childless, victims of conditions that science still could not fix. Yet in the aggregate, the supply of fertility treatments had finally begun to approximate the demand. And because post-war couples were particularly eager to start their families; because they had a newfound confidence in the power of both markets and science, would-be parents gratefully bought whatever the growing baby business could provide. In 1952, one observer estimated that there were 2,000 doctors offering fertility treatments in the New York metropolitan area alone, toting up “many millions every year... from the hopes and heartaches of the childless.”

Advances in hormonal therapy brought new options and more business in the 1960s, when researchers perfected the drugs that would become Clomid and Pergonal. Through mechanisms that scientists didn’t fully understand, both of these drugs worked to stimulate ovulation in women who did not otherwise ovulate; they were endocrinological catalysts, in other words, that could induce pregnancy in previously infertile women. Although both drugs (and particularly Pergonal) substantially increased the chances of multiple births, they were also extremely effective, generating pregnancy rates of around 14 – 15% per cycle in women who otherwise had virtually no hope of conception. Because these odds were so much higher than

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66 He also argued that “only a few dozen” of this group were actually qualified as fertility experts. See Albert Q. Maisel, “Beware the Fertility Racketeers,” Park East, April 1952, p. 15.
those offered by any previous remedies, women frequently underwent 6-8 cycles of treatment before either conceiving or giving up.

As word of these drugs spread, infertile couples mobbed fertility clinics, eagerly paying thousands of dollars to receive the new treatments. In 1970, after one participant in a Pergonal trial gave birth to quintuplets, other clinics involved in the trial were rapidly booked solid. In Los Angeles, one doctor reported, “We don’t have a vial in the house.” By the turn of the century, Pergonal had been replaced by later-generation drugs such as Follistim and Gonal F. These drugs were among the most common fertility treatments and, at between $1,050 and $5,600 per cycle, also the most profitable.

<A> TEMPEST IN A TEST TUBE

From all accounts, Louise Brown was a perfectly ordinary child: a blond, blue-eyed little girl born on July 25, 1978 in Oldham, England. The circumstances surrounding her birth, however, were anything but ordinary. For Louise was the world’s first child born from in vitro fertilization; the first of what would soon become an army of “test tube babies.” And her birth set off both a firestorm of criticism and a burst of commercial activity.

The details of the birth and criticism are legendary now, providing perhaps the central story of technology’s advance into reproduction. Louise’s parents, Lesley and Gilbert John, were a working class couple from Bristol. Gilbert worked as a truck driver; Lesley stayed at home. They had been childless for a decade, victims of blocked fallopian tubes that prevented Mrs. Brown from conceiving. In technical terms, Mrs. Brown suffered from a simple and common reproductive flaw. It was the same flaw, in fact, that John Rock had tried so fervently to address in the 1940s – a simple malfunction of the fallopian tubes that befell a couple who were otherwise perfectly capable of conception. As Rock had realized, the only way to cure such a couple’s infertility was to circumvent the tubes themselves, allowing the egg and sperm to mingle in some other medium. Rock proved that such mingling was possible, but moved on to other pursuits before demonstrating how the resulting embryo – a tiny, delicate, sixteen cell creation – could be transferred to the mother’s womb. This task fell to a later generation of specialists, who quietly worked on the second phase of Rock’s experiment for the next several decades.

Two of these doctors, Patrick Steptoe and Robert Edwards, were responsible for Louise’s birth. Working together since 1967, Steptoe and Edwards were determined to complete Rock’s mission; to fertilize an egg outside a woman’s body and transfer it to her uterus. To do so, they realized, would involve at least three components, each medically radical in its own right: they would need to remove the woman’s eggs at the right time (as Rock had done), fertilize them in a medium that could sustain the egg outside the body, and then administer the precise hormones that would convince the woman’s body that conception had occurred. Without this chemical conviction, the womb would reject the fertilized egg in what became essentially a high-tech miscarriage.

Quietly, the pair had been working for over a decade, experimenting with different combinations of fertility drugs, different methods of egg retrieval, and different schedules for both retrieval and transfer. Nothing worked. Between 1967 and 1975 Steptoe and Edwards performed at least 80 in vitro procedures without achieving a single pregnancy. When one woman finally became pregnant in 1975, the pregnancy was ectopic and had to be terminated. The two doctors then tinkered with their methods some more, arriving at last at the combination of tactics that produced Louise.

