Daughters or Sons?
It All Depends

"The son was alive then, and the daughter was at a discount..."
—from George Eliot in *Middlemarch*, 1872

Seventy thousand calories, nine months, seventeen-plus years of room, board, and extras—and yes, there is a charge. Parents expect returns from their investment in children. How often have you overheard a parent telling a child that he or she is “a disgrace,” “good for nothing,” or complaining that a son or daughter “will never amount to much”? How many parents have entertained such thoughts themselves? “It’s for your own good.” Or especially, “I just want you to live up to your potential.” Talking to young people this way is so commonplace that it has become routine fare in melodramas. What is at issue here?

There is a contract stored deep in the minds of parents: they expect those to whom they give so much to bring credit to the family name, or to translate parental investment into either cultural success or its former correlate: enhanced fitness for the lineage. Parents may justify their behavior by claiming to act in “the child’s interests.” Closer scrutiny often reveals parents defining those interests in line with their own.

In the West, such conflicts have tended to be over education, inheritances, career decisions, social or sexual choices. Parental preferences rarely place infants in mortal peril. Elsewhere, though, parents literally sacrifice children to family goals. Nowhere are underlying tensions more manifest than in societies where parents resort to sex-selective infanticide in order to obtain specific family configurations.

**China’s Missing Daughters**

In 1991, results from China’s massive census of every hundredth household became available, sparking worldwide comment. “Where have the girls gone?” It is normal for slightly more boys than girls to be born: 104 to 106
boys per 100 girls is considered normal. But comparisons of expected sex ratios with those from China’s 1990 census revealed that out of a total 1.2 billion people, millions of girls that should have been counted seemed either not to have been born, not to have been reported as born, or else eliminated so soon after birth as to escape notice in the census. Instead of the expected 106 sex ratio there were 111 boys per 100 girls. Perhaps Asians are genetically disposed to produce more sons than other people, some suggested. Demographers, however, are convinced that girls are being eliminated on a massive scale, either through prenatal sex determination followed by selective abortion of female fetuses, or through neonaticide.

Later-born children are most at risk. Westerners assume that the one-child-per-family policy means that Chinese families only have one or at most two children. But that is not necessarily the case, especially in rural areas. Dispensations for extra offspring can also be obtained—especially for parents who only have girls. But often a fine is imposed, and many families are reluctant to bear penalties for an extra child without getting the sex they want.

Either sex may be acceptable for the first birth. This explains why the current Chinese sex ratio for first births is within the normal range—106 boys reported for every 100 girls. For higher birth orders, however, sex ratios start to climb. For families producing a fifth child, 125 male births are reported for every 100 daughters.

Policy to Blame—or Parental Preferences?
Viewed in historical perspective, China’s one-child policy has enhanced the well-being of wanted children and helped the country to catch up economically. But small families also increased pressure for a son. China’s “missing daughters” have become an international cause célèbre, with special condemnation reserved for the one-child policy itself.

Female infanticide, however, was practiced long before Mao’s population policies were introduced in the second half of the twentieth century. In southern regions like the Lower Yangtze, where Shanghai is situated, the only plausible explanation for so many missing daughters is either sex-selective abortion or infanticide. Infanticide rates are higher today than ten years ago, but they are lower than in centuries past. In some areas, childhood sex ratios in the eighteenth and nineteenth centuries were as high as 154:100. In large
cities like Beijing, wagons made scheduled rounds in the early morning to collect corpses of unwanted daughters that had been soundlessly drowned in a bucket of milk while the mother looked away. One nineteenth-century woman interviewed recalled eliminating eleven newborn daughters. Another could not recall the exact number, except that she had borne more daughters than she wanted.

Such anti-daughter prejudice was scarcely new. A Chinese poem recited 2,500 years ago celebrated the arrival of a son who should be dressed in finery, laid on an elaborate bed, and given a jade insignia to hold. A daughter, by contrast, would be dressed in a wrapper, laid on the ground, and given a wooden whirligig. According to a popular proverb: “More sons, the more happiness and prosperity.”

Whether current distortions in China’s sex ratios are due to selective abortion of female fetuses or female infanticide, existing laws are not effective. Sex ratios are most skewed in remote rural areas. Labor provided by sons is more essential there, and laws harder to enforce. The strongest skews are found in southern China, where discrimination against daughters was traditionally more pronounced.

The call for more and tougher laws detracts attention from the underlying problem: long-standing parental desires for a particular family composition. This means that unwanted infants, if they survive, are likely to grow into unwanted children who will be fed last and fed least, have less attention paid to their education and medical needs, and suffer physical and emotional abuse. A more effective and humane solution would focus on changing parental mindsets. But how? Ongoing propaganda campaigns—for example, the signs posted all over proclaiming “Little Boy, Little Girl, Both Okay”—have had limited impact.

Fig 13.1 Public sign from urban China. Essentially it says: “Little Boy, Little Girl, Both Okay” (Courtesy of Craig Kirkpatrick)
A Widespread and Very Ancient Bias

The first step is to understand what ancient and deep-rooted parental preferences for sons versus daughters are about. Sex ratios as high as those found in China today (116:100) can be documented for other Asian countries that do not have such coercive family planning. Far beyond the boundaries of China, wherever preferences for offspring of one sex are so extreme that sex-selective infanticide is practiced (in about 9 percent of the world’s cultures), sons are the desired sex.

Outside of China, female infanticide is well documented for other parts of Asia, among tribes in highland New Guinea and South America, as well as in ancient Italy. Wherever it is found, extreme son preference and the devaluation of daughters that accompanies it go hand in hand with patriarchal ideologies. Indifference to the fates of daughters can be stunning, as evidenced by the note of a Roman soldier sent his wife in the first century B.C.: I ask and beg you to take good care of our baby son. . . . If you are delivered of child. . . . if it is a boy keep it, if a girl discard it.

In India, special mantras from the *Veda*, sacred texts of Hinduism, are still chanted when a wife becomes pregnant. If by some mischance the fetus is female, this text expresses the hope that she will be magically transformed into a son.

Various well-meaning pundits have proposed letting the “mania for sons” take its course. Playwright, congresswoman, and ambassador Clare Boothe Luce was among the most outspoken of them. She correctly noted that the Chinese desire for sons motivated parents to have larger families, since those with only daughters kept trying for sons. She proposed a “male-child birth pill” as the “quickest way of peacefully slowing down the [population] clock.” Furthermore, Luce suggested, as daughters became scarcer, the status of women would rise.