For the Browns, of course, the technology proffered by Steptoe and Edwards was nothing short of miraculous. “It was like a dream,” recalled the newfound dad, “I couldn’t believe it.” For many outside observers, however, it was somewhere between a nightmare and unmitigated sin; emblematic of both technology’s gruesome advance and the abnormal intervention of mankind into nature’s realm. Some ethicists, for example, worried that the separation between sex and reproduction was too fundamental to replace by technical means; that creating children outside the body would eventually undermine the very meaning of life. At the University of Chicago, biologist Leon Kass argued that “this blind assertion of will against our bodily nature – in contradiction of the meaning of the human generation it seeks to control – can only lead to self-degradation and dehumanization.” Similarly, Paul Ramsey, a leading Protestant ethicist, pronounced that “Men ought not to play God before they learn to be men, and after they have learned to be men they will not play God.” Feminists, meanwhile, split into two contentious groups. Some, led most famously by Shulamith Firestone in her Dialectic of Sex, embraced IVF as

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the first step towards liberating women from their reproductive biology. Others painted IVF as the self-serving creation of men and commerce. Like potions and hormones and tubal surgery, they argued, it was just another “hubristic and harmful technology,” born of a conspiracy between the “collective male ego and the corporate and medical and pharmacological purses.”

By promoting the idea that a woman could only find happiness in motherhood, it “perpetuate[d] the cycle of depression, despair, hope... [and] promote[d] a fetus-centered ideology.” More damaging criticism came from the Catholic Church, which was explicit in its denunciation of any form of assisted reproduction: “… [F]rom a moral point of view procreation is deprived of its proper perfection when it is not desired as the fruit of the conjugal act, that is to say of the specific act of the spouses’ union.”

Chastened by such critics, governments in the United States, United Kingdom and Australia launched high-profile inquiries into the implications of IVF, promising to arrive at an appropriate set of guidelines. In all three countries, the inquiries dragged on for years, becoming intimately intertwined with debates over abortion, fetal research, and state funding. In the end, they reached widely disparate yet similarly inspired conclusions. The British ultimately decided that in vitro techniques, including the freezing and donation of embryos, could “be regarded as an established form of treatment for infertility.” Children born as a result of these techniques were to be considered fully legitimate in the eyes of the law, and a new state agency, the Human Fertilisation and Embryology Authority, was established to regulate both fertility research and fertility services. In Australia, state parliaments arrived at their own set of conclusions and recommendations: in South Australia, for example, clinics were permitted only to treat patients who were considered medically infertile and a new regulatory agency was given wide-sweeping powers to govern reproductive technology. In Victoria, treatment was limited to infertile heterosexual couples and a separate agency was established to license fertility centers and approve fertility specialists. In effect, therefore, the Australians, like the British, decided to permit in vitro fertilization but regulate its practice.

In the United States, by contrast, the political system was still reeling from the 1973 Roe v. Wade decision. Faced with fervent – occasionally even violent – opposition to abortion or fetal research, the federal government had suspended funding for fetal research in 1974, pending the recommendations of a soon-to-be-created National Ethics Advisory Board. During the waning

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days of the Nixon Administration, oversight for these policies fell to Health, Education and Welfare (HEW) Secretary Caspar Weinberger, whose conservative views on reproductive matters were well known. In 1976, responsibility moved to Joseph Califano, President Carter’s Secretary of Health and Human Services, and another public opponent of abortion. Califano established a revamped commission and launched his own round of hearings, which most in the field of reproductive medicine regarded as an extended excuse for an eventual ban. Surprisingly, though, Califano’s commission reported positively on IVF, recommending in March of 1979 that the government end its moratorium on funding. Even with this report, however, Califano and the National Institutes of Health were reluctant to act. “It was a political hot potato,” recalls one leading fertility specialist. “No one would touch it.” And so, amazingly, the “short term” moratorium stayed in place. No federal funds in the United States flowed to IVF research.

Yet by this point, the seduction of Louise was far too strong to be resisted. Only two years after Louise’s birth, doctors in Melbourne, Australia, announced the birth of Candice Elizabeth Reed. Eighteen months later, America’s first test tube child, Elizabeth Jordan Carr, entered the world. By the spring of 1983, roughly 150 babies had been conceived in vitro.

**<A> Birth of the Baby Market**

At this stage, the success rates for IVF were still slim – roughly 10-15% in 1987. Costs were relatively high – around $5,000 per cycle - and social critics shunned IVF as a mechanistic intervention in the work of God. In commercial terms, it wasn’t a particularly attractive market.

The birth of Louise and her siblings, though, demonstrated that IVF could work, and that technology could indeed address some of the toughest cases of infertility. Accordingly, observers in the field quickly realized that supply was now poised to meet a deep and latent demand. If doctors could provide IVF services, they reasoned, infertile couples would clamor to consume them, regardless of the price or social acceptability. The demand was simply that strong. And thus the late 1980s saw a slow but steady exodus into the fertility trade; a stream of private clinics and medical schools willing to eschew federal funding in favor of a reproductive practice.