Laws of supply and demand, however, do not always work, especially not where odds are stacked against a sex that is not only scarce but is socially disenfranchised. In urban China, scarcity has indeed provided women with undreamed-of opportunities. In television broadcasts that fall somewhere between *The Dating Game* and talent shows, desperate bachelors make their appeals, then anxiously await a summons, as female viewers choose among potential mates. But the very same scarcity that drives urban bachelors to
these extremes makes women's lives more perilous than ever in rural areas. The incidence of rape, kidnap, and even women being bought and sold, has risen along with the number of wifeless men. Women may be in short supply, but as a class they are no better off. In 1995, China was the only country in the world where the suicide rate for women exceeded the rate for men.

For parts of the world where "a daughter's birth makes even a philosophical man ... gloomy [while] a son's birth is like sunrise in the abode of gods," prenatal sex diagnosis with the option of selective abortion arrived on the scene like a divine gift. The old proverb according to which "eighteen goddess-like daughters are not equal to one son with a hump" is taken quite literally by parents who use prenatal diagnosis not to guard against genetic defects, but against paired XX chromosomes. Of 8,000 abortions performed at a clinic in India, 7,997 eliminated fetuses parents had been told would be daughters. (Typically, mothers being tested already had one or more daughters.)

Officially, such discrimination is banned. Asian countries have far stricter laws against using prenatal tests this way than do Western countries. But the laws are unenforceable. In 1988 Maharashtra state in south India banned all prenatal sex determinations. India's Parliament followed suit. In 1994, nationwide penalties of three years in prison and a fine (equal to about $320) were imposed on anyone found guilty of administering or taking prenatal tests solely to determine the sex of a fetus. Korea followed suit the same year, making it a crime to abort a female fetus. Such laws notwithstanding, volunteer organizations in India estimate that around 80,000 abortions after sex tests are still performed every year (surely an underestimate). The situation is similar in Korea. Meanwhile in the poorest areas of Asia, where prenatal testing is largely unavailable (e.g., in Tamil Nadu or Rajasthan in India), female infanticide continues. Unwanted daughters may be dispatched either the traditional way (by smearing opium on the mother's nipples or by poisoning with plant extracts) or the "modern" way—denying a daughter breast milk, so that she dies of unavoidable (and unprosecutable) "natural" causes.

How Much Say Do Mothers Have?
How could a mother, a woman herself, kill a daughter because her baby is female? To discriminate on these grounds would seem to validate her own
inferiority. It is interesting to note that in places like China and Bangladesh daughters are most at risk in families that already have one or more daughters—in precisely those families where the mother has already nursed a daughter. She can remember what it was like to love a baby girl. It is hard to believe, yet maternal compliance with daughter infanticide cannot be understood without taking into account her situation.24 She lives with her husband,
among his relatives, dependent upon them. The well-being of the children she rears will rely on their good will. Quite simply, the men of the family wanted sons, therefore so did the women. From an early age, these women were conditioned to place their hopes on sons they would bear one day, and on the sons born to their sons.²⁵

Even today, in many societies mothers without sons are pitied and looked down upon. Wives with sons are more highly prized, their male children favored. "Soon after I delivered my son, my parents-in-law moved us into a larger apartment," recalled one Korean woman who happened to be a winner in this chromosomal lottery. Such pervasive conditioning makes it impossible to view maternal preferences separately from her husband's family's interests.²⁶ One modern mother who disapproved of this prejudice nevertheless voluntarily opted for an (illegal) abortion when told that her second child would be another daughter. She knew girls were scarce, but after agonizing, still chose not to bear another daughter. Often, the matter is literally taken out of a mother's hands, as in the case of the Pakistani twins where the mother-in-law bottle-feeds the daughter, consigning the girl (but not breast-fed son) to die of dysentery and malnutrition (see figure 13.2).

Such cases led anthropologist Susan Scrimshaw to argue in a much cited passage that "the decline of infanticide may result in more suffering for older infants and children, and even adults, than when an infant's fate, be it life or death, was determined swiftly, early and irrevocably." Scrimshaw was not advocating infanticide. Rather, she was making a realistic and compassionate comparison between one fate and a "far crueller" alternative.²⁷ Similar logic leads many educated people in Asia—including medical personnel—to view sex-selective abortion not only as a family's right but as preferable to unwanted births.²⁸

Reasons for Preferring Sons

"Daughters are no better than crows" observes a Tibetan proverb. Variations on this theme can be heard throughout northern India. "Their parents feed them and when they get their wings, they fly away."²⁹ Daughters, people complain, leave at marriage; resources devoted to rearing them are lost to the patriline. With them depart substantial dowries, enriching their husbands' families while impoverishing their own. Parents dread the prospect of marrying off several daughters almost (but not quite) as much as they dread poten-
tial disgrace should a daughter fail to marry into a family of appropriate sta-
tus, or be seduced and left pregnant but unmarried.

By itself, the “daughters depart” rationale begs the question of why the system is set up this way, with sons staying, daughters decamping. Nor does it explain why parents voluntarily fork over exorbitant dowries. Attention, then, gravitates to the traditional rationales for son preference, explanations of “pride and purse,” sons’ special labor value, the ritual role accorded to sons, and their symbolic value.

In one of the few studies of its kind, Mead Caine of the Population Council of New York quantified the value of labor provided by sons as compared with daughters in Bangladesh. By ten to thirteen years of age, a boy is a net producer. By age fifteen a son has repaid his parents for what it cost them to rear him, and by age twenty-one repaid them for one sister as well. Daughters, by contrast, though they work early and hard, leave home before they repay parental outlays. 30

By themselves, neither family “pride” nor “purse” (economic interests) explains why sons earn more in the first place, why parents continue to favor them, or why parents send daughters away with large dowries.

The Reproductive Potential of Sons
A long history of male-male competition for mates has left a sexually selected legacy of men who are somewhat larger, and much more muscular, than women. This is one reason men make more effective allies than women. The other is that in patrilocal breeding systems, these allies will also be kin. Whether protecting access to females in the community or helping to maintain a patriline’s rights over sources of production, males have greater “resource holding ability.” This fact of life is not lost on parents in parts of the world where possession has long been ten-tenths of what law there is, and where resources have been inseparably linked to family survival through time. Where “sons are guns” (an old Rajasthani saying), the alternative to passing property to sons who can defend it against competing lineages is to lose control of a legacy.