Some of these providers came directly from the federal government, victims of the ambiguous ban on federal funding. Dr. Joseph Schulman, for example, left a prestigious job at the National Institutes of Health to launch the Genetics and IVF Institute, a private clinic in

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77 Cited in Andrew Veitch, “How Dr. Edwards was Brought out of the Cold,” *Guardian*, July 19, 1984, p. 17.  
Virginia. Others were medical renegades who had withdrawn to the margins of American
practice. And some were mainstream clinics or medical schools who simply identified a need for
their services. The very first American IVF center, for instance, was launched in Norfolk,
Virginia, where Howard and Georgeanna Jones, two of the country’s most respected fertility
specialists, had gone to spend their retirement years. Yale Medical School began to offer IVF in its
In Vitro Fertilization Program in 1982; Columbia followed suit in 1983. Then came more explicitly
commercial ventures such as IVF Australia, a chain of clinics launched by an American
businesswoman who had herself conceived at one of Australia’s first IVF centers.

As the centers multiplied, IVF slipped from an oddity into a niche. The doctors perfected
their techniques, produced more children, and trained more doctors to enter the growing trade.
Although prices stayed firm, demand was more than strong enough to meet the expanded
supply, especially as success rates increased. Quietly, doctors began to see the field of
reproduction not only as a cutting edge of medicine, but also as a distinctly profitable endeavor –
expanding, unregulated, and catering to a population that seemed ever eager to pay. Between
1995 and 1998, the number of in vitro procedures performed in the United States rose by 37
percent, from roughly 59,000 to roughly 81,000. During this same period, the number of fertility
clinics rose from 281 to 360.\footnote{See Gina Kolata, “Fertility Inc.: Clinics Race to Lure Clients,” \textit{New York Times}, January 1, 2002, p. F1.} Fertility, by this point, was far more than a mysterious blessing, a
hormonal reaction, or even a developing science. It had become a thriving business as well.

The only constraints on the baby business, in fact, were those that would tease it for the next
ten years, those that continue to define the boundaries of this trade. The first of these constraints
is simply science. Because despite the vast achievements in the field of fertility treatment; despite
what one practitioner has described as a “revolution” in medical success rates, fertility clinics still
can’t treat countless cases of involuntary childlessness. Some of these cases are due to the
patients’ age or a particular medical condition. More, however, are consigned to the category of
“unknown” causes, devastating the parents and frustrating their doctors. What complicates
these cases from a commercial point of view, however, is that unknown causes and unsatisfied
parents can, cruelly perhaps, bring the greatest financial rewards – the rewards of charging for
round after round of expensive treatments, none of which leads to the desired result.

This central irony drives the second constraint on the baby trade. Babies, it turns out, are
relatively expensive to produce. As Chapter Two describes in greater detail, the average price for
a cycle of IVF in the United States was $12,400 in 2003. The lowest cost for donor eggs (in the
midwest, or outside major urban areas) was between $3,000 and $4,000. These are hefty prices to

\footnote{See “Making Babies is Hard to Do,” \textit{Economist}, November 15, 1986, p. 99; and Jean Seligman, “The
pay, even in a rich nation like the United States. As a result, many people who would presumably like to enter the baby business are forced by their finances to the sidelines, because the price – of IVF, or donor eggs, or a gestational surrogate, or a foreign adoption – is simply too high for them to pay. In this market, therefore, price acts harshly as a constraint on demand. The desire is there, as we know. So, increasingly, is the supply. Yet the price of this supply is still too high for many potential buyers, leaving supply and demand to meet at a point well below their full potential.

Theoretically, of course, governments could solve the price constraint. They could, like the Danes and Israelis, fold fertility treatment into their national health systems, covering their cost through private funds. Or, like fifteen US states, they could mandate insurance coverage for fertility treatment, dramatically lowering the cost to affected patients. Yet any policy of this type runs straight into the third constraint that faces the baby market. This is the constraint of politics, the constraint that has made US lawmakers and US administrations exquisitely wary of treading too close to the baby trade. They don’t want to prohibit it, and risk the wrath of those for whom assisted reproduction is the only path to conception. Yet they also don’t want to condone its farthest reaches, since assisted reproduction is undeniably what its critics claim it to be: a technological intrusion into nature’s most intimate process. An intrusion, moreover, that raises excruciating questions about women’s bodies, and women’s rights, and the ability of parents to manipulate and perhaps even market their offspring.

The moral content of these questions have made the baby business too sensitive to legislate in the United States. But they haven’t stopped the market itself. Instead, as subsequent chapters will show, the baby business is thriving and expanding, rapidly developing the medical solutions for even higher-tech births. This market, though, remains hampered by the three constraints just described: by the limits of its science; the dilemma of unmet demand; and by a political system that has left the baby business to wander through an unsustainable thicket of legal and commercial uncertainty. We will return to these constraints in the chapters that follow.

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