In patriarchal social systems, a wealthy son finds himself in control of productive resources that women need. He will be in a position to attract multiple mates. In a stratified society such as Rajasthan’s, families seeking social advancement compete among themselves to amass a dowry large
enough to secure a place for their daughter in an elite household. This brings
a prestigious alliance for parents along with the prospect of well-endowed
grandsons. Should calamity strike, it is the only prospect for descendants
surviving at all. Thus does son preference among elites lead to hypergamy,
the custom by which women marry men of higher status. At the top of the
hierarchy, however, hypergamy dooms daughters. There is no higher-ranking
family for them to marry into. 31

Selective elimination of daughters first attracted attention in the West
during the years of the British Raj. Nineteenth-century travelers visiting
Rajasthan and Uttar Pradesh in northern India remarked on the rarity of see-
ing girls among any of the elite clans. It was assumed that as part of purdah
the daughters of these proud descendants of warrior-kings were kept in
seclusion. “I have been nearly four years in India and never beheld any women
but those in attendance as servants in European families, the low caste wives
of petty shopkeepers and [dancing] women,” wrote Fanny Parks in her 1850
travels through northern India. It did not occur to the observer that there
were no daughters 32

Bit by bit, the light dawned. One British official stumbled on the phenom-
emon of missing daughters while engaged in negotiations with local land-
owners. He mistakenly referred to one of these mustachioed men as the
son-in-law of the other, evoking sarcastic laughter. This was scarcely possible,
they told him. The birth of a daughter would be such a calamity to families of
their rank that she would never survive. It was unthinkable that any of their
daughters would reach marriageable age. Among the most elite clans such as
the Jhareja Rajputs and the Bedi Sikhs—known locally as the Kuri Mat, or
“daughter destroyers”—censuses confirmed the near total absence of daugh-
ters; lesser elites killed only later born daughters. Overall, including lower-
ranking clans who kept some or all daughters, sex ratios in the region were as
high as 400 little boys surviving for every 100 girls.

Public outrage against infanticide among nineteenth-century Britons back
home led to the anti-infanticide laws of the 1870s. British colonial legislation
reduced infanticide but did little to alleviate the often lethal neglect of girls
who survived. When a nineteenth-century British official asked a landholder
from Uttar Pradesh why the majority of Rajput families continued to elimi-
nate their daughters in spite of British laws against it, his reply was to the
point: “The father who preserves a daughter will never live to see her suitably
married, or [else] the family into which she does marry will perish and be ruined." The man then went on to itemize specific cases confirming his point that "those who preserve their daughters never prosper" and end by losing their land.  

In a world fraught with ecological peril, recurring droughts, famines, and warfare, the best hope for long-term persistence of a lineage was concentration of resources in a strong, well-situated male heir with several wives or concubines. If family circumstances make this tactic doubtful, a daughter or two provide insurance against total extinction of the family line. If a family is truly wretched, the best it can hope for is that daughters will be able, as slaves, wives, or concubines, to move up the social scale into positions where their children might possibly survive. Such systems did not originate because men sought to sire as many offspring as possible, although many did. Rather, the goal—both subliminal and consciously stated—was to ensure that at least some of their own lineage, "honor" and advantages intact, were represented in subsequent generations. Ultimately, this conservative course tended to prevent local extinction of the family, and in that way was correlated long-term with lineage survival.

From turbaned warriors on the dusty plains of Rajasthan to modern urbanites, we are endlessly fascinated by how families fare over time. Witness the worldwide popularity of such TV programs as Dallas, Falcon Crest, and Dynasty. Whether it is a television family or their own, people are easily drawn in. They want to know how different characters will fare in the high-stakes game of marriage, reproduction, and maintaining access to resources. Who will survive and prevail? Who succumb? People discuss such matters ad nauseam. Voyeurs and gossips weigh the merits of alternative solutions to each family's posterity problems. We are a species obsessed by strategies of heirship, and superbly equipped to devise them.

In nineteenth-century Rajasthan, where periodic droughts and famines were a certainty, survival of family lines required extreme measures. Heartless? Definitely. And ruthless. But prevailing rules for deciding which sex offspring will contribute most to family ends were devised over generations. Outcomes of successive trial and error, observation of the trials of others, imitation of those who succeed—these became codified as preferences for particular family systems. Adaptive solutions were retained as custom because families that followed these rules survived and prospered.
Ideology Alone Cannot Explain Sex Preferences
Sex preferences obviously have a lot to do with ideologies. Yet if genetic survival of family lines is at stake, evolutionists would expect a biological basis for the underlying emotions. They would also expect parents in other species to bias investment by sex as well.

Animals have no traffic with symbolism, gender constructs, or concepts like “old age insurance.” Hence it is sobering to discover that humans are not the only creatures shaping offspring sets to achieve particular compositions. When they can, many animal mothers bias sex ratios prior to conception, selectively abort fetuses, and differentially nurture sons and daughters. Humans are merely the only animals to do so consciously and to articulate reasons for their biases. Only the mechanisms differ. As Aldous Huxley put it: “Ends are ape-chosen; only the means are man’s.”

One difficulty with research on sex ratios is that unless the sample sizes are very large, it can be devilishly difficult to be sure that small fluctuations in the proportion of sons and daughters are not due to chance. Under a range of circumstances, birds, fish, reptiles, and mammals invest differentially in daughters and sons. It is instructive to take a closer look at the pattern of sex-biased parental investment in these other animals before returning to the question of why humans bias sex ratios as they do, using techniques as crude, cruel, and wasteful as many routinely do. Far more efficient mechanisms for biasing sex ratios prior to birth are evolutionarily feasible. Fig wasp mothers, for example, evolved the capacity to customize the sex ratios of their clutches. (See p. 65.) Somehow assessing which sex offspring will be reproductively most advantageous, the mother adds or withholds Y-bearing sperm as she lays each egg. When William Hamilton published his 1967 paper “Extraordinary Sex Ratios,” he launched one of the wildest and woolliest pursuits within evolutionary biology, known as “sex ratio theory.”

More “Extraordinary Sex Ratios”
In turtles, alligators, crocodiles, and many fish, a mother’s task is simple. Sex is not predetermined when the egg is laid but gradually crystallizes during embryonic development, determined by temperature or other environmental conditions. A mother American alligator, for example, ensures that most of her eggs hatch female simply by locating her nest in a sunny spot. If, on the other hand, she clammers ashore and lays her eggs in a shady part of the
beach, her eggs develop into males. In the case of some fish, like Atlantic silversides, the adaptive rationale for environmentally determined sex seems clear-cut. Fry released into the cool waters at the outset of each breeding season are always female, while those born later, after the water has warmed, are mostly male. In a world where big mothers will be more fecund ones, “his” and “her” time-sharing of the birth season means daughters born early have more time to grow big before they lay eggs. Biasing sex ratios in mammals is more complicated, and less well understood.

Skews in secondary sex ratios have been documented in mammals, but deviations from 50-50 are rarely so pronounced as in fish or wasps—with one notable exception, wood lemmings. These denizens of fir forests in Northern Europe have the most skewed sex ratios of any mammal known. Wood lemming mothers produce three to four times as many daughters as sons. Their secret is a curious alteration on the sex chromosomes that causes genes carried on the Y chromosome to remain unexpressed. In humans and other mammals, a female with just one X chromosome (denoted “XO”) would not be fertile, but for some reason, these “XY” lemmings exhibit female phenotypes and are fertile.

Just why such a capacity evolved is not known. Zoologist Nils Stenseth suggests that manipulative lemming mothers have adapted to reproductive cycles characterized by an inbreeding phase. Wood lemming sons in the past confronted the same local competition for mates that wasp sons confront when circumstances force them to breed with their sisters inside a fig. This very “dominant” X chromosome allows XY sons to be transformed into daughters.

Like other small arctic mammals, lemmings are prone to excesses, population explosions followed by population busts. In bad years, the population may crash. A pregnant female lucky enough to survive would find herself alone in a lemmingless land, with no females for her sons to mate with. What better tactic at that point than producing only as many sons as needed to fertilize daughters—like Hamilton’s fig wasps. Her grandchildren will move out to colonize a new wide-open niche.36

Wood lemmings are the only mammals with chromosomal sex determination known to bias sex ratios to such hymenopteran extremes. But more modest sex-ratio biases are widely documented, including spontaneous abortions that are sex selective—a surprise, perhaps, to anyone who assumes that abortions are unnatural.
Sex-Selective Abortion in Animals

Few funding agencies are interested in spending money to find out for sure if other animals bias their sex ratios. Fewer still feel compelled to study spontaneous abortion of daughters in aquatic rodents. Fortunately, though, governments are very interested in eliminating introduced pests. This is why Britain’s Ministry of Agriculture set up a massive program to trap coypu, large (10-kg) guinea pig–like animals brought to Europe from South America for fur breeding. When some of the coypu (also known as nutria) escaped, they proved as footloose as they were furry and prolific, spreading like kudzu weed across the marshlands of eastern England.

The coypu trapped in this pest-control program provided the first opportunity to test sex-ratio theory in free-ranging mammals. Hired by the government to eliminate his quarry, biologist Morris Gosling decided to inspect their innards in the process. He dissected 5,853 coypu. Of these, 1,485 had embryos old enough to count and to sex. Examining them, Gosling made the first of several startling discoveries.

Prior to fourteen weeks of pregnancy, a coypu uterus was as likely to contain a mostly male as a mostly female litter. Later in gestation, however, it was hard to find a mother pregnant with a small litter (of four embryos or less) that was anything other than mostly male. The only plausible explanation was that females carrying small, mostly female litters were spontaneously aborting them. Surprisingly, the fattenest females in best condition were the most prone to do so. Were these abortions really reproductive failures, Gosling wondered, or were they adaptive maternal management?

Et Tu, Coypu?

Late in her pregnancy, after week fourteen of her nineteen-week gestation, a particularly fat coypu carrying the “wrong” type of litter for her circumstances spontaneously aborts. By this point, she would have laid down fat stores needed to tide her through lactation. So what can a fat female at this stage gain by bailing out so late? What she gains is the opportunity to do even better reproductively in her next pregnancy. Instead of squandering a somatic windfall on a handful of daughters, she aborts and quickly conceives again—possibly conceiving a mostly male litter, or, failing that, at least a litter large enough to take advantage of being in such fettle.

“Abortion might be advantageous,” Gosling reasoned, if “it allows the female to transfer resources to a litter that is likely to achieve higher RS
[reproductive success].” Females in good condition who find themselves pregnant with small, mostly male litters, can count on producing especially large-bodied, competitive sons. But fat females pregnant with mostly daughters reap no special reward. Pregnant coyupu are somehow assessing their own condition, and aborting or continuing with pregnancies accordingly.37

It was an astonishing observation, but not totally unforeseen. Just over a decade earlier, in 1973, two graduate students, biologist Robert Trivers and mathematician Dan Willard, had published a paper in Science predicting Gosling’s result.

**Custom-Made Families**
The Trivers-Willard hypothesis states that wherever variation in reproductive success is greater for one sex than for the other, and where the reproductive success of individuals of that sex depends on maternal effects, then mothers in good condition should favor the sex with the greatest variance in reproductive success. Mothers in poor condition should favor the sex with the least. Under most circumstances, the sex with the greatest variance in reproductive success, and the one that benefits most from maternal advantages, is sons. This is why in a species like coyupu, mothers in good condition should theoretically prefer sons (or else a very large litter), while those in poor condition should prefer daughters. Just how mothers might do this is a mystery. Some have speculated that sex ratios are biased prior to conception by different hormonal conditions in the mother and differential survival of X- and Y-bearing sperm inside the mother en route to the egg, or else through differential survival of male and female embryos38

In devising the theory, Trivers and Willard actually had large mammals, like deer or caribou, in mind. A male deer whose mother was healthy and well fed would grow into a particularly large and competitive stag, able to out-compete and exclude rivals born to mothers in poor condition. The mother of a noncompetitive son would be better off producing a daughter: even a hind in poor condition should be able to conceive and pull through at least some offspring.

Today, the logic of Trivers-Willard has been found to predict sex ratios at birth among animals ranging from the noble red deer of Scotland to pudgy possums ambling about on the forest floor of Central America, not to mention footloose coyupu everywhere. The hypothesis even explains the near complete specialization in daughters by low-ranking spider monkey mothers in
The Trivers-Willard hypothesis seemed to explain sex-biased termination of pregnancy in coypus.

Peruvian rain forests. It applies when the main determinant of reproductive success is access to females. But what happens when the critical factor is not access to mates but resources? What if offspring of one sex are better than the other at protecting a territory, or converting its resources into reproductive success? What if offspring of one sex do more than the other sex to enhance or protect the value of local resources at the parents’ disposal—known as “local resource enhancement”? Today the classic demonstration of biased production of daughters or sons depending on which sex most enhances the value of parental resources derives from a remarkable study of a rare species of bird known as the Seychelles warbler.

The Seychelles are a motley group of islands in the western Indian ocean, some rocky and waterless, others lushly tropical. These islands provide the natural “laboratory” that permitted Dutch ornithologist Jan Komdeur to prove conclusively that bird parents adjust sex ratios, producing offspring of the sex most likely to enhance the family’s situation, depending on the circumstances prevailing when they hatch. These birds clinch the case that animals can custom-tailor their families.

Up until 1988, the entire world population of Seychelles warblers was confined to a single island. Three hundred and twenty perky, white-chested little birds the color of cinnamon toast had saturated locally available habitats on that island. Breeding pairs were spread out in territories, where they remained for up to nine years, producing a clutch once a year, usually just one egg per clutch. Although warblers can breed in their first year, daughters remained where they were born, helping parents catch insects to feed
younger siblings. When this allomother was removed, reproductive success of the parents went down. But there is a catch.

If insects are scarce, having helpers around who compete with their parents for sustenance is more a liability than an asset. In line with this calculus, parents on poor territories who do not benefit from having helpers produce mostly sons (who are not inclined to stick around). Noticing this, the researchers decided to experiment. Parents were transplanted to new territories under controlled conditions.

Warbler pairs placed on food-rich, wide-open territories could presumably afford “au pairs.” As predicted, 87 percent of these privileged parents produced daughters, the sex most inclined to stay and help out. Of parents placed on poor territories, only 23 percent had daughters fledge. How? Not known. One possibility might be that the birds use some sort of “starting rule”—incubating eggs of the “right sex” but abandoning nests containing the wrong sex and starting over. This much is certain: Seychelles warblers are adaptively configuring offspring sets in response to family history and local conditions just as surely as some human parents are. It is unlikely, however, that the mechanisms in humans are the same. Rather, there appears to have been selection on the human psyche for general decision rules that produce outcomes similar to those physiologically produced in other animals. Far from locking parents into some preordained response, however, a biological basis for these preferences should make parental attitudes toward sons versus daughters imminently changeable. By now, this claim will seem curious only to readers who still assume that evolved traits are necessarily immutable—which they are not.

**When the “Rules” Themselves Are Contingent . . .**

The perennial question “which sex to produce” can be mind-boggling, especially in such flexible primates as baboons and macaques, “weedy” species like humans are, readily adapting to diverse habitats. As in all the well-studied Old World cercopithecine monkeys, baboon and macaque daughters inherit rank from their mothers. Because daughters remain nearby, it behooves a high-ranking mother to produce the sex that will benefit most from her own status, as well as bolster matrilineal interests by supporting kin (another form of local resource enhancement). In habitats like Amboseli, where food is scarce, high-ranking mothers do just this—they overproduce daughters. The same pattern can also be documented for some populations of macaques.
Year after year, mothers in the highest-ranking matriline consistently produce significantly more daughters than sons, while low-ranking females produce few daughters and more sons. Low-ranking females not only produce few daughters, but such daughters as they do produce are more likely to die than are sons born to mothers of equivalently low rank. Based on captive studies of bonnet macaques, Joan Silk showed that whereas sons who depart their natal group can leave the disadvantages of their mother’s low rank behind, daughters cannot. In her study, no daughter born to a low-ranking mother managed to produce a single surviving offspring. When competition for local resources is intense, a daughter born to a high-status mother is the right sex in the right place at that time.42

Recall that among the baboons Jeanne Altmann studied at Amboseli, infants have a 25-percent chance of dying during each of the first two years of life. But if that baby is a daughter born to a high-ranking mother—the “right sex”—the baby’s survival chances go up twofold, and are higher than survival chances for a son born to a mother of the same status. Such daughters also breed sooner. On average, mothers who get the sex right contribute an extra half-grand-offspring to the next generation. Mothers at Amboseli produce no more than seven offspring in their lives, of which on average only two survive. Given how little these baboon mothers have to show for a lifetime spent producing and carrying babies, such bonuses add up.

Generation after generation, cumulative reproductive advantages mean that mothers in these matrilineal systems compete for more enduring stakes than the isolated copulations males fight over. A male who hitched his reproductive star to a successful matriline by siring a daughter in one, secures his ticket to posterity. Similarly, if a male’s mate is a subordinate female, both parents benefit from son production. Lowborn sons, like poor country boys, strike out for distant opportunities, leaving natal disadvantages behind. But in some cercopithecine monkeys like macaques, there is another reason for subordinate mothers to bias toward sons. Females from dominant matriline maliciously harass daughters born to competing mothers, sending a not so subtle message: “We may tolerate your sons for a time, but your daughters—who will be permanent residents—are not welcome.” These bullies inflict much wear and tear on low-ranking mothers, especially those carrying daughters. Silk hypothesized that such penalties imposed upon low-ranking mothers who produce daughters has led to selection on subordinate mothers to either avoid conceiving, or avoid gestating, daughters.43
Yet even this sophisticated calculus is not the whole story. When environmental conditions change, the mother macaque or baboon pulls out a new rule book.

... and the “Wrong” Sex Shall Become the “Right” One

Year after year the evidence grows stronger that in habitats like Amboseli, daughters are a liability to low-ranking mothers. Sons offer the best prospects. Yet researchers elsewhere document different patterns. In some baboon and macaque populations, no effect of maternal rank on sex ratios is found at all. Others exhibit the mirror-image of the Amboseli pattern, with high-ranking mothers overproducing sons, low-ranking ones daughters, just as Trivers and Willard predicted.\(^4\)

Different teams of researchers were reporting different patterns, each group suspecting the others must be getting it wrong. Those who found no statistically significant differences assumed that the other two groups were infected by “sex-ratio fever” and in their theoretical delirium were imagining patterns in what was only random variation.

In 1991, Carel van Schaik and I were among the primatologists swept up in what we jokingly referred to as the “wild, wild world of sex-ratio research.” What if, we wondered, the researchers weren’t wrong. What if the monkeys were changing the rules? We noticed, for example, that it was the macaque and baboon populations from wide-open habitats with plenty of food and room for expansion that were least likely to conform to the “Amboseli pattern.” Outright reversals of that pattern (with high-ranking mothers overproducing sons, low-ranking ones daughters) were most often reported in large outdoor breeding colonies where the combination of ample food and space contributed to very high birth rates. (Producing babies, after all, is what breeding colonies are for.) This is when it occurred to us that under ecological conditions conducive to rapid population growth, the differences in male and female reproductive potential so critical to the logic of the Trivers-Willard hypothesis become relevant. At this point, a mother’s determination of the optimal sex of offspring for her circumstances does a flip-flop.

We reasoned that in rapidly expanding populations, where both high- and low-ranking females can successfully breed, the greater reproductive potential of sons born to mothers in good condition takes priority over the enduring value of advantageous maternal rank. Under the arduous conditions at
Amboseli, matrilineal access to scarce resources is the mother’s top priority. But in high-growth populations, monkey mothers march to a different drummer, depending on whether the most important factor limiting the breeding success of their offspring will be access to resources or access to mates.

**What Keeps Human Sex Ratios Nearly Equal?**
The existence in animals, especially other primates, of heretofore undreamed-of capacities to adjust their production of sons versus daughters in adaptive ways raises an awkward question. Given long-standing biases in favor of a particular sex, why hasn’t natural selection led to subsets of human mothers who adjust to variable local conditions by automatically producing the desired sex? The existing system is not only cruel (which is not relevant to Mother Nature), it is wasteful (which is).

If it is possible for selection to act on mothers to bias sex ratios at birth, why stop with a paltry six extra sons per hundred daughters? In populations where from time immemorial parents have discriminated against daughters, why don’t we see sex ratios at birth in the vicinity of 200:100? This would save parents much wasted effort: all the energy, the opportunity costs, the time and risk of a pregnancy to produce a baby her parents won’t even keep. Why, then, are human sex ratios at birth so nearly equal, roughly 51 percent male, 49 percent female?

When biologists are asked why sex ratios consistently hover conservatively close to parity, more likely than not they will invoke “Fisher’s principle of the sex ratio.” This time-honored axiom of population genetics explains why roughly equal numbers of the two sexes are produced among so many species of birds and mammals. In the 1930s, British biostatistician Sir Ronald Fisher reasoned that so long as producing sons costs the same as producing daughters; and so long as outbreeding prevails (that is, brothers don’t breed with sisters, as fig wasps do); and so long as all individuals have roughly the same opportunity to breed (a big if, as it turns out); then parents should allocate equal investment in sons and daughters.

Imagine a population in which certain parents specialize in one or the other sex. Let’s say most mothers produced sons. As offspring mature, they will breed in a lopsided world, top-heavy with males. Too bad for the sex in excess. Although every scarce female will get to breed, only a random subset of males will manage to. Too bad also for the parents that overproduced sons,
because, on average, son-producers will be penalized by having fewer grandchildren. The mother lucky enough to produce daughters, on the other hand, will be rewarded by disproportionately more grandchildren—at least temporarily.

Over time, natural selection should favor parents that produce the rare sex, with the predictable outcome—a glut of daughters. Once again, the sex ratio should gravitate back to favor son-producers. And so it goes, the pendulum swinging first one direction, then the other, favoring first daughter-producers, then son-specialists. The outcome, according to Fisher, is a population with more or less equal numbers of sons and daughters.  

Fisher’s principle is the conventional explanation for why wildly skewed sex ratios evolve only under special conditions. But such special conditions turn out to be not so unusual. Supposedly, Fisher’s principle explains why most human sex ratios are only as mildly skewed as they are. The reasons slightly more sons are born on average is that males are more vulnerable (both in utero and in infancy) to dying before the end of parental investment; thus, by producing slightly more of them, parents are merely equalizing investment in sons and daughters.

Yet other animals—baboons and macaques, for example—deviate from Fisherian equality when one or the other sex costs less or provides a bigger reproductive payoff. Why don’t humans?

It is possible, of course, that the phenomenon occurs but has somehow gone undetected. For example, if parents biasing toward sons were lumped with those biasing toward daughters, the average sex ratio would come out 50-50. Indeed, deviations from the expected, approximately equal, human sex ratios at birth are sometimes noted. Occasionally groups surface with spectacularly high sex ratios that cannot be attributed to differential neglect or infanticide. These may (or may not) have to do with customs that affect the timing of conception. Furthermore, every so often geneticists stumble on a rare pedigree, such as the English family that for ten generations produced daughters in 32 of 35 births, or the French family that produced exclusively daughters (72 of them) over three generations. Yet these could be explained as chance occurrences.

Massive screening has unearthed only a handful of deviant cases, and none so extreme, nor so precisely calibrated to reproductive possibilities, as the wildly biased sex ratios readily located among wasps, wood lemmings, war-
tions that for generations have lived in an unprecedented state of ecological release, freed from concern about famines. Continued survival of such parents and their children rarely depends on choices mothers make about how much food to allocate to one child versus another. But not all mothers are so fortunate. Daughters not only offered the only prospect for upward mobility, in many cases they provided the only possibility at all of continued survival of a family line.

In parts of the world where drought and famine are recurring hazards, the landless and dispossessed invariably have the worst chance of making it through. Under such harsh circumstances the likeliest survivors will be offspring of mothers who marry into families with access to resources, like arable land. Hypergamy (girls marrying up) is not a fluke. It was a long-standing necessity for lineage survival. Nor can it be denied that decisions leading to it have genetic outcomes.

Centuries of hypergamous mating have left a trail of genetic markers, like breadcrumbs through the forest of the Indian caste system, documenting the different paths followed by the two sexes as they married and produced offspring. An examination of genetic traits carried in mitochondrial DNA (DNA found in somatic and egg cells but not in sperm), which is transmitted only from mother to offspring, showed that these mother-transmitted traits are spread widely beyond traditional caste boundaries. For centuries, they have been carried by brides and concubines moving up in the world by marrying into higher-caste families. By contrast, paternally transmitted markers, traits passed from father to son on the Y chromosome, are less mobile. Father-transmitted traits remain localized, rarely spreading beyond the caste where they originated. This may be one reason why male traits are more vulnerable to extinction than those carried by mothers. Thus do customs previously viewed as purely cultural have profound demographic and genetic consequences, as well as deep roots in human motivations and their decision rules regarding children.

**Human Nature and Human History**
The earliest evidence for sex-biased infanticide derives from the DNA of baby skeletons—all less than two days old and without apparent defect—excavated from the sewer of an ancient brothel in Roman Ashkelon on the southern coast of modern Israel. Fourteen of the nineteen victims of what
archaeologists suspected was infanticide were male. If their mothers were indeed prostitutes, one assumes they came from the lowest rank of society: daughters but not sons of these women would have value. A preference for sons among elites mirrored by a preference for daughters among the dispossessed is a pattern that still persists. Daughter preference can still be documented today among Hungarian Gypsies and other disadvantaged groups. Consider what happened with the late 1980s fall of communism. Across eastern Europe, economies and social services were disrupted, leading to an increase in both misery and unwanted pregnancies. Not surprisingly, the incidence of neonaticide has increased, but with an unusual twist. Prior to 1990, sons and daughters were about equally likely to be killed. After 1990, Slovakian researcher Peter Sykora documents that the victims are disproportionately male—21 of 27 in the neonaticides in his sample.55

Large chunks of Western history can be understood only by paying attention to such patterns. Human fates can be read as artifacts of differential treatment of offspring by their parents. Which sons inherited land and continued dynasties, which departed instead to colonize new worlds. Which offspring were predestined to live out their lives in monasteries (or in convents), which daughters were dowered and sent off to distant kingdoms. Nowhere is this point better made than in the writing of the archaeologist and social historian James Boone.

Using medieval Portuguese genealogies, Boone traced the fates of sons and daughters among both the elites—royalty and landed gentry—and those who served them, bureaucrats and soldiers, over a two-hundred-year period (from 1380 to 1580). Dukes and counts at the highest social ranks left more surviving legitimate offspring (4.7 offspring on average, with no reliable counts for illegitimates) than did cavaleiros and military men below them (2.3 legitimate children on average). For both sexes, firstborn offspring fared better. Later-born sons fought in the Crusades farther from home, stayed away longer, and were more likely to die in far-off places like India than first-born sons, who often went no farther than Morocco and soon returned to marry and take over family holdings.

Redundant daughters were similarly banished, not to distant lands, but to convents. Italian novelist Alessandro Manzoni provided an apt description of this predestined castration in his description of the proud Milanese patriarch who “destined all the younger children of either sex to the cloister, so as
to leave the family fortune intact for the eldest son, whose function it was to perpetuate the family.” This practice brought great unhappiness to younger offspring of both sexes.

In his 1827 epic I promessi sposi (The Betrothed), Manzoni sums up the plight of a later-born daughter:

Still hidden in her mother’s womb . . . her state in life had already been irrevocably settled. All that remained to be decided was whether it was to be that of a monk or a nun, a decision for which her presence but not her consent was required.\textsuperscript{56}

Among Boone’s medieval Portuguese, between 10 and 40 percent of daughters at any given time were cloistered in convents. Elite daughters who married produced an average of 3.7 children, about the same as the number (3.3) of surviving children left by sub-elite women, many of whom had moved up the social scale when they married. Overall, the reproductive success of daughters born to lower-ranking families was higher than that of their brothers, while at the top of the hierarchy—as among the north Indian Rajputs—the reverse was true. When Boone fed these data into his computer to simulate how this situation would play out through time, elites produced significantly more grandchildren in the third generation through sons than daughters, while lower ranks did better with daughters than sons.\textsuperscript{57}

\textbf{Among “The Despised Ones”}

It was reversals of fortune such as these that attracted the notice of anthropologist Lee Cronk when he went to Kenya to study the Mukogodo. Cronk’s study is unusual, because he specifically focused on those on the lowest rungs of the local ladder.

The Mukogodo are former foragers pressured by economic necessity to attach themselves as a disadvantaged “subcaste” to Masai pastoralists, adopting Masai language and values but never achieving equal status. Locally, the name Mukogodo means “the despised ones” or, more literally, “poor scum.”

As is typical among pastoralists, the Masai prefer sons. The Mukogodo, who emulate them, \textit{claim} to as well. But the actual behavior of Mukogodo mothers and the sex ratio of their offspring (there are about 67 little boys for every 100 girls) tell a different story. Mukogodo mothers breast-feed daughters longer than sons, and are more inclined to pay to take a sick daughter
than a sick son to the medical clinic. Partly for this reason, daughters are healthier and more likely to survive than sons.

Out of this strange union of two cultures has emerged a hypergamous marriage system structured along the lines Dickemann identified in the rigidly stratified clans of precolonial Rajasthan: women flow up the hierarchy, with daughters preferred over sons at the bottom. Because so many Mukogodo women become primary or secondary wives to Masai up the social scale, many Mukogodo men, with smaller herds of livestock to draw on for bride-price, have difficulty obtaining wives at all. With so many Mukogodo sons growing old childless, their average completed fertility is below that of the average Mukogodo daughter. It is not possible to know for sure which mothers value more, the material benefits daughters bring, counted in livestock, or the grandchildren; but my guess is that over evolutionary time the two were so intertwined as to make them inseparable so far as a mother's internalized preferences for different offspring are concerned.

**Economics of Daughter Preference**

Outright daughter preference is unusual, but not necessarily confined to the disadvantaged. Among the matrilineal Tonga people of southern Zaire, daughters are essential for perpetuating the *basimukoa*, or matrilineage. The more prosperous the matrilineage, the more pressure to bear daughters. Not surprisingly, there are two cries of joy at the birth of a baby girl, only one for a boy. Too many sons, and the mother comes in for criticism from kin. More to the point, males die in childhood at far higher rates than females. Of recorded births, only 92 boys are reported for every 100 girls. When twins of mixed sexes are born, the boy is neglected, and more likely to die. Same-sex male twins die at five times the rate of singletons, suggesting that parents do not go out of their way to keep them alive.

Sometimes parents, even those living in areas with a long tradition of son preference, come to prefer daughters because women have found a special economic niche for themselves. This is the case with daughters born on the island of Cheju Do, off the coast of South Korea. Cheju Do is renowned for its women abalone divers, called *haeyno*. Because this occupation is relatively well paid, daughters provide more security than sons. When a woman on Cheju Do learns she is pregnant, she prays for a girl. Financial independence of these women has also led to the highest divorce rate in Korea. In this respect, Cheju Do has come to resemble some Western countries where fami-
Families are in transition between long-standing patriarchal traditions and brave new worlds where legal protections along with economic opportunities for women mean they can afford to survive and rear a family with or without a male provider.

**Fine-Tuning Family Configurations**

Parents can be remarkably specific in their requirements for certain offspring sets. There are time-honored traditions specifying which sex stays or inherits, which leaves empty-handed or marries out with a dowry instead, which child lingers on as a celibate spinster baby-sitting for the designated heir.

In many areas of Asia, the ideal family is composed of two to four sons and one or two daughters. Thus, it should not surprise us to occasionally encounter “missing boys” along with all the missing girls—albeit not in such vast numbers. Anthropologist G. William Skinner was among the first to predict and document just such a pattern to missing children. In his most recent study of census data from China’s lower Yangtze region, Skinner and co-worker Yuan Jianhua documented 1.2 million missing girls, mostly higher-birth-order daughters, but also some 60,000 missing boys, mostly from families that already had several sons.

Culturally mediated parental preferences can play out with chilling predictability. Studies of child survival among villagers in the Punjab and in Bangladesh make it clear that it is not just daughters in these families that are at risk, but daughters with one or more older sisters. In one village in Bangladesh, such daughters have a 90-percent higher chance of dying before the end of childhood than do girls without any older sister. A boy with the bad luck of being born after two or more older brothers has a 40-percent greater chance of dying than an only son does.61

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Parental commitment to offspring can depend on how nearly the child’s sex and birth order conform to a desired norm. Among the first to empirically demonstrate this was sociobiologist Paul Turke, in fieldwork among Pacific islanders on Ifaluk Atoll. Daughters among these fishersfolk are more productive than sons. They also help parents to rear younger siblings more than sons do. No wonder daughters are preferred. Parents who achieve the ideal configuration, producing a daughter first and then a son, were better off and
reared more surviving offspring than those whose firstborn child was male. Overall, mothers who bore a daughter early in their reproductive career had higher lifetime reproductive success than women who bore a son first. 62

In patriarchal societies in saturated habitats, such mild preference for an initial daughter may be taken to extremes. Among eighteenth- and nineteenth-century farmers on the Nobi plain of Japan, the ideal pattern of “first a girl then a boy” has a name: *ichihime nitari*. Sons are the preferred sex, but if they can, parents arrange things so as to have a little allomother on hand to help rear the primary heir, to make sure he is as healthy and good as he can be. 63 Parents were not above loading the demographic dice in an astounding gamble. Those young enough to be confident of plenty more chances to try for a “jackpot” configuration might eliminate even the much desired son if he happened to be born first, thus enhancing the odds of achieving the ideal *ichihime nitari*. Thereafter, parents in Tokugawa Japan used infanticide to space births and—if conditions were sufficiently auspicious—to achieve as nearly as possible an ideal configuration of well-spaced, gender-balanced offspring with a fully qualified firstborn son coming of age just as his father was ready to retire. 64 Clearly, the “mania for sons” was never so simple as an across-the-board preference for male children, solvable by an across-the-board biasing of the sex ratio.

**Why Humans Bias Investment After Birth**

Humans, like other animals, use flexible “decision rules” to bias investment toward daughters under some conditions, toward sons under others. But unlike a mother wasp, who sizes up demographic prospects and then commits herself to producing mostly daughters or mostly sons, humans with very few exceptions leave the matter open until after birth. Then they evaluate contingencies like birth order, offspring quality, available assistance, even inheritance prospects. Given the importance of history and how extraordinarily flexible human breeding systems are, and how variable the environments in which they live can be, parents with innate propensities to produce one or the other sex would have been wrong as often as they were right. 65

Where environmental conditions, marriage and residence patterns, or laws can change on short notice, the better part of evolutionary valor is to postpone irrevocable decisions till the last feasible moment. Conscious strategists constantly update information about local prospects for sons versus daughters. Chronic tensions between maternal and patrilineal interests
Western folklore about sex determination could fill volumes. The Greek philosopher Anaxagoras believed that the left and the right testes differed, so that by tying off the weaker (left one) a man increased the odds of a son. Aristotle recommended facing north during sexual intercourse, because he believed a cold southern wind would induce conception of daughters. For the more literal-minded, homespun recommendations for siring sons prescribed wearing boots to bed.

Not all of this is ancient history. Eschewing such folklore, New Yorkers in the 1960s turned to Dr. Landrum Shettles, who prescribed a regimen of vinegar douches to privilege X-bearing sperm, a douche of baking powder to promote the fortunes of Y-bearers. Shettles was followed in the 1980s by his West Coast counterpart, physiologist Ronald Ericsson, founder of Gametrics Ltd. of Sausalito, California. Ericsson promised parents sex selection using a special technique to separate faster Y-bearing sperm from the more sluggish X-bearing ones. He advertised his central premise with vanity license plates.
on his car that read "X or Y." There was even a brief period when North Americans could go to a drugstore and pick up a "Gender choice child selection kit" for $49.95, complete with thermometer and paraphernalia for monitoring vaginal mucus, to determine precisely the moment for conceiving a son or daughter. When the U.S. Food and Drug Administration decided that claims implied by pink and blue advertising on the box were not substantiated, the kits were pulled off store shelves. Today, prenatal sex testing is widely available in the West. Anyone determined to use it for sex selection can manage to do so without breaking any laws.

This chapter began with sex-selective infanticide in China. I am not immune to the distress this stark topic generates. All the more reason for dispassionate analysis. For humans are, above all, resourceful creatures. They do not readily abandon self-interest for the common good, or for someone else's good. Humans do not easily, and without good cause, abandon the nepotistic urges that brought us from a paltry ten thousand souls a few hundred thousand years ago to the six billion on Earth today. Philosophizing about topics like whether humans have free will (and if so, how to employ it) is far removed from the daily concerns of most humans.

It is the common humanity of the parents that is at stake here, not ethnic or cultural differences. Those who would rush to Beijing to deliver passionate diatribes would do well to maintain some historical perspective. While Chinese infanticide rates have declined dramatically since the nineteenth century, during that same period rates of child abuse, neglect, and infanticide have skyrocketed in countries like the United States, although sex of the offspring has relatively little to do with it.66

Infanticide in China is already illegal. Since 1987, laws against disclosing the sex of a fetus to parents who might subsequently practice sex-selective abortion make Chinese laws related to sex-selective abortion tougher than such laws in the West. It is hard to see, therefore, what sense there would be to additional legislation making preferential female infanticide or sex-selective abortion more illegal in China than it already is. Incentives are liable to be more effective than prohibitions. The most effective remedy may be widely available contraception for birth spacing combined with educational
and employment opportunities that create attractive futures for daughters, including scholarships and job opportunities that will benefit their families. Countries convinced that mandatory birth control is essential for the long-term welfare of their people might want to consider special vouchers for daughters-only families—good for extra grandchildren.